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Epidemiology and the Future of World Health

The following article reproduces the Robert Cruickshank Lecture given by Dr. Hiroshi Nakajima, Director-General of the World Health Organization at the XII International Scientific Meeting of the International Epidemiological Association. Los Angeles, California, August 1990.

I am honoured indeed by the invitation to deliver this lecture today, in memory of the great Scottish bacteriologist and epidemiologist, Robert Cruickshank. Quite apart from his professional contributions to epidemiology and bacteriology, Cruickshank was undoubtedly an extraordinary human being. Permit me to quote from the *British Medical Journal* of 7 September 1974.

> "His knowledge was wide, his mind open. His concern for public health made him seek practical applications of pure science. His common sense clarified the complex and exposed the impracticable; his kindliness brought out the best in others; his friendliness and fairness resolved conflicts. These qualities, invaluable in committee, also made him a first-class teacher and editor. They multiplied his influence many-fold. This influence will live on and be propagated."

In 1945, when he became Director of the Central Public Health Laboratory in Colindale, near London, Robert Cruickshank realized the paramount importance of international cooperation in preventive medicine. We in WHO remember him as a close collaborator from the early days of our Organization, in numerous consultant assignments in a wide variety of subjects.

I am pleased to address you on a subject that would certainly have been a challenge to Cruickshank himself, *Epidemiology and the future of world health.* In a sense, I am expanding and developing ideas he himself put forward in his paper on *Measurements in medicine,* written in 1961 while serving as Lister Fellow of the Royal College of Physicians in Edinburgh. I quote:

> "My treatise deals with another form of measurement in medicine which, like the physical and chemical devices, has developed enormously in the past 50 years--I mean measurements of the extent and causes of sickness in the community and, as a corollary, community measurements of methods for prevention and cure. This puts the emphasis on numbers and statistics, but I must hasten to reassure you that I am no statistician or mathematician. Indeed, I still rather feel about statisticians what the

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French lady felt about ghosts. When asked if she believed in them, she said 'No. But I'm afraid of them'."

I intend to address four main questions:

1. What is the contribution that epidemiology has made to the state of the world's health today?

2. How can epidemiology help us to anticipate and meet the health challenges of the future?

3. How can advances in the epidemiological sciences be encouraged and utilized in the service of man?

4. What are the socio-ethical implications of epidemiological studies?

In earlier times, epidemiology was conceived, literally, as "That branch of medical sciences which treats of epidemics"[1]. Thus epidemiology originated in response to a need to understand and control the highly infectious epidemic diseases, such as cholera, plague, smallpox, and yellow fever. It was only with time that appreciation grew of the fact that *all* conditions of disease and ill-health are interrelated, and that the emerging science of epidemiology provided the tools for helping to understand the major factors underlying these issues as well.

International health work also began with a concentration on infectious disease, and then moved towards a wider concept of health as part of overall development. The roots of the World Health Organization, as an international health agency, go back to efforts in the last century and early in this century, particularly to the Rome Agreement of 1907 establishing the Office International d'Hygiene Publique, with the express purpose "to combat infectious diseases". The progressive shift of the concept of health, from the prevention of infectious diseases to health as "A state of complete physical, mental and social well-being and not merely the absence of disease or infirmity", is reflected in the successive evolution of the Pan American Sanitary Bureau, founded in 1902, the health services arm of the League of Nations founded in 1918, and finally the World Health Organization, founded in 1948.

Epidemiology, even in its more restricted sense, has served WHO and the cause of human health very well. It has provided the tools for better understanding the incidence, prevalence, natural history, causes, and effects of control and other measures, that are relevant to each of the communicable disease control programmes of WHO. More than this, the epidemiological sciences have enabled us also to understand noncommunicable diseases such as cancer, cardiovascular diseases, and genetic disorders. In the area of primary prevention this understanding has allowed for intervention before the onset of disease.

Let me take the example of smallpox. In the 1960s and 1970s, WHO was perhaps best known for its efforts to orchestrate the international eradication of this dreaded disease from the face of the earth. The importance of eradication was recognized in the 1950s, leading to formal declaration of the goal of worldwide eradication in 1965. Thanks to extraordinary international collaboration, smallpox was declared finally eradicated in 1980. We owe this remarkable triumph largely to epidemiology! Let me explain.

To eradicate smallpox, we had the vaccine and the political will to succeed. But conventional wisdom held that we would have to reach 100% vaccination coverage; otherwise the last unreached infected person, somewhere in the world, would start the transmission cycle all over again. And we knew that 100% vaccination coverage at that time was impossible. But our epidemiological analysis of the natural history of the disease suggested something else: if we could cover 80% of the population, maintain surveillance, and track individual cases to contain outbreaks, the smallpox virus, like the dinosaur, would become extinct. Epidemiology gave us the courage of our convictions, and history has proved us right. Such an approach is being used for other infectious diseases, such as poliomyelitis and hepatitis B infection.

Let me take another, more current, example--Acquired Immune Deficiency Syndrome, or AIDS. We owe to epidemiology the discovery of this disease! AIDS was first recognized as a disease in 1981, before the HIV virus was identified about two years later, or even suspected as the causative agent of AIDS. Epidemiological observation noted the prevalence of a curious and inexplicable combination of clinical manifestations of *other* diseases conditions: asthenia, weight loss, dermatoses, impaired immune system and Kaposi's sarcoma, as well as the presence of "opportunistic" infections, such as *Pneumocystis carinii* pneumonia. Even today, it is this kind of complex of clinical signs, together with the HIV-positive test result, that defines a "case" of AIDS. You can be HIV-positive and still not have AIDS. Furthermore, it was through epidemiological analysis that the syndrome was correlated initially with certain population groups and associated risk-taking behaviours. If we look at AIDS as a worldwide epidemic, it seems to be something new and sudden, but if we look at AIDS as a disease, and at the virus that causes it, we find that neither is new; they date back at least to the 1950s. It took the tools of epidemiology to tell us we were faced with a discrete, deadly disease.

Even today, our understanding of the three possible routes of AIDS transmission--namely through blood, through sexual contact and from mother to fetus--is derived more from epidemiological evidence than from a strict understanding of the internal mechanisms of the virus itself--although we know a great deal about this as well. Current AIDS control strategies are based on this knowledge. The WHO Global Programme on AIDS is promoting careful epidemiological research, placing particular emphasis on the study of blood, sexual, and mother to fetus transmissison of HIV-1 and HIV-2, to serve

[1] *The Oxford English Dictionary* (1989).

as a basis for the further development of prevention strategies. Unlinked anonymous testing of individuals, and rapid assessment techniques, such as sentinel surveillance, the Delphi method, and the "syndromic" case definition approach to cross-sectional studies, are being promoted by WHO in an effort better to track the secular trends in AIDS and HIV infection. It is estimated that there are between 8 and 10 million people already infected with HIV. Epidemiological experience suggests that half will develop AIDS within ten years, and most of these will die. When you consider the average cost of the life-long treatment of an AIDS patient, and multiply it by several million, it is clear that, in the next decade, AIDS will place an immense burden on health care services, health insurance, and public and private sources of financing. Meanwhile, new cases of HIV and AIDS are being reported every day. Epidemiological trend analysis teaches us not to be complacent about this terrible disease. Trend analysis warns us that the money spent today on successful health education to promote healthy behaviour, and on research to develop an effective drug or vaccine, will result in savings many times over tomorrow, not to mention the price in human suffering.

