Epidemiological Bulletin

PAN AMERICAN HEALTH ORGANIZATION

Vol. 16, No. 3 September 1995

New, Emerging, and Re-Emerging Infectious Diseases

In the Americas, a complex array of factors has contributed to the recognition of an increasing number of new, emerging, and re-emerging infectious diseases in both developed and developing nations. Cholera, for example, returned to the Western Hemisphere in epidemic proportions in 1991. Since then, over one million cases and 9,000 deaths have occurred. In 1993 and 1994, the number of reported cases decreased in some countries but continued to increase in several areas of Central America, Brazil, and Argentina. PAHO has estimated that it will take more than a decade and over US$ 200 billion to control the regional epidemic. Factors contributing to the resurgence of cholera include poor public sanitation, inadequate water treatment, and high levels of poverty associated with unsatisfactory living conditions. The cholera problem also illustrates how factors in one continent may affect global health through increased microbial traffic to distant regions.

In Peru, sporadic cases of human plague have been reported for the past 40 to 50 years. However, in October 1992, a plague epidemic emerged. By the end of 1994, a total of 1,299 cases were diagnosed, with 62 deaths and a case fatality rate of 4.8%.

Antimicrobial drug resistance is perhaps one of the most alarming threats among the problems presented by new and emerging infections. The problem is well documented in the United States where increasing levels of drug resistance in both community-acquired (e.g., multi-drug-resistant *Streptococcus pneumoniae*) and nosocomial infections (e.g., vancomycin-resistant enterococci) have led infectious disease experts to declare the situation a crisis that could lead to a "post-antibiotic" era. Although less well-documented, the detection of significant levels of antimicrobial drug resistance is increasing in Latin America where, for example, over 20% of strains of *S. pneumoniae* have diminished susceptibility to penicillin. Resistance is also spreading among Latin American strains of *Shigella*, and high-level resistance is anticipated to develop in *Salmonella typhi* in the near future. Although documentation is limited, the threat of antimicrobial resistance in the developing nations of the Western Hemisphere appears to outweigh that present in the United States and Canada. Resistant *Plasmodium falciparum* malaria is now present throughout *P. falciparum*-endemic regions in South America. Resistance to chloroquine was soon followed by resistance to sulfadoxine-pyrimethamine combinations. Diminished sensitivity to quinine has been reported in Brazil. Conditions that encourage the development of antimicrobial resistance are widespread throughout Latin America: over-the-counter sale of antibiotics and frequent self-medication; overcrowding and suboptimal infection control practices in many hospitals; minimal regulation of antibiotic usage within or outside hospitals; scarce documentation of clinical trial results for newer antibiotics; and almost nonexistent surveillance and reporting of antimicrobial resistance patterns.

Human immunodeficiency virus infection/acquired immunodeficiency syndrome (HIV/ AIDS) may be the most devastating example of the potential impact of a newly emerging infectious disease on global public health. The HIV/AIDS pandemic has been pivotal in drawing the attention of public health experts to the problem and to the need for increased surveillance and research. HIV and other sexually transmitted diseases

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(STDs) illustrate the impact of changes in demographic conditions, social standards, modification of the global environment, and the mutability of microorganisms. The discovery of HIV has also led to the identification of other etiologic agents with similar modes of transmission through sexual contact, blood contamination, and perinatal acquisition, such as HTLV-I- and HTLV-II-associated myelopathy/tropical spastic paraparesis in the Caribbean and Brazil.

The Pan American Health Organization estimates that over 1.5 million people in Latin America and the Caribbean are infected with HIV and that by 1999 the cost of caring for AIDS patients in the entire Region will exceed $2,000 million. The dramatic impact of HIV/AIDS on public health is due in large part to the multiple opportunistic infections that develop in association with this condition. Data from Brazil, Honduras, Argentina, and Mexico indicate that tuberculosis is the most common opportunistic infection in the Region, afflicting over 330,000 persons in 1992. Co-infection with HIV and *M. tuberculosis* substantially increases the pool of individuals with active pulmonary disease, thus increasing the risk of contagion to both immunosuppressed and non-immunosuppressed persons. In addition, such patients frequently harbor strains of *M. tuberculosis* with multiple drug resistance. This complex interplay between HIV and *M. tuberculosis*, in association with decreasing support for tuberculosis surveillance and control programs, accounts for part of the recent resurgence of this condition in the United States of America, where direct costs for tuberculosis treatment in 1991 alone exceeded $700 million. The economic impact in Latin America and the Caribbean has yet to be documented.

HIV/AIDS is interacting with new and emerging infectious diseases in other ways as well. Common tropical diseases in Latin America, such as Chagas' disease, are presenting with varied and unusual clinical manifestations in persons with HIV/AIDS. Moreover, experience with some HIV-related infections has led to their increased recognition in broader populations, such as *Cryptosporidium* in diarrheal disease outbreaks associated with childcare facilities and contaminated municipal water supplies in the United States. Even "new" diseases such as human microsporidiosis are being recognized with increasing frequency because of the expanding population of persons with HIV/AIDS. Three new species of microsporidia (*Enterocytozoon bieneusi, Encephalitozoon hellem*, and *Encephalitozoon* [formerly *Septata*] *intestinalis*) were first described in HIV-infected individuals from North America and the Caribbean. HIV has also been found to affect susceptibility to cervical and other cancers. In the case of another sexually transmitted agent, human papillomavirus (HPV), the relationship between certain strains of HPV and the development of cervical cancer have been well established. Cervical cancer, the leading cause of death from cancer among women in developing countries, is expected to increase because HIV-induced immunosuppression facilitates HPV-induced neoplasia.

Although worldwide in scope, the emergence of dengue and dengue hemorrhagic fever (DHF) as a major public health problem has been most dramatic in the Americas, where the mean annual number of reported DHF cases between 1989 and 1993 increased over 60-fold as compared to the preceding five-year period (1984-1988). Dengue has now become hyperendemic (types 1, 2, and 4) in many countries in the American tropics; during the last 10 years, five countries in South America have experienced major epidemics, following a period of over 50 years in which the disease was largely absent. The geographic distribution of *Aedes aegypti* in 1995 is similar to its distribution prior to the successful eradication campaigns of the 1950s and 1960s. As of this year, 15 countries in the Region of the Americas had reported confirmed cases of DHF, and DHF is now endemic in many of these countries. In 1994 dengue type 3 virus activity was detected in Nicaragua and Panama and in 1995, in Costa Rica, Honduras, and El Salvador, representing the first reappearance of this strain in the Americas in 16 years.

The South American arenaviruses provide an important example of how exploitation of new areas for human settlement and agriculture will increase the likelihood that new infectious diseases will emerge. A new member of this group of rodent-borne viruses has been discovered on an average of every three years since the first was isolated in 1956. Some are not pathogenic for humans, but five cause human disease and three of these cause important health problems in Argentina (Junín virus: Argentine hemorrhagic fever), Bolivia (Machupo virus: Bolivian hemorrhagic fever), and Venezuela (Guanarito virus: Venezuelan hemorrhagic fever). The pattern of these emerging infections is that humans become involved when they enter new areas where viruses are circulating among wild rodents and that the viruses may spread to involve wide geographic areas.

Yellow fever mainly affects five countries of the tropical Americas. It occurs sporadically or causes relatively small outbreaks among persons exposed to

the infection in forests where it is enzootic. The disease re-emerged with dramatic force in Peru in 1995, causing the largest outbreak in the country's history. Nearly 400 cases have been notified (provisional figure), with a case-fatality rate approaching 50%.