WHO has a constitutional responsibility for the global epidemiological surveillance of disease. It receives information on outbreaks of communicable disease and distributes this information by telecommunication and printed bulletins throughout the world. You are all familiar with the WHO *Weekly Epidemiological Record.* The WHO system of international epidemiological surveillance provides countries with access to information. This includes the countries that otherwise would not be able to communicate directly with each other. WHO is responsible for the *International Health Regulations,* the *International Classification of Diseases*, and a great many international standards, which make international epidemiological comparisons possible. As you know, WHO publishes the *World Health Statistics Quarterly*, the *World Health Statistics Annual*, the *World Health Situation* report, and other publications of an epidemiological nature. But my purpose today is not to tell you about WHO's information services. My purpose is to show how new developments in international health work are placing an enormous demand on epidemiology, in the wider sense meant by Professor Cruickshank.

Ladies and gentlemen, 13 years ago, the Thirtieth World Health Assembly decided that the main social target of governments and WHO in the coming decades should be health for all by the year 2000. One year later, in 1978, at a major international conference at Alma-Ata, primary health care was declared to be the key to attaining this goal, in the spirit of social justice. The policies and strategies for "health for all" have subsequently been defined by the World Health Assembly at international level, and by each country at national level, in the light of its own health and socioeconomic situation. Furthermore, WHO's Member States have committed themselves, with the Organization, to monitoring progress towards, and evaluating the attainment of, this common goal, using a basic set of global indicators, in addition to those applicable within each country. For the first time in the history of international health work, an epidemiological framework is being applied on a global scale. The implication is that the science of epidemiology must be applied for strategic health planning and evaluation, in a systematic manner, in practically all countries of the world, for national and international health development purposes. This is particularly important for the developing countries and for some of the socialist countries of eastern and central Europe where data are either not available or otherwise not reliable.

The health-for-all monitoring and evaluation process is intended to establish a baseline of current health and socioeconomic conditions, against which progress towards defined targets and objectives can be measured. Periodic measurement should establish trends that will permit us to anticipate future conditions, and to start planning for them in advance. The three cycles of monitoring and evaluation of the health-for-all strategy that have taken place so far, make us optimistic that the information obtained can be used to reorient national and international priorities and directions for health development work, on the basis of sound epidemiological evidence, reported by countries with honesty.

This brings me to a further conclusion on the nature and use of epidemiology, with which Professor Cruickshank would surely agree. Epidemiology is not limited to assessment of the *existing* (or past) health and socioeconomic situation. If we accept Professor Cruickshank's wider view, we have to place the accent on *future* trend assessment, i.e., "prospective epidemiology". The question is, what do current trends tell us about the likely future situation, for which we have to plan and take corrective action (or inaction), what will be the likely outcome tomorrow? Thus we are seeing the emergence of a new dimension in the science of epidemiology, which will be of major relevance to health planning, resource allocation, management and evaluation, and potentially will affect the future course of human history.

Have I overstated the case for epidemiology, and in particular for the role of future trend assessment in health planning? I think not. To further make my point, let me mention a few examples, drawn from the health-for-all monitoring experience. The source data are widely published. My intention is to highlight a few salient aspects.

At first sight, the information obtained is encouraging. People are living longer. Infant mortality rates are down, immunization coverage is up. Many communicable diseases are coming under control. Urban and rural water supply services have increased. Literacy is on the rise. Global productivity is still advancing.

But on closer analysis, the picture is not so rosy. In spite of overall technological progress, especially in the developed world, the data show that, for the majority of the population in many developing countries, the basic conditions for health, socioeconomic development, and daily living, remain unacceptable. In these areas, the gap between the rich and the poor is widening, rather than narrowing. In some countries of eastern and central Europe specific situations are being observed: life expectancy has decreased, infant mortality has increased, as has maternal mortality because of abortion practices, and at the same time the high consumption levels of alcohol and tobacco have resulted in an increased incidence of noncommunicable diseases.

However, while in general people are living longer, with life expectancy at birth averaging about 62 years of age, the difference in life expectancy between rich and poor remains significant for both men and women. On average, people in developed countries live about 14 years longer than those in developing countries. By the end of the 1990s, the world's population will increase by about one thousand million, or by 20% over the present 5.3 thousand million. The average birth rate is far higher in the lesser developed countries, and among the poorer populations, than in the industrialized nations and among the more well-to-do. Already we see food shortages and malnutrition among the less privileged populations. The external debt of Third World countries exceeds their capacity to pay, and their prospects of catching up with these social burdens are, at best, uncertain. If these trends continue, what will be the situation by the year 2000?

In 1990, nearly 10% of the world's population is over 60 years of age. By the year 2000, the majority of the world's population aged 60 years and over will be living in developing countries. What will this mean for working populations, the productivity of nations, and the nature and cost of health care? Everywhere, the environment is threatened, and greater and greater demands are placed on fewer and fewer natural resources. The burning of fossil fuels appears to be leading to the "greenhouse effect," with untold consequences. Deforestation may result in ecological disaster, and risk of the loss of biological diversity. It has even led to a resurgence of malaria - an epidemiologically proven fact.

Certainly, countries have been working hard to provide health services and to control diseases, and much has been accomplished. But what do future epidemiological trend analyses suggest will happen in the decade of the 1990s, if we maintain only the current rate of progress? Unless the expansion of immunization coverage accelerates, 30 million children will die prematurely of vaccine-preventable diseases. Forty million children will die of diarrhoeal diseases, and an equal number will succumb to acute respiratory diseases, and this includes measles and whooping cough. Thirty million people, mostly in developing countries, will die of tuberculosis. Up to 20 million people will die of malaria. Cancer will take 50 million lives, while cardiovascular diseases will take more than twice that many, largely as a result of unhealthy life-styles and environmental factors. Many developing countries will carry the triple burden of the continuing prevalence of some age-old infectious diseases, diseases of "modern" society (such as cancer, cardiovascular disease and diabetes, and accidents), and new ones such as AIDS.

In all too many countries, developed and developing alike, we see disturbing behavioural and social trends. On the one hand, the relationship between unemployment, and poverty and alcoholism, drug abuse, and violence, are well recognized. On the other hand, in some industrialized countries, where the basic physical needs have largely been satisfied, the lack of social and intellectual challenges leads to similar substance abuse and antisocial behaviour. An increasing proportion of young people everywhere exhibit signs of alienation from society, and indulge in risk-taking behaviour, for example reckless driving and the use of tobacco. Risk-taking behaviour and attitudes correlate statistically with patterns of disease, including AIDS and the widespread increase in sexually transmitted diseases. What is happening to the young people on whom the future of the world dependens? what about our older citizens? Among the elderly, social isolation and alienation lead to a rapid physical and mental decline. In all of these instances, the waste of human resources potential and promise is tragic. For how long can politicians, decision-makers, planners, and citizens, faced with these trends, continue with "business as usual"? The major contributions that epidemiology can make to world health are to sound the alarm before it is too late, and to help decision makers to develop solution strategies.

It is not my intention to confront you with a litany of the current and future woes of mankind. Rather, my intention is to stress the worth of all who are engaged in the epidemiological sciences, in assessing the situation, and influencing corrective action. I am appealing for the responsible involvement of epidemiologists in the health development process. What I mean is that epidemiologists should make their findings known through social marketing to promote health, rather than contribute to the commercial marketing of health industries.

Professor Detels of the International Epidemiological Association has aptly said that epidemiology is the core science of public health and preventive medicine. Epidemiology has recently been defined as the study of the distribution and determinants of health-related states and events in populations, and application of this study to the control of health problems. I can endorse this definition only if it does not ignore the basic principles of health, human rights and social justice. If we take it seriously and fully, it implies that epidemiology is an inseparable component of the health development process. The concepts and approaches of epidemiology must become familiar to all those who deal with the health of the

community. Epidemiology should ideally permeate the approach to health, without necessarily constituting a specialized branch of health practice, in the same way that the clinical diagnostic sciences permeate the whole approach to individual health care, without constituting a specialty branch of medical practice.

We owe a debt of gratitude to the many fine epidemiologists whose work has lighted our way. I acknowledge particularly the large-scale epidemiological studies of cardiovascular diseases initiated in many countries, as for example the Framingham study in the United States, which have improved our understanding of these diseases and the means of their control. The work of Sir Richard Doll and Sir Austin Bradford Hill on tobacco-related illness opened the area of life-styles to epidemiological approaches. The examples of individual epidemiological research contributions to health for all are legion, and beyond recounting here.

In order to ensure the continuing contribution of epidemiology to health, training is important. Examples can be drawn from all parts of the world. I would mention only a few by way of illustration. The Field Epidemiology Training Programmes initiated, in collaboration with WHO, by the Global Epidemic Intelligence Service of the United States Centers for Disease Control, provide innovative "hands-on" experience. Throughout the WHO Region of the Americas, improved collaboration among schools of public health is strengthening the teaching of epidemiology. The Association of Schools of Public Health in Europe is developing a programme for the training of health professionals, on the basis of European regional health-for-all targets. In several WHO regions, concerted efforts have been made to include epidemiology in the training of health managers and professionals, including nurses, and to strengthen the training of research epidemiologists in designing and carrying out studies.

Epidemiology is an important constituent of essential national health research activities. It requires investment in human resources and institutional capabilities, in establishing national research priorities, and in setting up links between researchers and the users of research in many areas. The development of new measurements and new approaches, for epidemiological research on health policies and programmes, is an important aspect, despite conceptual and technical difficulties. For example, the value of an indicator such as "life expectancy free from disability" is becoming increasingly recognized. A challenging current question is how can epidemiological tools and approaches contribute to the assessment of equity? Future health care systems must satisfy three conditions: (1) continuing improvement of the efficiency and efficacy of our interventions; (2) compatibility with the political and socioeconomic realities; and (3) respect for basic human rights, such as the right to be informed and the integrity of the indivual including freedom to decide.

Therefore, the sharing, presentation, and use of epidemiological information involve ethical issues, such as confidentiality, duty to warn, appropriateness of response, and balancing of interests, advantages, disadvantages, and costs. Health communicators, and those who apply the tools and approaches of epidemiology, as well as those who use the results, jointly have a duty to find ways to present epidemiological findings in conformity with the requirements of both science and general information. In this way, an interested public may become an informed one, and in turn provide feedback to policy makers.

Let me turn to developments in the application of epidemiology to the health-for-all strategy, and to the role various partners can play therein. Many countries are increasingly conscious of the actual and potential inputs of epidemiology to progress on the road to health for all. In 1988, the Forty-first World Health Assembly urged Member States "To make greater use of epidemiological data, concepts and methods in preparing, updating, monitoring and evaluating their health-for-all strategies". In 1989, the Forty-second World Health Assembly emphasized the appropriate use of epidemiology in the monitoring and evaluating of progress towards health for all, and gave a clear mandate to WHO to strengthen epidemiological capabilities, both in countries and within its own operations. Unfortunately, experience has shown that it is precisely the countries in greatest need which lack the capabilities necessary for effective epidemiological analysis.

Vigorous and repeated calls from Member States for the better use of epidemiology have thus been received through the WHO governing bodies. Consequently, we are engaged in the preparation and development of a plan of action, covering the next five years, to strengthen the epidemiological capabilities of countries in greatest need. Nongovernmental organizations and professional organizations, including the International Epidemiological Association, have an important role to play in this regard. The plan is for action destined to enhance the pertinence, quality, and timeliness of the epidemiological information produced by the selected countries, and to ensure a greater use of this information in decision-making for health at all levels. Under the plan, activities should progressively extend to other countries.

In support of these efforts, WHO will continue to foster collaborative relationships with other governmental and nongovernmental agencies, to support its Member States, to stress the importance of having and using epidemiological capabilities in health and development, and to disseminate relevant information. WHO will also foster and reinforce the epidemiological capabilities of individual institutions, and encourage them to form the networks that are essential to sustained research and its application. New methodologies will be developed and tested, including new techniques for future trend assessment. Mechanisms are being developed to enhance

the provision to WHO of expert guidance in reviewing current knowledge relating to epidemiology, and in monitoring progress in the strengthening of epidemiological capabilities. The additional resource requirements for the new plan of action are beyond those that are available in the regular budget of WHO. However, the plan can be used as the basis for encouraging donor agencies to develop explicit strategies for long-term support to the strengthening and application of national epidemiological approaches, and the promotion of collaboration among scientists and decision-makers both within and between countries. The International Epidemiological Association, through its resources and networks of personal goodwill and experience, can do much to help us with our plan.

I should, however, introduce a word of caution. With the virtuosity that exists today in the field of information processing technology, all too often we see information being collected almost as an end in itself. We must constantly remind ourselves that there is a cost attached to every bit of information collected. That cost is often paid by those least able to afford it. The challenge is to identify the most relevant data for the purpose intended. Robert Cruickshank, the good Scot that he was, would certainly have said no less.

With this *caveat*, I am convinced that epidemiology must, and will, play a significant role in the assessment and development of global health. Epidemiology will thus make a vital contribution to fulfill our vision of health for all and the socioeconomic development of the world community.

Cervical Cancer Research

Epidemiologic Studies of Cervical Cancer in Latin America

During the last five years, two large epidemiologic studies were conducted in Latin America to determine risk factors for cervical cancer in this high-risk population and to compare the prevalence and effects of different risk factors in this region and in Spain, a country with a nearly 10-fold lower incidence of invasive cervical cancer.

The *Latin American Cervical Cancer Study* was conducted between January 1986 and July 1987 in Bogota, Colombia; Mexico City, Mexico; Costa Rica and Panama, by the National Cancer Institute of the United States (NCI) in collaboration with the Gorgas Memorial Laboratory in Panama and research institutes in the participating countries. The study enrolled cases of invasive cervical cancer younger than 70 years of age at the major cancer referral hospitals in the areas of the study. For each case, two controls were selected: in Bogota and Mexico City, two hospital controls were selected, matched on age (in 5 year groups), excluding patients with diagnoses related to the exposures of interest. In Costa Rica and Panama, one hospital and one community control were selected from census listings of the same areas of residence of the cases.

Overall, 99% of 766 eligible cases and 96% of 1532 controls agreed to participate and were interviewed on demographic, sexual, reproductive, medical, dietary and contraceptive history. A cervical swab obtained cells from the cervical lesions of the cases and the cervical lesions of the controls to determine the presence of type-specific human papillomaviruses (HPV) by filter in situ hybridization. In addition, a blood sample was drawn for determination of micronutrients and antibodies against specific sexually transmitted agents. The male sexual partners of those women reporting only one lifetime sexual partner were also interviewed on demographic, socioeconomic, sexual and medical characteristics. A physical examination was performed on participating males (78% of eligible case husbands and 71% of eligible control husbands) and a swab of the coronal sulcus and urethral canal were obtained to test for HPV.