Vulnerability to emerging infections is not limited to the developing nations of tropical America. In 1993, the United States experienced the largest waterborne disease outbreak ever recognized there. The source was an urban municipal water supply contaminated with *Cryptosporidium*—an intestinal parasite that causes prolonged diarrheal illness in the immunocompetent and severe, often life-threatening, disease in the immunosuppressed. Also in 1993, the emerging bacterial pathogen *Escherichia coli* O157:H7 caused a multi-state foodborne outbreak of hemorrhagic colitis and hemolytic uremic syndrome, with at least four deaths among infected children.

Likewise, a previously unknown hantavirus was identified in the four-corner area of the United States (Arizona, Colorado, New Mexico, and Utah) as the etiologic agent of hantavirus pulmonary syndrome. This infection, which was linked to exposure to infected rodents, has affected primarily otherwise healthy young adults and has demonstrated a cumulative mortality approaching 50%. Over 100 cases have been identified in 22 states in the United States; Canada has reported seven cases. Elsewhere in the Americas, recognition of hantavirus is also increasing. Three cases, with two deaths, have been confirmed in Brazil, while Argentina has recently released data suggesting that three outbreaks of hantavirus pulmonary syndrome occurred in that country between 1991 and 1995.

Regional Plan of Action

In recent years considerable attention has been given to the serious threat posed by new, emerging, and re-emerging infectious diseases. The magnitude of the problem is illustrated by the appearance of several new pathogens causing disease of marked severity, such as the human immunodeficiency virus (HIV) and other retroviruses, arenaviruses, hantaviruses, and Ebola virus. Simultaneously, old pathogens, including those which cause cholera, plague, dengue hemorrhagic fever, and yellow fever, have re-emerged and are having a considerable impact in the Americas. Microorganism mutations leading to drug and multi-drug-resistant strains of *mycobacterium, tuberculosis*, enterobacteria, staphylococci, pneumococci, gonococci, malaria parasites, and other agents have been occurring continuously and are becoming major obstacles to the control of these infections. Some of these infections exhibit a focal geographic distribution, whereas others are widely dispersed and, in some cases, tend to become a global problem.

In response to this alarming trend, in June 1995 PAHO convened a meeting of international experts to discuss strategies for the prevention and control of new, emerging, and re-emerging diseases. As result of this meeting, a Regional Plan of Action was prepared to develop regional and subregional approaches and to guide Member States in addressing specific problems.

Goals and Objectives

The goals and objectives of the Plan are as follows:

Goal 1: Strengthening regional surveillance networks for infectious diseases in the Americas

The purpose of regional surveillance networks is to provide the vigilance and rapid response capability required to better detect, contain, and prevent new and resurgent infectious diseases in the Americas. Such networks should monitor infectious agents, the diseases they cause, and the factors influencing their emergence. Well-run surveillance networks are invaluable tools for disease monitoring and assessment. Specifically, surveillance serves to: characterize disease patterns by time, place, and person; detect epidemics; generate hypotheses for epidemiologic investigation; evaluate prevention and control programs; project future health care needs; and lower health care expenditures by facilitating earlier implementation of intervention strategies. Surveillance networks that are closely linked with reference diagnostic support function as early warning systems for emerging infections.

Objectives:

- Provide the regional leadership and coordination needed to enhance and integrate existing infectious disease surveillance networks in the Americas to ensure adequate vigilance for new, emerging, and re-emerging infectious diseases.
- Establish a regional steering committee for emerging infectious disease surveillance that will develop priorities for regional surveillance and work closely with other regional efforts to enhance surveillance.
- Develop uniform guidelines for Member States that program-matically link surveillance and reference diagnostic services, emphasizing that such services are inherent governmental functions and responsibilities.

Goal 2: Establishing national and regional infrastructures for early warning of and rapid response to infectious disease threats through laboratory enhancement and multidisciplinary training programs

Careful design of the components needed to ensure appropriate resource development and integration of those resources among local, national, subregional, and regional partners should facilitate the establishment of truly useful infrastructures. Components of a program for early warning and rapid response to emerging infections should include: (1) human resources; (2) facilities for laboratory, clinical, and training support; (3) appropriate communications networks; (4) an organizational structure that integrates the different infrastructural elements, provides for basic logistical support (e.g., procurement, specimen handling/storage, and shipping of specimens to reference facilities); (5) political/governmental support that integrates the program into overall national health priorities; and (6) a long-term plan for fiscal support and budgetary management.

Objectives:

- Develop an organizational structure that integrates the different infrastructural elements, provides for basic logistical support (e.g., procurement, specimen handling/storage, and shipping of specimens to reference facilities), and has sufficient political/governmental support to integrate the program into overall national health priorities.
- Develop a long-term plan for fiscal support and budgetary management.
- Establish mechanisms to assign, redeploy, and maintain the necessary human resources through training and career development programs.
- Secure the necessary facilities for laboratory-based diagnosis and research, clinical evaluation and care, and training.
- Develop communications links among program participants that are "level-appropriate" and emphasize feedback to and participation of communities.

Goal 3: Promoting the further development of applied research in the areas of rapid diagnosis, epidemiology, and prevention

With the exception of Region-wide emerging infectious threats such as cholera, tuberculosis, and HIV, disease-specific research priorities will likely be developed on a country-by-country basis. Some general principles, however, can be used when assessing priority applied research needs for new and emerging infections in the Americas. For purposes of discussion, these principles can be classified into three broad categories: diagnostics, epidemiology/prevention effectiveness, and clinical studies.

Objectives:

- Develop rapid, simple, and cost-effective diagnostic techniques for emerging pathogens of importance in the Americas.
- Expand efforts in epidemiologic and prevention effectiveness research.
- Develop clinical research protocols designed to answer critical questions on pathogenesis and a spectrum of emerging infections.

Goal 4: Strengthening the regional capacity for effective implementation of prevention and control strategies

Prevention and control strategies will complement Goals 1-3 and can be viewed as the "action" and "feedback" components of the Regional Plan of Action. Emphasis will be placed on information dissemination systems/programs, aggressive efforts to develop and rapidly implement educational programs on antimicrobial resistance, and enhancement of emergency response and outbreak control measures.

Objectives:

- Develop programs for the appropriate dissemination of prevention guidelines and other critical information on emerging infections.
- Educate both the health consumer and provider about the inappropriate use of antibiotics and the development of antimicrobial resistance.
- Enhance regional outbreak control measures.

Strategies

The following strategic approaches have been established for each of the defined goals of the Regional Plan of Action.

1. Strengthening regional surveillance networks for infectious diseases in the Americas

Several surveillance networks are presently functioning in the Americas. Some of these networks, such as those for polio and measles, were established as part of eradication programs. Their role has been very valuable in documenting the elimination of these diseases. The cholera network was established after the re-emergence of this disease in the Americas and provides useful information on its distribution in the

Region. The WHONET was developed by the World Health Organization for use in laboratories to monitor antimicrobial resistance and guide the selection of antibiotics, and to identify resistance and quality control problems, at both national and international levels. The influenza and dengue networks and the WHO Collaborating Centers are examples of other networks making significant contributions to the surveillance of infectious diseases in the Americas. In addition, the Caribbean Epidemiology Center (CAREC), the Pan American Foot-and-Mouth Disease Center (PANAFTOSA), and the Pan American Institute for Food Protection and Zoonoses (INPPAZ) have important functions in the surveillance of human and animal diseases. It should also be noted that the Integrated Border Information and Surveillance System (IBISS) for monitoring health events in the United States-Mexico border region is currently under development.