The *Spain and Cali Cervical Cancer Study* was conducted in nine provinces in Spain and in the city of Cali, Colombia by the International Agency for Research on Cancer (IARC). The main purpose was to explain the 10-fold difference in the incidence of cervical cancer between these two regions: in Spain, 5-7 cases per 100,000 women per year (age adjusted), and in Cali, Colombia, 50 cases per 100,000. Attempts were made to explain this striking difference in terms of sexual behavior of males and females and differences in the prevalence of the common sexually transmitted diseases associated with cervical cancer in the past. Among these, the evaluation of the role of HPV and herpes simplex virus type 2 (HSV-2) was of primary interest.

In total, about 3000 subjects participated in the study. Two groups of cases were included, 406 invasive squamous cell carcinomas and 526 in situ carcinomas/CIN III.

Controls for the invasive cases were selected from the general population, while controls for the in situ carcinoma/CIN III cases were derived from women participating in screening programs with normal smears. All current husbands or steady sexual relationships of cases and controls were also invited to participate. From each participant, a detailed questionnaire was completed to assess general demographic and socioeconomic information, past sexual behavior and marital experience, reproductive history, general and genital hygiene, and sexually transmitted diseases. For each woman, two cervical scrapes were taken and two specimens prepared. One sample was frozen for HPV assays and the second was used to prepare a Pap smear which was stained and interpreted for signs of HPV and other sexually transmitted diseases. For cases of invasive cancer, a biopsy specimen was also kept frozen for further virological studies. Blood samples were collected from all participants. Males were also asked to provide a sample of cells from the urethra and the coronal sulcus of the penis.

Published results from the NCI study and preliminary results from the IARC study show that risk factors for invasive cervical cancer are similar. Namely, both studies identified strong relationships of risk with multiple sexual partners and early ages at first sexual intercourse. Furthermore, risk was independently influenced by low socioeconomic status, with strong relationships emerging in both investigations with limited education. There was also strong evidence of increased risk associated with multiple pregnancies, even after adjustment for the effects of sexual and other factors, particularly in the NCI study, which included large numbers of cases and controls with multiple pregnancies. The association with parity was also evident in Spain, but only a marginal relationship was observed in Cali, Colombia. When comparing various risk factors among the control populations in Spain and Cali, Colombia, with the exception of education, prevalence rates were consistently higher in Cali than in Spain, probably explaining the higher cervical cancer incidence rates.

The NCI study also detected reduced risk of invasive cervical cancer among women with the highest levels of ingestion of vitamin C and carotenoids and among those with the highest levels of beta-carotene in the serum. Cigarette smoking by the women was not a risk factor in the NCI study, but in Spain and Cali some increased risk was found among smokers and women married to smokers. A slight, but non-significant, increase in risk was detected in both studies among users of oral contraceptives. This association was stronger in the NCI study for adenocarcinomas. The NCI study also found increased risk among women reporting long-term utilization (more than 5 years) of injectable contraceptives. In both studies, increased risks were observed among women with antibodies against HSV-2, but in the NCI study this effect was restricted to women also positive for types 16/18 HPV, resulting in a statistically significant multiplicative interaction of the two viruses.

In both investigations, attempts were made to assess the influence of male characteristics on cervical cancer risk. The NCI study restricted this component of the study to the husbands of the sexually monogamous women, while the IARC study attempted interviews with all current partners, regardless of the sexual history of the woman. Results from the NCI study as well as the Spain component of the IARC study supported the notion that male sexual behavior has an influence on cervical cancer risk, since in both studies there was evidence of increasing risk with multiple number of sexual partners reported by the male partner. Such an association, however, was not observed in Cali, Colombia. This may relate to the low proportion of male subjects in this site reporting few partners or to the need to consider more specific aspects of timing of sexual promiscuity. Visits to prostitutes was a predictor of risk in the Spain study, but not in Cali or in any area of the NCI study. This may reflect the inability of either study to more specifically examine the number of different prostitutes or types of prostitutes visited, which has been shown to be an important determinant of the prevalence of sexually transmitted diseases in other studies.

In terms of relationships with the human papillomaviruses, both investigations found support for an effect. The NCI investigation used a filter in situ hybridization assay, while the IARC study utilized a variety of DNA hybridization assays, including ViraPap, Southern blot and PCR. Each of these assays has undefined sensitivities and specificities, and accordingly there was variation in the relative risks depending on the assay considered. Regardless, there was a strong relationship of risk with a positive test result for HPV types 16 or 18, although none of the results supported HPV being a necessary and sufficient cause of cervical cancer. Surprisingly, in the NCI study, there was no correlation among control subjects of a positive HPV 16/18 assay with any of the sexual variables examined, including number of sexual partners, leading to questions regarding the possibility of assay measurement error. The extent to which results reflect measurement error or the influence of co-factors remains to be clarified. Detailed validation studies and estimation of sensitivity and specificity of the previous tests utilized are currently underway in both studies. Among males, the rate of detectability was considerably lower than among females in both studies, and no substantial case-control differences were observed, but these results may reflect difficulties with the appropriateness of the samples obtained.

Problems with Laboratory Methods to Detect HPV in Epidemiologic Studies

One peculiarity of epidemiologic studies exploring the association of HPV and cervical cancer lies with the fact that exposure to HPV can be assessed at present only by

detecting HPV DNA in the cells under study, reflecting shedding of HPV DNA at one point in time rather than lifetime exposure. Serological assays using various HPV peptides are currently under development, which might provide a means of assessing past or lifetime exposure. However, type-specific markers of chronic persistent HPV infection are needed to assess the nature of the association of HPV and cervical cancer.

The DNA hybridization methods currently available to assess HPV exposure are as follow: filter in situ hybridization (FISH), Southern blot, ViraPap, and polymerase chain reaction (PCR). The FISH and ViraPap methods are easy to perform although both share disadvantages such as signals of low intensity difficult to detect, poor reproducibility and that only a limited number of probes can be tested. Furthermore, ViraPap does not identify specific types. The Southern blot method can detect different HPV types and estimate the amount of virus, although it requires very intensive labor. PCR sensitivity and specificity are optimal for viral detection. It might lead, however, to false positives due to contamination.

Research Directions

Although these two studies have provided preliminary evidence of a strong epidemiologic relationship between HPV and risk of cervical cancer, a number of issues remain unresolved. Because of methodologic limitations of the available assays, the nature and magnitude of the association of HPV with cervical cancer is uncertain. In addition, the relationship of specific types of HPV to various cervical abnormalities is unclear. Part of the difficulty in assessing these relationships is the rapid advance been made in recent times in identifying new types of HPV, with over 60 types now recognized. In terms of future research activities, the following are recommended:

- Further assessment of the validity of various hybridization assays, involving calculations of sensitivity, specificity, and predictive value. At the moment, it is uncertain what should be viewed as the gold standard test, although PCR appears from preliminary evaluations to be a very promising test, if it can be performed without contamination. An important component of these validation activities will be separate evaluations among diseased versus non-diseased women.

- The usefulness of available serologic tests for integration into epidemiologic studies should be given high priority. Of importance will be assessments of how serologic test results correlate with established risk factors as well as with results from hybridization assays. Serologic tests may have the advantage over hybridization assays in assessing lifetime exposure to HPV. Hybridization assays, on the other hand, merely test for the present detectability of the virus. Thus, there is uncertainty over how infection versus chronic persistence of the virus relates to risk. Should more specific tests become available to test for chronic persistence, this would seem a particularly valuable avenue for future epidemiologic activities.

- Although studies have now identified the effect of a number of risk factors for cervical cancer other than HPV, their relationship remains unclear in the absence of valid HPV measures. Until HPV can be assessed with more precision, it is recommended that emphasis not be placed on re-evaluating the role of these other factors, except as they may modify the expression or effects of HPV. Preliminary evidence suggests that attention should focus on possible enhancing effects of cigarette smoking, hormonal factors (such as oral contraceptives, pregnancy), and nutritional deficiencies (particularly vitamin C and carotenoids).

- In investigations where cervical biopsy specimens are available, it may be informative to test for the presence of a multitude of viral types to determine whether higher rates of infection can be achieved over investigations using more limited viral probes.

- Given the limitations of case-control studies in assessing temporal relationships with HPV, further emphasis should be placed on the conduct of prospective studies, both among females and males. Little is currently known about the natural history of HPV, particularly as it relates to subsequent cervical abnormalities. Thus, recommendations are made for further studies to assess how viral presence among cytologically normal women affects the risk of subsequent disease. An important component of these studies should be on assessing viral persistence; thus, repeated measurements of the virus over time should be performed. These studies will also need to consider the influence of other risk factors, both as potential confounding and interactive factors.

- Further to the above recommendations, it may be fruitful for studies to focus on specific high-risk populations, including prostitutes, to determine both the prevalence of HPV as well as the incidence of cervical abnormalities. Studies aimed at determining reasons for geographic variations in the incidence of cervical cancer should also be considered, particularly in conjunction with information on the prevalence of HPV.

- Since the predictive value of HPV testing in terms of risk of developing cervical abnormalities over time remains uncertain, widespread use of this test either in screening programs or in clinical contexts does not appear warranted, particularly given the recognized efficacy of Pap smear screening in reducing the incidence of invasive cervical cancer. Current experience indicates that premature introduction of HPV testing may cause unnecessary patient anxiety and overtreatment.

(Source: Summary Report. Consulting Group on Cervical Cancer Research. Washington, D.C., 9-10 October 1990. Health of Adults Program, PAHO.)

Epidemiological Activities in the Countries

First National Meeting on Epidemiology in Colombia

The First National Meeting on Epidemiology was held from 12 to 16 November 1990 in Cali, organized by the Provisional Commission of the Colombian Association of Epidemiology and sponsored by the Pan American Health Organization, the Ministry of Health, the Del Valle University, the Del Valle Sectional Health Service, the Antioquia Sectional Health Service, the Municipal Health Secretariat of Cali, and the Higher Education Foundation (FES).

Two courses were provided simultaneously for epidemiologists from the Sectional Health Services and the local health systems and for participants in general:

Epidemiology: Basic Concepts, with emphasis on the design of epidemiological studies and the practice of epidemiology in the health services.
Instructors: Rodrigo Guerrero and Alberto Alzate (Coordinator).

Systematization of Epidemiology Data, with emphasis on the management of EPIINFO.
Instructors: the team from the CIMBER Computer Center: Fernando Delgado, Reynaldo Carvajal, William Sánchez, and María Isabel Gutiérrez (Coordinator).

Sessions were also held on: Epidemiology in the health services (including epidemiology and local health systems); Epidemiology of violence; Epidemiology of cancer in Colombia, and AIDS-tuberculosis association.

Each subject was followed by a round table discussion and a session was devoted to the presentation of research projects.

Colombian Association of Epidemiology

During the course of the First National Meeting on Epidemiology an Assembly was convened to set up the Colombian Association of Epidemiology, with the participation of epidemiologists from the Sectional Health Services, the universities, and other institutions.

Once the Association was constituted, a study was made of the statutes, whose objectives include promotion of the dissemination of scientific knowledge related to the area of epidemiology; the promotion of epidemiological research; the maintenance of relations with similar associations in Colombia and abroad; and the provision of advisory services to public health institutions and community organizations that require them.

As part of future activities it plans to initiate a collaborative study on violence, provide support to a research project already initiated on the status of epidemiology in Colombia (the practice of epidemiology in the services, research, teaching), analyze the training process and prepare a project for its development, hold two workshops (on violence and human reproduction), and program national meetings annually in different sites in the country.

National Cooperative Research

Since 1981 the Department of Epidemiology of the Ministry of Health has carried out four national collaborative epidemiological research projects aiming at analyzing the epidemiological situation in various areas of the country, supporting current programs, developing evaluation and adjustment processes, and consolidating interaction among epidemiologists in the country. The subject of the research projects is proposed as part of the conclusions of the immediately preceeding project. The subjects proposed up to 1989 were:

-Trends of the six EPI diseases from 1976 to 1980, 1981.

-Mumps, rubella, hepatitis, and rabies, 1982.

-Trends of STDs: syphilis and gonococci, 1983.

-Epidemiology of malaria in 30 Colombian localities, 1987.

The proposal for the V National Cooperative Research arose from the need to further explore the conceptual and methodological elements derived from research on malaria, in addition to the need to respond to a new political context emerging from the processes of decentralization-municipalization and community participation. The legal framework of these processes includes Legislative Act 1/1986, which established the popular election of Mayors; Decree 077/1987 on regulations for decentralization; Decree 1216/1989 on the establishment of community participation committees; and Decree 1416/1990, which supplements Decree 1216/1989 and specifies the functions and modalities of organization of the committees. Law 10/1990 on Reform of the National Health System includes as its main subjects community participation and decentralization of the health services, which remain under the responsibility of the 1,009 mayoral offices, 23 governorates, 4 intendancies, and 5 commissaries.

The policies of the Ministry of Health, reduced to the nine strategies of the Quadrennial Plan 1991-1994, assigns special importance to prevention and joint management actions; and Strategy No.1 (A Healthy Family in a Healthy Environment) considers among its goals the development of family and community organizational and institutional capacity to deal with health analysis (problems, risks, environment) for the programming, execution, and evaluation of projects at the local level. Strategy No. 3, (Decentralization and Municipalization of Health Care and

its Risk Factors), commits the *municipios* to control risk factors in the environment through adequate intervention actions.

With the purpose of developing the conceptual and methodological aspects of the V Research Project, two meetings were held, one in Paipa (Boyacá) from 13 to 15 August 1990, and another in Villavicencio (Meta) from 30 October to 1 November 1990. Through presentations and workshop methodology the following subjects were analyzed: health indicators, tracer indicators, population risk, risk approach, health analysis at the local level, local health systems, and social participation in health analysis. Two experiences were presented, one on epidemiology and local health system in Cali, and another on community health diagnosis in Medellin. As part of the methodology of the Villavicencio meeting, a summit of mayors was organized for them to express their views regarding the inclusion of health in the municipal development plan and to provide the opportunity for an exchange of opinions on the possibility of articulating the project for decision-making.

The general objective of the project is to define the determinants of health and well-being in the municipios for decision-making; the specific objectives may be classified into three areas:

a.Health situation analysis with essentially institutional data (socioeconomic mapping on the basis of unsatisfied basic needs; identification of risk factors in the environment, lifestyle, biological area and area of the health services, selection of tracer indicators, mapping of risk, mapping of mortality, mapping of social resources, formal and informal community organizations, and analysis of intermunicipal and intramunicipal risk).

b.Design of a training strategy for insertion of the health team at the community level.

c.Community-based health situation analysis for local programming.

It is hoped that the project will contribute to municipal development, strengthen intersectoral work and coordination, promote community participation, promote a change in attitudes on the part of health teams, and promote the use of the epidemiological method as a tool for analysis in local areas with regard to patterns and strategies for intervention that will help to solve the problem of health and well-being. The project could also contribute an additional criterion based on population risk besides the number of inhabitants in assigning resources in the process of decentralization.