Regional leadership and coordination are necessary to enhance these existing capacities by strengthening and linking established laboratories and surveillance facilities. Advantage should be taken of modern technologies in information management, exchange, and dissemination, such as geographic information systems (GIS), the Public Health Laboratory Information System (PHLIS), and the Internet and World Wide Web (WWW) connections.

Consideration should be given to establishing a regional committee for emerging infectious disease surveillance to develop priorities and enhance regional surveillance, in close coordination with the countries of the Region. The committee could include representatives of leading institutions in these countries.

The purpose of the surveillance should be to detect, promptly investigate, and monitor emerging pathogens, the diseases they cause, and the factors influencing their emergence. In this context, three lines of surveillance should be considered:

- **Micropathogen surveillance.** This approach would rely on laboratory-based surveillance and should utilize techniques for isolation or culture of etiological agents, serological testing, and monitoring of antimicrobial resistance.
- **Syndrome surveillance.** The system would use existing capacities for routine and sentinel surveillance, including public and private hospitals and health clinics. The syndromes to monitor would include respiratory failure of unknown etiology, encephalitis and aseptic meningitis, hemorrhagic fevers (febrile illness with thrombocytopenia), febrile illness with rash, acute flaccid paralysis, dysentery/ acute febrile diarrhea with blood and or mucus, and unexplained jaundice.
- **Surveillance of selected specific factors** known to be associated with an emerging infectious disease, such as environmental changes and food handling practices.

2. Establishing national and regional infrastructures for early warning of and rapid response to emerging infectious disease threats through laboratory enhancement and multidisciplinary training programs

To establish the appropriate infrastructure to respond to a new disease threat, human resources, facilities for laboratory capacities and clinical training, communica-tions, logistical support, and organizational structure must be developed.

Appropriately trained personnel will be a critical component of the infrastructure needed for early warning and rapid response. Training programs should be carried out in partnership with the numerous national institutions that provide such training in the Americas. Particularly important will be the development of education and training activities targeted at practical issues of disease surveillance, recognition, and response. These activities should focus on the country-level medical community to facilitate appropriate specimen collection and handling, the laboratory resources for optimum specimen processing, and the intelligent utilization of data obtained by program managers. Training should also target country-level laboratory personnel. Collaborative programs with organizations in the United States of America and other countries are needed to train specialists in state-of-the-art, field-applicable, and cost-effective technologies.

Career development is essential. There must be a system for training skilled personnel for each of these roles and a career path to ensure retention. This is especially true for surveillance (both laboratory and epidemiologic), where there is often no developed career path and no career incentive. At both regional and national levels, contacts and partnerships with appropriate professional groups (and the development of appropriate groups, when none exist) should be encouraged.

It is necessary to define the complement of minimal laboratory (and epidemiologic) capabilities that should be available at each level (from the local, through national, to subregional and regional), develop guidelines and standard procedures, and assist governments in implementing these guidelines. There

laboratory and epidemiological facilities and for an assessment of their capabilities. This should be done through questionnaires and (as necessary) visits. As a start, all known laboratory networks should be listed and assessed. Regional quality assurance and quality control programs for diagnostic laboratories need to be implemented. Guidelines should be available for sample collection, handling, and storage. Regional self-sufficiency in diagnostics is a goal, with the more specialized reagents produced, at least initially, by appropriate specialized laboratories; the reagents would then be standardized and inventoried regionally. Technology transfer of laboratory diagnostic tests should be encouraged, including appropriate ways to evaluate and utilize tests that might be of particular value in the Region.

Different communication mechanisms are appropriate at different levels, with fax and electronic communications being the major options beyond the local level. Implementing a small number of well-standardized and well-established systems, such as PHLIS (with EPI-INFO) and WHONET (for antimicrobial resistance data), would facilitate data sharing and coordination.

Logistical support must be assured at regional level for the provision of diagnostic reagents, supplies, and equipment. At national level, systems must exist for specimen collection and transport from original sites to laboratories.

3. Promoting the further development of applied research in the areas of rapid diagnosis, epidemiology and prevention

Under the category of applied research are included diagnostics, treatment, prevention, surveillance, development of products, and studies of socioeconomic factors affecting disease transmission.

Each country must determine its own emerging disease priority list. Obviously, the applied research needs will vary, depending on the diseases selected. In many countries, basic epidemiologic information about emerging diseases is still lacking. Research is needed on the prevalence, morbidity/mortality, geographic distribution, risk factors, and presence or absence of appropriate vectors and/or reservoirs, among others.

It is essential to standardize the clinical diagnosis and treatment of newly emerging diseases, and diagnostic protocols should be developed for the major emerging disease groups. Research is needed on the pathogenesis and spectrum of disease caused by emerging agents. This should include acute as well as chronic disease manifestations.

Development of rapid and simple diagnostic techniques for emerging pathogens should have high priority. It would be useful to develop reagents (e.g., recombinant antigens and well-characterized monoclonal antibodies) which could be produced by a regional reference center or by local laboratories, depending on their capabilities.

There should be more field application of molecular epidemiologic techniques. On the other hand, some molecular techniques are not within the capability or budget of every laboratory. Studies of the cost effectiveness of various diagnostic tests should be carried out. There is often a tendency to develop the newest high-tech (molecular) diagnostic test when it may be more cost-effective to continue using a simpler and older test which gives the same information.

Antimicrobial resistance is a growing worldwide problem and a subject urgently needing research. Studies in this area should include the control of antibiotics in animal feed and fish/shrimp farms, testing of new drugs, and evaluation of therapies. Antimicrobial resistance should be studied in health care settings and in the community. It is important that the resulting information be disseminated from researchers to users in the community.

Food- and waterborne diseases are another important area for research. This should include studies of the economic, social, and behavioral factors affecting disease transmission.

Partnerships should be encouraged between investigators in different countries in developing applied research programs. In an era of reduced funding, sharing of resources and knowledge makes good sense.

Development of vaccines and other preventive strategies should have high priority in applied research programs. There should also be periodic evaluation of the cost- effectiveness of different preventive and control measures.

More research is needed on the effects of social, behavioral, and ecologic factors/changes on disease emergence. Research in this area should include the development and testing of innovative interventions to control or prevent emerging diseases.

In many countries, vector control programs now have low priority and are not very effective. Research is needed on alternative vector control strategies. This should include research on social and behavioral risk factors associated with disease risk prevention. There is a growing need for field-trained entomologists to study vector biology and behavior under field conditions.

4. Strengthening the regional capacity for effective implementation of prevention and control strategies

Consideration should be given to three broad areas related to prevention and control strategies for emerging diseases in the Americas:

(a) **Information Dissemination:** This would consist of developing and regularly updating disease-specific prevention and control guidelines for communities and individuals, addressing both biologic and behavioral measures. Their development would require groups of experts for each disease as well as communications experts. Diseases of interest include, but are not limited to, yellow fever, dengue, antimicrobial resistant organisms (*P. falciparum, M. tuberculosis* and enteric bacteria), measles, polio, cholera and other food- and waterborne diseases, viral hemorrhagic fevers, plague, rabies and other zoonoses, trypanosomiasis and other vectorborne diseases. Points of contact to receive and transmit information in countries where action is taken should be properly identified, including organizations and individuals outside the government sector. In addition, in order to involve communities in the fight against emerging diseases, plans must be developed to distribute accurate and timely information for the education of the general public and the health community, making effective use of the press, including radio, television, newspapers, flyers, and other media.