Project for Strengthening Border Epidemiology Units

In the Colombia-Venezuela Border Health Integration Meeting held in the city of Cucuta, Colombia, from 21 to 23 March 1990 under the auspices of the Presidential Border Integration Commission, the respective Ministries of Health agreed to prepare two joint projects: *Strengthening of Border Epidemiology Units* and *Basic Health Care for the Colombian-Venezuelan Indigenous Communities.*

From 25 to 27 July 1990 epidemiologists from the border areas, the heads of international organization offices, and the PAHO Representatives of both countries met in Cucuta to analyze conceptual and methodological aspects as well as the viability of both projects. On 25 and 26 October another Colombia-Venezuela border meeting was held in Cucuta on epidemiological surveillance in the context of the Expanded Program on Immunization.

The project *Strengthening of Border Epidemiology Units* includes health policy guidelines of both countries and an analysis of the border situation, delimiting the area of the project and three subareas of geographical proximity. Plans have been made to improve the information systems, systematize the exchange of information (telephone, radio, telegram, personal, periodic bulletins) and of biologicals and other supplies, establish a referral network for cases and samples, train binational health teams for health analysis and epidemiological surveillance, and improve the health promoters team analysis capacity at regional and local levels, including the community through a permanent training process. The instruments for analysis include updating of local population censuses, family files, mapping of risk, registration of health events, and simplified epidemiological surveillance.

United States-Mexico Border Project Consenso

Emanating from the United States-Mexico Border Health Association Annual Meeting held in Saltillo, Coahuila, Mexico in June 1990, the two governments agreed to pursue agreement on binational health priorities. The El Paso Field Office of the Pan American Health Organization and the United States-Mexico Border Health Association (USMBHA) presented a strategy in response to the agreements reached in Saltillo, which are embodied in **Project Consenso.**

Project Consenso will identify and prioritize USA - Mexico border health issues that lend themselves to binational cooperation. Activities will include: an inventory and assessment of current health programs, leadership and resources along the border, a survey of key individuals to identify health priorities in four border regions; and the coordination of four regional conferences and one borderwide conference. These conferences will provide an opportunity for both public and private sector policy makers from USA and Mexican border states, as well as representatives of both federal governments, to interact and exchange information for the purpose of reaching agreement on principal health priorities and planning for cooperative strategies.

The aim of all these activities will be to achieve consensus among the concerned parties; consensus being defined here as a process of discussion and agreement.

The objectives of **Project Consenso** are:

1) To perform an asessment of the current US-Mexico health situation that will include an inventory of existing border health programs, projects, regional leaders, and resources. This information, collected from institutions identified, will be incorporated into background documents for dissemination to local, state, and federal authorities, and public and private sector policy makers prior to each regional meeting. These inventories and assessments of resources will be used by conference participants in setting regional priorities and developing regional strategies and recommendations for action, and will be incorporated into the final conference report.

2) To develop and perform a survey, in each of the three regions using the DELPHI Technique, on persons knowledgeable of and involved in border health issues, from both the public and private sectors. These respondents, who may be potential participants in their respective regional conferences, will be asked to provide their perceptions of binational health issues and problems. The results of these surveys will be used as a tool in each regional conference to facilitate the achievement of consensus on priorities and strategies for action.

3) To develop and coordinate regional conferences (January and February), using a consensus driven model, for the purpose of identifying binational health priorities in each region and recommending cooperative strategies to resolve these. Participants will attend by invitation only. The regional meetings will (a) lay the groundwork for the border-wide consensus conference; (b) set binational health priorities; (c) suggest regional strategies for binational cooperation; and (d) identify resources.

4) To develop and coordinate a borderwide consensus meeting (March) using the same methods as that used in the regional meetings, that based on the outcomes of the regional consensus meetings, will (a) establish the principal border health priorities for purposes of binational cooperation; (b) propose potential strategies for unilateral implementation by local, state, and/or federal level policy makers and planners; (c) recommend actions for those priorities that may only be addresssed through binational cooperation, and (d) identify resources.

5) To define an ongoing process for the setting of priorities, developing strategies, and reaching consensus for binational cooperation and action along the USA-Mexico border.

6) To publish and disseminate a report in both English and Spanish summarizing the results and recommendations of the binational health consensus conferences. This report will describe the process used for identification and prioritization of binational health issued by border communities. It will incorporate the recommendations for binational action emanating from the meetings, and will also include information from the initial regional surveys and inventories.

Course on Epidemiology in Guatemala

The pre-congress course on "Epidemiology in the 1990s" took place on 20 November 1990 in Guatemala City, in connection with the XLI National Medical Congress. The objectives of the event were to update and plan the concepts and applications of epidemiology for the next decade; to promote the use of epidemiology in the health services; to promote the use of the analysis of the health situation and to contribute to the dissemination of information on these subjects. Some 94 professionals participated in the course. Three lectures were presented, followed by workshop discussions on the following subjects: Analysis of the health situation, policies and perspectives - Dr. Milton Terris, editor of the *Journal of Public Health Policy,* United States; Epidemiological surveillance - Dr. Fernando Martínez Navarro, Director of the National Center of Epidemiology, Spain; and Perspectives on the use of epidemiology - Dr. Marlo Libel, PAHO. After a panel discussion with the participation of the lecturers, four presentations were given on national experiences which highlighted the use of epidemiology: Project for the extension of social security coverage in Escuintla; Community medicine project of the Francisco Marroquín School of Medicine in the Department of Guatemala; Epidemiological information at the national level, and Supervised practice for graduates in medicine of San Carlos University.

AIDS Surveillance in the Americas

Number of AIDS cases by year, and cumulative number of AIDS cases and deaths by country and subregion, as of 31 December 1990.

SUBREGION Country	Number of cases Through 1986	1987	1988	1989	1990	Cumulative total(a)	Total deaths	Date of last report
REGIONAL TOTAL	45,302	32,826	40,996	45,123	28,142	192,616	112,938	
LATIN AMERICA b)	3,661	4,553	7,158	8,147	4,236	27,970	11,703	
ANDEAN AREA	182	365	584	714	301	2,176	1,052	
Bolivia	3	3	10	2	4	22	18	30/Sep/90
Colombia	66	151	213	254	80	764	333	30/Sep/90
Ecuador	13	19	25	15	26	100	75	30/Sep/90
Peru	9	60	68	117	70	352	122	31/Mar/90
Venezuela	91	132	268	326	121	938	504	30/Sep/90
	104	128	254	331	187	1,004	402	
SOUTHERN CONE	104	128	254	331	187	1,004	402	
Argentina	73	72	169	229	108	651	242	30/Jun/90
Chile	22	41	55	60	...	178	71	31/Dec/89
Paraguay	1	6	2	4	3	16	13	31/Mar/90
Uruguay	8	9	28	38	76	159	76	31/Dec/90
BRAZIL	1,574	2,136	3,475	4,231	2,401	13,817	6,788	30/Sep/90
CENTRAL AMERICAN ISTHMUS	86	155	309	538	831	1,920	688	
Belize	1	6	4	...	...	11	8	30/Sep/88
Costa Rica	20	23	52	56	55	206	116	30/Sep/90
El Salvador	7	16	48	94	91	256	38	31/Dec/90
Guatemala	18	16	13	18	56	121	73	30/Sep/90
Honduras	15	66	130	301	586	1,098 *	319	31/Dec/90
Nicaragua	0	0	2	2	3	8	4	30/Jun/90
Panama	25	28	60	67	40	220 *	130	31/Sep/90
MEXICO	793	1,033	1,452	1,348	315	5,113 *	2,242	31/Dec/90
LATIN CARIBBEAN c)	922	736	1,084	985	201	3,940	531	
Cuba	3	24	24	12	6	69	37	30/Sep/90
Dominican Republic **	124	235	329	520	195	1,415 *	197	30/Sep/90
Haiti	795	477	731	453	...	2,456	297	31/Dec/89
CARIBBEAN	467	375	522	740	455	2,571	1,488	
Anguilla	0	0	1	2	1	4	1	30/Sep/90
Antigua	2	1	0	0	...	3	3	30/Mar/89
Bahamas	86	90	93	168	117	554	296	30/Sep/90
Barbados	32	24	15	40	34	145	103	30/Sep/90
Cayman Islands	2	1	1	1	1	6	5	30/Sep/90
Dominica	0	5	2	3	2	12	11	30/Jun/90
French Guiana	78	25	34	54	41	232	144	30/Sep/90
Grenada	3	5	3	5	3	19	17	30/Jun/90
Guadeloupe	47	41	47	47	...	182	85	31/Dec/89
Guyana	0	10	34	40	24	108	49	30/Jun/90
Jamaica	11	33	30	66	26	166	80	30/Jun/90
Martinique	25	22	28	50	17	142	82	30/Sep/90
Montserrat	0	0	0	1	0	1	0	30/Sep/90
Netherlands Antilles	9	12	9	16	22	68	16	30/Sep/90
Saint Lucia	3	7	2	4	2	30	30	30/Sep/90
St. Christopher-Nevis	1	0	17	...	...	18	9	31/Dec/88
St. Vincent and the Grenadines	3	5	8	6	4	26	12	30/Sep/90
Suriname	4	5	4	35	27	75	59	30/Sep/90
Trinidad and Tobago	151	85	160	167	130	693	451	30/Sep/90
Turks and Caicos Islands	3	4	1	...	...	8	4	31/Dec/88
Virgin Islands (UK)	0	0	1	0	1	2	0	30/Sep/90
Virgin Islands (US)	7	0	32	35	3	77	31	30/Sep/90
NORTH AMERICA	41,174	27,898	33,316	36,236	23,451	162,075	99,747	
Bermuda	51	21	28	35	12	147	114	30/Jun/90
Canada	1,232	861	949	1,003	358	4,403	2,526	30/Sep/90
United States of America c)	39,891	27,016	32,339	35,198	23,081	157,525	97,107	31/Dec/90

* Provisional

** Revised

(a) May include cases for year of diagnosis unknown.

(b) French Guiana, Guyana and Suriname included in the Caribbean.

(c) Puerto Rico included in the USA.

Meeting on Prevention of Non-Communicable Diseases

A meeting of the PAHO Advisory Group on Health Promotion and Prevention of Non-Communicable Diseases[1] was held in Washington, D.C., on 18-19 September 1990.

A description of the changing demographic and epidemiologic profiles of all countries in the American Region was presented by Health of Adults Program. The following aspects were highlighted:

- Fertility, infant mortality, and infectious and nutritional disease mortality rates have decreased in all countries.
- Life expectancy is increasing, and the population is aging.
- Urbanization is growing.
- NCDs have become the leading causes of death in almost all countries, and continue to increase throughout the Region.
- NCDs account for the majority of all deaths in the Region, having increased sharply in recent decades. There are great variations within countries as well.
- All of these changes have continued to occur despite the marked deterioration in the economies of most Latin American and Caribbean countries in the past two decades.

Recent data obtained by household surveys in 6 local areas of Latin American and the Caribbean indicate a high prevalence of some of the known risk factors for major NCDs.

NCD Prevention in PAHO

In the 1960's, PAHO's technical cooperation in NCD prevention was limited to cancer control; it was expanded in 1974 to include hypertension and rheumatic, allergic and immunological diseases. The MORE project for the development of integrated NCD programs was begun in 1983, but implementation turned out to be difficult because of the economic crisis in the 1980's and the scarcity of resources. In 1985, the PAHO Research Grant Program funded a multinational survey of NCD risk factors. The finding of this survey have emphasized the need for PAHO to strengthen its commitment to assist in the development of major programs to combat NCDs in the Region.

[1]The Advisory Group members are: John W. Farquhar MD, Stanford Center for Research in Disease Prevention, USA; Rodrigo Guerrero MD, Fundacion Carvajal, Colombia; Ivan Gyarfas MD, World Health Organization, Switzerland; Alfred McAllister PhD, The University of Texas Health Center at Houston, USA; Andres Petrasovits PhD, Department of National Health and Welfare, Canada; Alfredo Solari MD, Ministry of Public Health, Uruguay; Michael Sprafka MPH, PhD, School of Public Health, Minneapolis, USA; Milton Terris MD, Journal of Public Health Policy, Vermont, USA; Dale Williams PhD, University of North Carolina, USA.

Even though the awareness about the importance of NCDs in the Region has increased and there are limited experiences ongoing, efforts still need to be strengthened to achieve the goal of nationwide programs.

Some of the main obstacles to action in this area were outlined:

- Commitment to traditional priorities;
- Concerted comprehensive efforts for prevention and control of NCDs are lacking;
- Reluctance and resistance to face the challenge posed by NCDs;
- Fragmentary approach focusing on specific diseases;
- Emphasis has been placed on curative aspects within the health care system;
- Intervention measures are not prioritized in terms of their effectiveness.

A Comprehensive Program for Prevention of NCDs was defined during the meeting with the following essential components:

1. Health education and promotion directed to the public, the politicians and the professions.
2. Encouragement of resource development for prevention, such as cytology laboratories and personnel, production of unsaturated fatty foods, and availability of anti-hypertensive drugs.
3. Intersectorial cooperation: education, agriculture, transportation.
4. Laws and regulations.
5. Setting health objectives for definite time periods, such as improving health status; reducing risk factors; improving public and professional awareness and preparedness; improving services and protection, and improving surveillance and evaluation.
6. Organization and financing at the national, provincial, state and local levels.

The Advisory Group proposed the following recommendations:

1. To create effective health communication capacity for prevention of NCDs. The goal will be to facilitate development and dissemination of a suitable health communication strategy for the entire PAHO Region.
2. To develop in all PAHO Member Countries a strong organizational focus for comprehensive programs to prevent NCDs.
3. To give major attention to providing cooperation for the development of comprehensive nationwide programs of prevention of NCDs, with the use of local demonstration projects, as an initial step to provide the basis of

experience needed to establish effective national programs.

4. To give leadership in developing the tools for surveillance, monitoring and evaluation of programs for prevention of NCDs.

5. To provide leadership and assistance to the Member Countries in meeting the spectrum of training needs, including highly specialized personnel who need fundamental knowledge and skills in this area as well as various categories of health personnel who require less intensive training programs.

(Source: Based on the report of the PAHO Advisory Group on Health Promotion and Prevention of Non-Communicable Diseases. Health of Adults Program, PAHO.)

Brazilian Purpuric Fever

Brazilian purpuric fever (BPF) is a life-threatening pediatric infection that is preceded by conjunctivities and caused by a specific strain of *Haemophilus influenzae* biogroup aegyptius (BPF clone)[1] *(1-4)*. BPF was recognized during 1984 in the state of São Paulo, Brazil, when 10 children in a town of 20,000 persons died of an acute febrile illness associated with purpura and vascular collapse *(5,6)*. Although the etiology could not be determined at the time of the outbreak, the epidemiologic investigation indicated the disease was associated with purulent conjunctivities. Surveillance for BPF identified other cases, including an outbreak of 17 cases in 1984 in a town in the neighboring state of Parana; 12 sporadic cases in early 1985 and a cluster of 8 cases in February 1986 in São Paulo State. In March 1986 an outbreak of purulent conjunctivitis occurred in Serrana, São Paulo State with 10 culture confirmed cases, and four deaths.