(b) **Antimicrobial Resistance:** It is desirable to seek ways to reduce easy availability of over-the-counter antimicrobial agents, including veterinary applications. This would require efforts beyond the health care community, involving high-level interaction, education, and information dissemination to all sectors. Assistance to the countries in developing rational drug policies should be intensified. A very important aspect entails monitoring sensitivities to antibiotics in each country to allow for optimum selection of effective antibiotic use for individual cases and to eliminate antibiotics with little therapeutic value. Advantage should be taken of software presently available, such as WHONET and PHLIS. Other points to be considered include frequent revision and distribution of lists of essential antimicrobials based on sensitivity data and launching educational campaigns on cost-effectiveness of rational drug use in hospitals. Collaboration should be maintained with the pharmaceutical industry on rational drug use and on standardized labels and warnings, and ethical marketing strategies should be encouraged.

(c) **Outbreak Evaluation and Control:** Several actions should be implemented in order to deal properly with epidemics. For example, for contingency situations it is necessary to develop or update guidelines that include: (i) timely recommenda-tions to coordinate response to outbreaks or threats, including issues related to travel advisories, quarantine, and commerce; (ii) policies and standard operating plans for response to outbreaks, at the regional and country levels; and (iii) lists of individuals and groups with disease-specific expertise, laboratories with disease-specific diagnostic capabilities, and products, such as diagnostic reagents, drugs, and vaccines (both licensed and investigational products). Most importantly, a system for rapid procurement of vaccines, reagents, insecticides and antimicrobials for prompt response to outbreaks should be available. Information management and dissemination procedures should be in place for use during outbreaks, including accurate and regular release of information to the press and public.

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Source: Division of Disease Prevention and Control, Communicable Diseases Program, HCP/HCT, PAHO.

Bellagio Statement on Tobbaco and Sustainable Development

A group of 22 international organizations and individuals met at the Rockefeller Foundation's Bellagio Study and Conference Center in Italy, June 26-30, 1995 to examine the implications of current global trends in tobacco production and consumption, especially in developing countries, for sustainable development.

In the course of presentations and discussions on tobacco use and control and situation analyses from Africa, Asia, and Latin America, the following were noted:

- world-wide, there are only two major underlying causes of premature death that are increasing substantially - HIV and tobacco;
- each year, three million of these 30 million adult deaths in the world are attributable to tobacco. On current smoking patterns, by about 2025 this annual number will rise to 10 million deaths, of which seven million will then be in developing countries;
- of today's children and teenagers, about 300 million will, on current smoking patterns, eventually be killed by tobacco use. The addiction usually starts before adult life;
- each additional 1,000 tons of tobacco production will eventually result in about 1,000 deaths;
- the net economic costs of tobacco are profoundly negative - costs of treatment, mortality and disability exceed estimates of the economic benefits to producers and consumers by at least 200 billion US dollars annually, with one third of this loss being incurred by developing countries;
- there are about 800 million smokers presently in developing countries, and the number is still increasing. It is estimated that half of the men and almost 10 percent of the women in developing countries smoke;
- smoking during pregnancy substantially reduces birth weight, and low birthweight is strongly associated with infant mortality and illness;
- parental smoking increases the incidence of acute respiratory infections and asthma in children;
- women and youth in developing countries are being targeted as a growth market for tobacco.

Participants concluded that: **tobacco is a major threat to sustainable and equitable development.**

In the developing world tobacco poses a major challenge, not just to health, but also to social and economic development and to environmental sustainability.

Tobacco control needs to be more widely recognized as a development priority, but it is not on the agenda of most development agencies. Resources available from the donor community to assist in researching and responding to this pandemic are inadequate in view of the growing global burden of tobacco-attributable disease.

The initiative started at Bellagio will continue, and others will be invited to join an informal partnership which includes those United Nations and bilateral agencies, individual experts, research institutions, media, private sector groups, national agencies, foundations, and non-governmental organizations with particular interest in developing countries in order to:

- facilitate interacting and information exchange on tobacco;
- stimulate appropriate research into the causes and consequences of tobacco use;
- inform and motivate appropriate development agencies to place tobacco control on their agendas;
- accelerate action on tobacco control within agencies and governments;
- build capacity for tobacco control, particular in developing countries;
- support on-going actions and programs within agencies, such as World Health Organization and the Uited Nations Focal Point on Tobacco or Health; and
- mobilize new and additional resources for responding to the development implications of tobacco.

To this end, participants invited the International Development Research Centre (IDRC), Canada, to lead a round-table process of consulting with other agencies, countries and experts in the preparation of a broad-based funding strategy and global partnership that responds to tobacco as a major threat to equitable and sustainable development.

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Venezuelan Hemorrhagic Fever (VHF)

In September 1989, physicians in the state of Portuguesa, Venezuela, became aware of an outbreak of a severe febrile illness, mainly among rural inhabitants of the southern part of the state, which was characterized by fever, headache, myalgia, sore throat, weakness, anorexia, nausea, vomiting and occasionally convulsions. The duration of the illness in nonfatal cases ranged from about 10-14 days. Many of the patients where hospitalized because of unremitting fever, weakness, dehydration and hemorrhagic manifestations (epistaxis, bleeding gums, hematemesis, melena and menorrhagia). All age groups and both sexes were affected, but the highest incidence was in persons 15-44 years of age. Many of the cases were initially diagnosed as dengue hemorrhagic fever or classical dengue. A new arenavirus, designated Guanarito virus, was eventually identified as etiologic agent of the disease, now described as Venezuelan hemorrhagic fever (VHF). Guanarito virus is antigenically related to Junin, Machupo and Lassa viruses, the causative agents of Argentine hemorrhagic fever, Bolivian hemorrhagic fever and Lassa fever, respectively. Phylogenetic studies of the viral S-RNA indicate 30% divergence of Guanarito virus from other arenaviruses.

During the period from September 1989 until May 1995 a total of 105 confirmed or probable cases of VHF were reported to the Venezuelan Ministry of Health and Social Assistance. About 34% of the cases were fatal. Most of the recognized cases have been in persons living or working in rural areas in the municipality of Guanarito, Protuguesa State; however, the surveillance activities have been focused mainly in this region, it is possible that additional VHF cases have occurred in neighboring municipalities or in other states. Without laboratory confirmation, VHF can easily be confused clinically with dengue, yellow fever, idiopathic thrombocytopenic purpura and a number of other prolonged febrile illnesses with leucopenia and hemorrhagic manifestations.

As shown in Figure 1, the largest concentration of VHF cases occurred between October 1989 and February 1992. Cases have been sporadic and have occurred in all months of the year, although more that half of the reported VHF cases have been during the dry season (December to March). During this period of the year there is considerable agricultural and land clearing activity in the affected region.

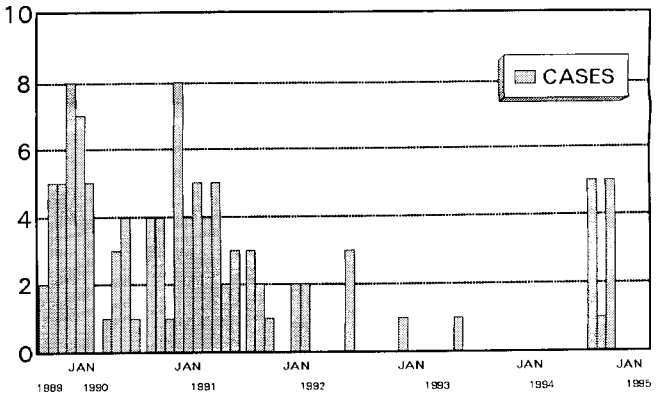
Epidemiologic field studies in the VHF-endemic region have implicated the cotton rat *Sigmodon alstoni* and the cane mouse *Zygodontomys brevicauda* as reservoirs of Guanarito virus. Laboratory studies with experimentally infected *Z. brevicauda* have demonstrated that these rodents develop a chronic infection and shed Guanarito virus in their urine and saliva for up to five months. During the past 2 years, several thousand wild rodents have been trapped in the states of Portuguesa, Barinas, Apure, Guarico and Cojedes in the central plains (llanos) of Venezuela in an attempt to determine the geographic range of Guanarito virus. Naturally infected *S. alstoni* and/or *Z. brevicauda* have been found at almost every site sampled in these five states. Guanarito virus isolation rates among *S. alstoni* at the different sample sites have ranged from 10 to 55%, indicating that the virus has a fairly wide geographic distribution. In contrast, serologic studies among humans living in the states of Portuguesa indicate the <2% of the population has antibodies to Guanarito virus. These data and the sporadic occurrence of the recognized cases of VHF suggest that the human infection with Guanarito virus is relatively infrequent and that transmission must occur under special circumstances that are not yet well understood. Like other arenavirus infections, transmission of Guanarito virus to people is though to be by aerosol from the excreta of infected rodents. To date, there are no confirmed reports of secondary VHF cases among attending hospital personnel or close family members.

Epidemiologic studies are continuing in the VHF endemic area to identify the full distribution of the disease in Venezuela, risk factors for human infection, methods for early detection and treatment of VHF cases, and the pathogenesis of Guanarito virus in its presumed rodent reservoirs. This work is a collaborative effort between scientists: Rosalba Salas, D.V.M., M.S., Instituto Nacional de Higiene "Rafael Rangel", Caracas, the Venezuelan Ministry of Health and Social Assistance; Nuris de Manzione, M.D., Universidad Nacional Experimental de los Llanos Ezequíel Zamora, Guanare; Robert B. Tesh, M.D., The University of Texas Medical Branch, Galveston, and Charles Fullhorst, D.V.M., Dr.P.H. at The Centers for Disease Control and Prevention, Atlanta.

Figure 1

Venezuelan hemorrhagic fever cases

1989-1995



Source: Division of Disease Prevention and Control, Program of Communicable Diseases, HPC/HCT, PAHO.

Regional Status of Malaria in the Americas, 1994

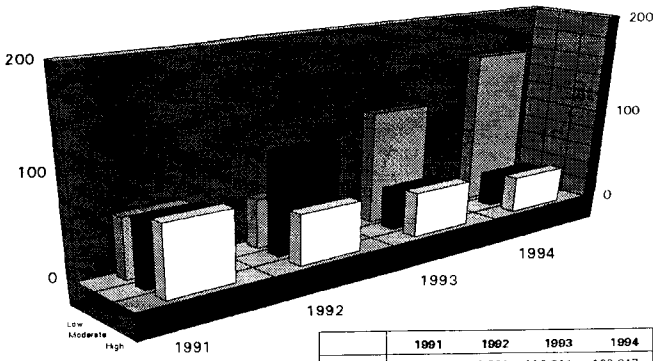
The number of malaria cases reported in the Americas increased steadily from 1974 to 1984. Since then close to 1 million cases have occurred annually, with 1,114,147 in 1994. The largest number of cases were reported from Brazil, which accounted for 50% of the total in 1994, followed by the Andean Countries, which reported 29% of all cases. The highest risk of transmission occurred in the Guyanas, where the annual parasite index was 210/1000, 7 times higher than in Brazil. The Guyanas also had the highest rate of falciparum infection, with half of all infections due to *Plasmodium falciparum,* compared with 1/3 in Brazil and 1/5 in the Andean Countries. Migration into high risk areas and environmental degradation continued to be major factors contributing to sustained malaria transmission. Countries are gradually adopting the global strategy for malaria control, but the process is incomplete.

In 1994 the population of the Region of the Americas was estimated at 763 million, of which 231 million (30.3%) lived in areas where ecological conditions were propitious to the transmission of malaria.

The exposure to the risk of contracting malaria in the Americas yields a different and more accurate picture of the distribution of the disease than one based solely on ecological conditions propitious to transmission. Taking into account that conditions for malaria transmission depend on factors related to population movement, social stability, individual adoption of attitudes and behavior that prevent and protect against human/vector contact, and immediate access to appropriate treatment, the countries of the Americas have redefined their malarious areas on the basis of different levels of risk of exposure to transmission (Figure 1).

Figure 1

Population living in malaria endemic areas* according to transmission level, 1991-1994



	1991	1992	1993	1994
Low	61,235	50,801	116,914	160,947
Moderate	66,504	103,885	41,631	32,967
High	72,381	51,974	46,225	37,409

* Population in thousands for all the Americas.

Table 1
Malaria morbidity in the Americas, 1970-1994

Year	Population (thousands)		Blood slides			Morbidity per 100,000 population	
	Country Total	Malarious Areas*	Examined	Positive	Porcentage	Total Americas	Malarious Areas
1970	505,819	181,257	9,925,162	344,170	3.47	68.04	189.88
1971	513,544	185,492	10,134,212	338,416	3.34	65.90	182.44
1972	524,774	190,448	9,695,953	284,813	2.94	54.27	149.55
1973	535,109	195,528	9,400,682	280,276	2.98	52.38	143.34
1974	544,865	200,755	8,997,318	269,003	2.99	49.37	134.00
1975	555,676	205,872	9,276,878	**356,692**	**3.84**	**64.19**	**173.26**
1976	565,249	211,086	9,352,775	**379,364**	4.06	**67.11**	**179.72**
1977	576,942	215,550	9,274,480	**398,925**	4.30	**69.14**	**185.07**
1978	587,704	220,153	9,493,751	**468,923**	**4.94**	**79.79**	**213.00**
1979	600,263	226,361	8,630,653	515,271	5.97	84.47	227.63
1980	610,021	231,366	8,943,369	602,836	6.74	98.82	260.56
1981	627,375	239,260	9,100,529	629,629	6.92	100.36	263.16
1982	635,954	245,307	8,826,418	715,177	8.10	112.46	291.54
1983	639,212	249,327	9,113,611	830,700	9.11	129.96	333.18
1984	659,535	257,276	9,422,827	931,356	9.88	141.21	362.01
1985	665,777	259,838	9,485,203	910,917	9.60	136.82	350.57
1986	662,983	263,371	10,070,388	950,570	9.44	143.38	360.92
1987	672,941	268,217	9,764,285	1,018,864	10.43	151.40	379.87
1988	703,370	280,758	10,092,472	1,120,040	11.10	159.24	398.93
1989	715,994	285,394	9,638,847	1,113,764	11.55	155.55	390.25
1990	698,741	278,600	9,459,912	1,045,808	11.06	149.67	375.38
1991	721,256	281,124	9,732,930	1,230,671	12.64	170.63	437.77
1992	725,564	289,948	9,373,323	1,187,316	12.67	163.64	409.49
1993	739,561	289,584	9,633,125	983,536	10.21	132.99	339.64
1994	763,305	231,323	8,261,090	1,114,147	13.49	145.96	481.64

* Areas with ecological risk for malaria transmission.
Information from some countries is incomplete.