In December 1989 two definite[2] cases of BPF were identified in two cities in Mato Grosso State (the first time outside of São Paulo and neighboring southern state of Parana.)

In the first case, *H. influenzae* biogroup aegyptius was isolated by blood culture from a clinically ill child; in the second, a definite case of BPF was clinically diagnosed. In addition, from August through October 1989, three possible[3] BPF cases occurred in Mato Grosso.

In January 1990, the Mato Grosso State Department of Health (MGSDH) distributed information about BPF to all hospitals and clinics in the state and conducted an educational seminar on BPF for physicians and public health workers. Health professionals were encouraged to report all suspected BPF cases to the MGSDH.

By April 1990, 26 cases (including the two definite and three possible cases identified in December) that were believed to be either definite or possible BPF had been reported. Of these, 10 cases (from six widely separated cities) were confirmed: three as definite and seven as possible BPF.

The overall attack rate for the combined population of the six cities was six per 100,000 children <10 years of age. Six of the 10 children classified as definite or possible cases died; another suffered autoamputation of portions of distal toes and fingers following septic shock.

The 16 other cases could not be confirmed as either definite or possible; however, at least some of these cases are believed to have been BPF because 1) no other cause of illness was identified and 2) the BPF clone was isolated on conjunctival culture from two of the children who could not be classified as having either definite or possible BPF but who where hospitalized with an acute febrile illness.

It is unknown whether BPF occurs in areas other than central and southern Brazil. In many areas blood cultures may not be drawn for cases treated for presumed meningococcemias. The occurrence of cases in areas separated by 500 miles suggests the potential for spread.

During the epidemiologic investigation of BPF in Mato Grosso, a randomized study was conducted to compare the efficacy of topical chloramphenicol with that of oral rifampin for conjunctival eradication of the BPF clone among children with BPF clone conjunctivitis. The results of this study suggest that oral rifampin is substantially more effective *(7)*. Because the development of the BPF may be related to conjunctival carriage of the BPF clone, oral rifampin may be useful for prevention of BPF among children with BPF clone conjunctivitis. In São Paulo and Mato Grosso, some children with conjunctivitis who have been exposed to a suspected case of BPF are being treated with oral rifampin (20 mg/kg/day for 4 days).

[1] BPF clones are defined as *H. influenzae* biogroup aegyptius strains that have the characteristics of strains that have caused BPF. These strains probably descended from a single clone with unique invasive potential.

[2] A definite BPF case is defined as isolation of *H. influenzae* biogroup aegyptius from a normally sterile body site or, in a child aged 3 months to 10 years, acute febrile illness, abdominal pain or vomiting, hemorrhagic skin lesions, a history of conjunctivitis in the 30 days preceding fever, no evidence of meningitis, and exclusion of meningococcal disease by specific tests. If other tests are obtained, results must be negative for other known pathogenic bacteria, and cerebrospinal fluid must contain < 100 leukocytes/mL *(1)*.

[3] A possible BPF case is defined as fever, recent conjunctivitis, and acute hemorrhagic skin lesions in a child aged 3 months to 10 years.

The occurrence of BPF in Mato Grosso and the continued occurrence of BPF in São Paulo emphasize the need for improved understanding of the epidemiology and pathogenesis of BPF to enable the development of effective methods for its control and prevention.

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(Source: Adapted from Centers for Disease Control. Brazilian Purpuric Fever - Mato Grosso, Brazil. *MMWR* 39: 903-905, 1990.)

Eradicating Indigenous Transmission of Wild Poliovirus in the Americas. An Update

In 1985, the Pan American Health Organization (PAHO) established a plan for eradicating the indigenous transmission of wild poliovirus from the Region of the Americas by the end of 1990. In response to this initiative, PAHO's Expanded Program on Immunization (EPI) implemented a program strategy that included (1) achievement and maintenance of high poliomyelitis immunization levels through accelerated immunization efforts, including national immunization days held twice a year at least 4 weeks apart; (2) surveillance to detect all new cases of acute flaccid paralysis (AFP); and (3) a rapid vigorous response, including containment measures to all new cases of paralysis.

Since 1985 rates of reported paralytic poliomyelitis in the Americas have declined substantially from the 930 cases confirmed in 1986 to 130 cases in 1989. During this same period oral poliovirus vaccine coverage with three doses, in children by 1 year of age increased from a 70% in 1985 to an estimated 87% in 1990.

At present the surveillance of paralytic poliomyelitis has shifted to focus on the surveillance of wild poliovirus.

As of 20 December 1990 only 10 wild polioviruses had been isolated from patients with acute flaccid paralysis: four type 3 from western Mexico, three type 3 from Guatemala, and three type 1 from the northern Andean subregion (Ecuador, Colombia and Peru). The last isolate so far has been from Guatemala (25 September 1990).

In July 1990, the International Certification Commission of Poliomyelitis Eradication in the Americas, convened by PAHO, met for the first time to develop the methodology to certify countries that are polio-free. Although the criteria are not finalized, many of the same indicators that PAHO uses to evaluate progress towards polio eradication efforts will be used by the Commission. The burden of diagnosis and, ultimately, the proof that eradication of transmission of wild poliovirus has been achieved rests with the laboratories. Accordingly, countries need to continue to investigate properly all cases of AFP, and stool specimens obtained from these individuals and their contacts must be submitted to the laboratory in adequate condition.

(Source: Expanded Program on Immunization, Maternal and Child Health Program, PAHO.)

Diseases Subject to the International Health Regulations

Number of cases and deaths reported by countries of the Region of the Americas up to 31 December 1990.

Country and administrative subdivision	Cholera Cases	Yellow fever Cases	Yellow fever Deaths	Plague Cases
BOLIVIA	-	*34*	*26*	-
Cochabamba	-	26	18	-
Santa Cruz	-	8	8	-
BRAZIL	-	*2*	*1*	-
Maranhão	-	1	1	-
Pará	-	1	-	-
ECUADOR	-	*6*	*4*	-
Napo	-	2[1]	2	-
Zamora Chinchipe	-	4[1]	2	-
FRENCH GUIANA	-	*1*	-	-
Cayenne	-	1	-	-
PERU	-	*7*	*7*	*4*
Huánuco	-	1	1	-
Junín	-	1	1	-
Piura	-	-	-	4
San Martín	-	4	4	-
Ucayali	-	1	1	-
UNITED STATES OF AMERICA	*6*	-	-	*2*
California	2[2]	-	-	-
Colorado	-	-	-	1
Guam	1[2]	-	-	-
Louisiana	2	-	-	-
District of Columbia	-	-	-	1[2]
New York	2[2]	-	-	-

[1]Suspected cases.

[2]Imported cases.

Note: Upon date of publication of this *Bulletin*, the Ministry of Health, Peru, had reported 3,723 cases of cholera with 1,011 hospitalizations and 38 deaths. The epidemic appeared to begin on 31 January, initially in Chancay, on the coast just north of Lima, and in Chimbote, a major fishing port 400 km north of Lima. Most cases have occurred in youths and adults, but some cases and deaths have been reported in children. At least 16 samples have been identified in two laboratories in Lima as *Vibrio cholerae*, and the Centers for Disease Control in Atlanta, Georgia, USA, has confirmed 4 isolates as *Vibrio cholerae* 01, biotype El Tor, serotype Inaba, which is a pandemic strain of cholera.

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