With regard to a more accurate characterization of the risk of malaria in the Region, Table 1 shows an increase in the malaria morbidity rates, on the basis of total population of the Americas as well as the population inhabiting areas that are ecologically propitious to transmission. Table 1 also shows an increase in the diagnostic efficiency of the blood samples taken, which is the result of a better concentration of surveillance in the areas of highest risk. This is also corroborated by the fact that a 2.7% increase in relation to 1993 in epidemiological surveillance of high-risk areas, accompanied by a significant reduction in surveillance in the areas of low and medium risk (27% and 16.2%, respectively) in the same period.

In the countries of the Americas with active transmission (Table 2), 35.6% of the population (146 million) is exposed to the areas of greatest risk of transmission. In 1994 a 13.3% increase in the number of cases diagnosed was reported in relation to the previous year, partially due to a 14.6% increase in *P. falciparum* infections, the etiologic agent of malignant tertian malaria, which indicates the high intensity of the malaria transmission in these areas.

In recent years the epidemiological stratification of malaria in the Americas has been accompanied by the integration of case finding, diagnosis, and immediate treatment activities by local health services. This can be appreciated by the fact that surveillance of 1.9 million suspected cases, with diagnostic efficiency by the local health services increased from 10.5% in 1993 to 16.2% in 1994. In addition, active surveillance has declined by 22.7%, which was anticipated due to the low diagnostic efficiency and high operational cost of this activity. The 42.7% reduction in the number of slides taken from febrile individuals by volunteer collaborators could reflect the implementation of the "clinical disease management" component of the new "Global Malaria Control Strategy" adopted by the countries of the Region in 1992. Nevertheless, this greater availability of treatments by the volunteer collaborators is not reflected in the overall quantity of treatment provided which was maintained at the same level as in 1993, probably indicating a change in the distribution of resources within the different services in the countries.

Table 3 details the geographic-political divisions as well as the demographic location of exposure to high risk, its causes, and the measures used for their control are presented. From the characterization of the factors that determine the persistence of the transmission, various control measures are identified and stand out the need for intersectoral coordination in order to ensure the sustainability of these measures over time.

Table 2

Epidemiological situation of 21 countries with active malaria programs, 1994

Countries by geographic subregions	Population of malarious areas*	Blood Slides		Parasites species		
		Examined	Positive	falciparum and mixed	vivax	malariae
Mexico	45,248	1,923,575	12,864	63	12,801	-
Belize	210	49,179	9,957	400	9,557	-
Costa Rica	1,015	143,721	4,445	3	4,442	-
El Salvador	4,951	139,587	2,803	5	2,798	-
Guatemala	3,222	133,611	22,057	423	21,634	-
Honduras	2,319	315,893	52,110	568	52,110	-
Nicaragua	4,264	355,661	41,490	1,427	40,063	-
Panama	313	220,062	684	18	666	-
Sub-total	**16,294**	**1,357,714**	**133,546**	**2,844**	**131,270**	**0**
Haiti	5,628	54,973	23,140	23,140	-	-
Dominican Rep.	7,376	316,182	1,670	1,664	5	1
Sub-total	**13,004**	**371,155**	**24,810**	**24,804**	**5**	**1**
French Guyana	55	48,242	4,241	3,809	415	17
Guyana	132	168,127	39,566	22,503	16,985	-
Suriname	42	29,148	4,704	4,389	240	75
Sub-total	**229**	**245,517**	**48,511**	**30,701**	**17,640**	**92**
Brazil	20,600	2,671,953	564,406	197,009	367,251	146
Bolivia	3,009	128,580	34,749	4,806	29,916	-
Colombia	24,620	572,924	127,218	34,070	93,108	40
Ecuador	6,095	301,546	30,006	10,241	19,765	-
Peru	11,171	295,824	122,039	21,203	100,801	35
Venezuela	746	123,953	13,727	3,416	10,294	17
Sub-total	**45,641**	**1,422,827**	**327,739**	**73,736**	**253,884**	**92**
Argentina	5,366	14,070	948	1	947	-
Paraguay	1,270	96,885	583	12	571	-
Sub-total	**6,636**	**110,955**	**1,531**	**13**	**1,518**	**0**
TOTAL	**147,652**	**8,103,696**	**1,113,407**	**329,170**	**784,369**	**331**

* Population in thousands.

Table 3

Malarious areas at high risk of transmission, and control priorities, 1994

Countries	Population	Reported cases	Control measures applied in different areas	Principal vectors	Causes producing the persistance of transmission
Mexico:					
Campeche	581,038	262	House, space and antilarval sprayings, individual and massive radical cure treatments, entomological studies and environmental management promotion.	A. albimanus A. vestitipennis A. pseudopunct	Important migratory movements of agricultural workers arriving from the south. Precarious housing. Vector resistance in some dispersed areas of limited extension. Popilation habit of staying outdoors for several hours of the afternoon and evening.
Chiapas	3,184,903	2,750			
Guerrero	2,768,585	386			
Michoacan	2,750,363	589			
Oaxaca	2,984,576	4,510			
Quintana Roo	600,194	586			
Sinaloa	2,345,724	1,795			
Tabasco	1,677,257	188			
Sub-total	**16,892,640**	**11,066**			
Belize:					
Corozal	34,993	1,245	Sprayings and treatments with drugs.	A. albimanus	Population movements. De-reforestation Intense rainfall
Orange Walk	33,207	1,179			
Belice	62,000	680			
Cayo	40,800	3,533			
Stann Creek	20,000	1,210			
Toledo	19,000	2,110			
Sub-total-	**210,000**	**9,957**			
Costa Rica:					
Canton Los Chiles	15,561	302	Radical treatment, focal and space spraying.	A. albimanus	Border areas with intense population movements. Agricultural development with unstable manpower and intense de-forestation. Large flow of susceptibles, inopportune control measures and lack of inter-agency coordination. Low social participation. Defficient decentralization process.
Canton Limon	69,728	849			
Canton Talamanca	15,956	445			
Canton Matina	19,825	984			
Sub-total	**121,070**	**2,580**			
El Salvador:					
Costa Pacifico area hiperendem.	**1,233,133**	**2,254**	Spraying, drug treatments, larvicides, small engeneering works, debnet use.	A. albimanus	Precarious housing, unhealthy environment, migration, low education, poverty, ideal vector habitat and types of cultivation.
Guatemala:					
El Peten	310,838	5,086	Non-coordinated indoor spraying and low coverage of diagnosis and treatment of the population.	A. albimanus	Unstable politics and migration. Insecticide resistance.
Huehuetenango	214,450	1,747			
Quiche	262,108	2,476			
Alta Verapaz	391,300	5,630			
Escuintla	440,932	1,273			
Sub-total	**1,619,628**	**16,212**			
Honduras:					
Region Sanitaria I	247,677	6,804	Integrated measures implemented; drug treatment; different spraying methods for physical and larval control; and community participation.	A. albimanus A. darlingi	Presence of rice crops. Increase of at risk population due to creation of industrial parks and rice cultivation. Migrant populations. Presence of large lagoons that are used for cattle watering.
Region Sanitaria II	285,033	5,484			
Region Sanitaria III	319,209	6,908			
Region Sanitaria VI	99,272	6,739			
Region Sanitaria VII	228,081	8,373			
Sub-total	**1,179,272**	**34,308**			
Nicaragua:					Dscentralization process in development.
Rio San Juan	37,508	1,547	...	A. albimanus	Low coverage of the SILAIS.
Chinandega	357,612	7,539		A. pseudopunct.	High unemployment level.
Leon	373,250	3,916			High human mobility.
Jinotega	190,067	3,391			Urban epidemic.
Matagalpa	403,917	4,703			
Nueva Segovia	139,888	2,456			
R.A.A.N.	115,295	2,404			
R.A.A.S.	72,075	735			
Managua	1,193,930	11,039			
Sub-total	**2,883,542**	**37,730**			
Panama:					Nomadic migration of ethnic groups to the south.
Bocas del Toro	21,888	189	...		Increase of population movements to the north.
Changuinola	64,684	258			
Chiriqui Grande	14,433	96			
Chepigana	29,488	83			
Sub-total	**130,493**	**626**			
Haiti:	...	...	...		...
Dominican Republic:					Border migration.
Comendador	25,118	32	Prophylatic treatments for inmigrants drug treatment barrier, peridomicile fogging indoor spraying, cleaning of channels, fish rearing, breeding site treatment with Bti.	A. albimanus	Commercial exchange. Rice growing. Extensive use of migrant manpower for agriculture and construction.
Banica	11,632	14			
El Llano	9,986	2			
Pedernales	19,471	3			
Dejabon	24,407	99			
Partido	5,570	4			
Sub-total	**96,184**	**154**			
French Guayana	...	...	...		...
Guayana					Forestry and mining areas of Amerindian groups.
Region I		11,415	Diagnosis.	A. darlingi	Migratory movements for exploitation of gold, forests and natural reserves.
Region VII		4,419	Radical treatment.		
Region VIII		8,692			
Region IX		3,506			
Sub-total	**53,497**	**28,032**			

Table 3

Malarious areas at high risk of transmission, and control priorities, 1994

Countries	Population	Reported Cases	Control measures applied in different areas	Principal Vectors	Causes producing the persistence of transmission
Brazil					
Acre	401,961	25,813	Integrated control of low coverage due to difficult access and low stability of the descentralization process. Lack of coordination between financial and administrative policies.	A. darlingi	All the epidemiologic factors that determine malaria transmission in "ecological areas of the agricultural frontier", mining areas and internal migration.
Amapa	94,200	6,539			
Amazonas	479,073	45,043			
Maranhao	271,629	8,642			
Mato Grosso	439,995	93,550			
Para	1,271,090	147,640			
Rondonia	695,757	127,121			
Roraima	259,763	24,467			
Sub-total	**3,859,468**	**478,815**			
Peru:					
Piura	727,932	26,880	Diagnosis and treatment through the general health services. Residual spraying, spatial spraying environmental health.	A. pseudopunct. A. benarrochi	Delays in th eimplementation of the global malaria control strategy. Implementation process started in 1994.
Sullana	428,682	19,845			
Tumbes	142,264	4,260			
Loreto	588,135	14,211			
Jaen	390,561	13,605			
Lambayeque	129,271	7,377			
San Martin	211,944	7,685			
Ucayali	45,762	4,975			
Madre de Dios	66,884	2,026			
Sub-total	**2,731,435**	**100,864**			
Venezuela:					
Amazonas	58,000	1,379	Spraying and fogging, application of larvicides.	A. darlingi A. aquasalis A. nuneztovari	Mining areas without control, in the rainforest. Migrant movements in the border areas.
Bolivar	82,162	820			
Delta Amacuro	2,200	321			
Táchira	23,112	52			
Apure	16,694	1,246			
Sub-total	**182,168**	**3,818**			
Argentina:					
Fase de ataque	24,741	752	Epidemiologic surveillance and spraying.	A. pseudopunct.	Intense internal and external migration. Accessibility limited by climatic factors. Economical and financial factors limit activities.
Sector I-Tartagal					
Sector II-Oran					
Paraguay:					
Caaguazu	442,725	308	Detection and treatment of cases, house spraying.	A. darlingi	Increase of the number of breeding sites. Migrations. Indigenous groups. Temporary workers.
Alto Paraná	447,122	125			
Sub-total	**889,847**	**433**			
Bolivia:					
Depart.: BENI	32,286	3,106	Case detection and supervised treatments, chemical control and physical control of breeding sites with petroleum. Health education in prevention and control.	A. darlingi A. pseudopunct.	Lack of complete and clear political decision. A priority level was only assigned from August onwards. Permanent migration with border communities of Brazil and to the south with Argentina. Resistance to change and implementation of new strategies among some malaria officers. Lack of complete economic support.
Provincias					
Vaca Diez					
Depart.: PANDO	2,132	1,459			
Provincias					
Fco. Román					
Manuripi					
Abuna					
Nicolás Suárez					
Depart.: TARIJA	33,770	645			
Provincias					
Gran Chaco					
O'Connor					
Depart.: chuquisaca					
Provincias					
1,4,5,10					
Oropeza					
Tomina					
H. Siles					
Luis Calvo					
Sub-total	**68,188**	**5,210**			
Colombia:					
1. Bajo Cauca	446,122	51,183	Indoor spraying, physical control. Impregnated bednets, topical repellents.	A. albimanus A. nuneztovari A. darlingi A. puntimacula A. evansae	Socio-political factors. Mining. Drug treatments. Migration. Colonization. Illicit crops. Vector behavior.
2. Orinoquia	567,452	34,660			
3. Pacifico	941,530	15,880			
4. Urabá	507,446	10,730			
5. Amazonia	481,608	8,017			
Sub-total	**2,944,158**	**120,470**			
Ecuador:					
Esmeralda	388,853	9,702	Indoor house spraying.	A. albimanus	Low operating coverage by the national program. Lack of political willingness to solve labor conflicts within the old centralized structure.
El Oro	38,248	728			
Los Rios	168,324	1,842			
Manabi	110,892	1,382			
Canar	30,760	708			
Cotopaxi	23,798	293			
Loja	23,476	360			
Sucumbios	46,498	467			
Pastaza	12,723	219			
Napo	9,554	233			
Sub-total	**853,126**	**15,934**			

... Information is not available

Table 4

National funds assigned to the health sector, public health and malaria programs, 1994

(Amounts US dollars)

Countries by geographic subregions	Health Sector Budget (total)	Public Health Budget	Percentage assigned to Public Health	Malaria Program Budget	Porcentage for Health Sector	Malaria Program Loans or Grants
Mexico	13,292,300,000	1,515,457,000	11.40	30,297,000	0.23	-
Belize	33,667,667	2,648,610	7.87	617,462	1.83	79,407
Costa Rica	-	185,320	-	138,000	-	393,308
El Salvador	1,095,153,300	100,789,020	9.20	1,314,286	0.12	682,571
Guatemala	...	...	...	...	...	288,703
Honduras	...	70,646,659	...	1,611,927	...	576,382
Nicaragua	...	...	...	...	...	386,004
Panama	343,350,300	171,657,150	49.99	3,633,545	1.06	124,224
Haiti	...	...	...	50,000	...	...
Dominican Rep.	...	...	...	667,171	...	...
French Guyana	...	...	...	...	...	-
Guyana	7,698,858	1,477,531	...	295,483	3.84	-
Suriname	360,554	50,245	13.94	5,494	1.52	...
Brazil	9,411,764,706	8,705,882,353	92.50	12,117,647	0.13	24,400,000
Bolivia	...	103,070	...	619,430	-	20,000
Colombia	1,038,105,568	637,814,868	61.44	14,614,045	-	-
Ecuador	126,458,939	...	...	5,253,888	4.15	-
Peru	-	-	-	3,062,696	-	-
Venezuela	4,950,294,950	3,026,720,994	61.14	24,233,445	0.49	25,319,792
Argentina	...	...	...	3,000,000	...	-
Paraguay	230,565,206	91,179,875	39.55	1,030,831	0.45	-
TOTAL	**30,529,720,049**	**14,324,612,695**	**46.92**	**102,562,351**	**0.336**	**52,270,391**

... Information not available.

With regard to the measures used to protect against transmission, the vector control activities continue to be applied by the countries, with an increase in relation to 1993 in the quantity of insecticides used; on the order of 40% for DDT and 100% for Fenitrothion in 1994.

The control programs, however, are undergoing a drastic reduction in budgetary funding and therefore are obtaining more of their financing each year through loans and grants from outside the health sector. Table 4 reflects a 41% reduction in the regular budget as compared to 1993, and a 75% increase in loans and grants. Moreover, an important increase is seen in investment in research on malaria in endemic countries of the Region. In Brazil, Colombia, Mexico, and Venezuela US$ 6.5 million were invested for research in 1994--a 58% increase over the previous year.

Source: This article is a summary from the original document"Regional Status of Malaria Program in the Americas". It has been prepared by the Division of Disease Prevention and Control, Program of Communicable Diseases, HCP/ HCT, PAHO.

Congresses, meetings and publications

VII Annual Scientific Meeting on Epidemiology,
Carabobo, Argentina

The VII Annual Scientific Meeting on Epidemiology will be held in the city of Valencia, the State of Carabobo from 18-21 October 1995. Prior to the meeting, courses will be offered on 17 and 18 October 95.

IV National Congress on Hygiene and Epidemiology,
Havana, Cuba

The IV Congress on Hygiene and Epidemiology will be held in Havana, Cuba from 18-22 November 1995.

On 18 and 19 November, prior to the Congress, courses will be offered on: health surveillance; clinical epidemiology; social perspectives on epidemiology; health and the environment; surveillance of micronutrients; techniques for rapid epidemiological assessment; risks, population, cause of diseases, and the environment; uses of epidemiology in planning and evaluation of health services; the epidemiology of cancer; and health promotion in primary care.

For additional information, contact:

The Permanent Secretary, IV National Congress on Hygiene and Epidemiology
National Council of Scientific Societies,
Ministry of Health
Calle L, #406 E/C 23 y 25 Vedado, Plaza de la Revolucion,
Habana 4, Codigo Postal #10400
or, The Convention Center ORTOP
Fax: (537) 33-14-22, (537) 33-64-44
Telex: 511983 ORTOP CU

II National Congress on Public Health and I National Congress on Epidemiology,
Atlapa, Panama

From 9-11 November 1995 the II National Congress on Public Health and the I National Congress on Epidemiology will be held in Atlapa, Panama. The principal theme will be "Epidemiology in Health Sector Reform."

Additional topics to be discussed during the congresses are: the process of health sector reform in Latin America, epidemiological perspectives in the analysis of the health situation, environmental epidemiology and sustainable human development, and challenges for the health sector in the XXI century.

VI National Seminar on Epidemiology
Barranquilla, Colombia

The VI National Seminar on Epidemiology was convened in Barranquilla, Colombia. The main theme was: "New Challenges in the Epidemiology of Transmissible Diseases."
The pre-congress courses were on: epidemiological surveillance, EPIDAT, burden of diseases, meta-analysis, and how to write a scientific article. Research findings were presented.
The following related themes were discussed: the challenge of epidemiology in Colombia, new techniques for the control of malaria, contemporary aspects in the surveillance and control of dengue, recent trends in the epidemiology of HIV/AIDS, virus and cancer, leishmaniasis in Colombia, new perpectives in the surveillance of tuberculosis, etc.

Publication

***Dengue and Dengue Hemorrhagic Fever in the Americas:* Guidelines for Prevention and Control**
Pan American Health Organziation
Scientific Publication No. 548, 1995
(ISBN 92 75 11548 6) Price: US$ 15.00

Dengue, and its potentially fatal forms, dengue hemorrhagic fever and dengue shock sydrome, again have become a serious health problem in many parts of the Americas. Althought a campaign once practically eradicated *Aedes aegypti*, the disease's principal vector, from the Region, most of the countries were reinfested and have suffered epidemics due to the curtailing of public expenditure on health that ca took place during the 1980s. Clearly, a new set of guidelines are needed, particulary since previous ones are either obsolete or incomplete.

This publication presents new guidelines that stress the fact that dengue is primarily a problem of domestic sanitation. Trough physical means and without the overuse of chemicals, *A. aegypti* and the other important vector, *A. albopictus*, can be eliminated. Contrary to the centralized and guidelines emphasize ways to transfer the responsability, capability, and motivation for dengue control and prevention to the comunity.

Prepared by eigth representatives from seven countries in the Americas and several PAHO staff members, all experts in the field, this publication fills a critical niche in the fight against dengue in the Americas, and is an invaluable tool for health professionals working in vector control everywhere.

This publication is available in spanish and english and can be obtained from the Publications Program (HBI), Pan American Health Organization, 525-twenty-Third Street, NW, Washington DC 20037.

Geographic Information Systems in Epidemiology (Epi-GIS)*

Geographic information Systems in Epidemiology (Epi-GIS) are computerized systems that enable the visualization, handling, integration and analysis of geographically referenced health information and are used for mapping the health situation and epidemiological risk profiles.

In order to strengthen them in the countries of the Region, the Health Situation Analysis Program, Division of Health and Human Development of PAHO is pursuing the following objectives:

- To support the development of Epi-GIS for their utilization in health situation analyses, including also operational applications for use in health planning at the local, regional and national levels;

- To provide technical assistance in the creation and use of epidemiologically important databases for their integration in Epi-GIS, in the epidemiological analysis of geo-referenced information and in the selection of hardware and software in concordance with the needs of institutions and health programs; and,

- To promote and conduct workshops, courses and scientific meetings on Epi-GIS at the national and regional levels.

Training of health personnel in Epi-GIS; development of cartographic and epidemiologic databases; digitizing of geographic priority areas; production of thematic maps; dissemination of results from geo-epidemiologic analyses and direct technical assistance in Epi-GIS are among the most relevant activities to reach the objectives.

* Further detail on this topic will be included in the next issues of the Epidemiological Bulletin.

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PAHO's Epidemiological Bulletin is published quarterly in English and Spanish.
Catalogued and indexed by the United States National Library of Medicine.
Printed on acid-free paper.

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WORLD HEALTH ORGANIZATION
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