

HIV and AIDS Research in Latin America and the Caribbean: 1983-1991

Acquired immunodeficiency syndrome (AIDS) is a growing public health problem in the Americas. As of December 1992, 59,723 AIDS cases had been reported in Latin America and the Caribbean (LAC). In addition, more than one million persons are already infected with HIV in these countries, and this number is expected to double by 1995.

In light of this rampant increase in the number of infected persons, research efforts in LAC could aid in controlling the spread of HIV infection. For instance, HIV research can provide the information needed to assess the magnitude of the problem, set program objectives, and improve the efficiency and effectiveness of interventions. In other words, the results of HIV research can empower the LAC countries to control the spread of HIV.

However, HIV research not only provides guidance to HIV control strategies, but also is crucial both to the development of a new understanding of HIV's pathogenesis and natural history and to the generation of new interventions to prevent and treat HIV infection. This role of research is particularly important for LAC countries since current knowledge about HIV infection and effective control of its spread has been generated mostly in more developed countries and thus may not be totally applicable to those countries that are less developed. Given the social specificity of behaviors and other risk factors associated with HIV transmission and the geographic variability of the genetic structure of HIV strains that could translate into distinctive human immunological responses and clinical manifestations, studies among selected populations in LAC countries can provide a unique insight into the determinants of HIV infection and the interventions that can prevent it.

The status of HIV research in LAC has not been evaluated as yet. As a first step toward this objective, an inventory was conducted of HIV-related research projects in LAC countries in order to identify all past and ongoing HIV research. This paper summarizes the major features of this research as reflected in the inventory.

From March to September 1991, completed and ongoing HIV-related research projects were identified in Latin America and the Caribbean. In each country, principal investigators of these projects were then asked to complete a self-administered questionnaire to provide information about the research projects. These investigators were assisted in this endeavor by national collaborators specifically hired and trained for this purpose. If the principal investigator was not a resident

of the country in which the research was conducted, the top ranked associate national investigator completed the questionnaire.

The basic unit of analysis is the research project. A research project was defined as the sum total of organized activities a researcher carries out within an institution to generate scientific knowledge. These projects were classified into six content areas: (1) basic; (2) epidemiological, including natural history of HIV; (3) vaccine; (4) diagnostics; (5) clinical and drug development; and (6) social, behavioral, and intervention research. Projects were also categorized as descriptive or analytical, according to the purpose of the study, and as longitudinal or cross-sectional, depending on whether or not the study was designed to establish the temporal relationship between the event studied and exposure.

Principal investigators were also requested to list the total number of their previous scientific publications, whether HIV related or not. They were then asked whether the results of the HIV research projects reported to the inventory had been published and if so, where. In general, results were published as abstracts in the proceedings of scientific meetings, papers in national scientific journals, papers in scientific journals outside LAC (which will be considered international for our purposes), or as books or chapters in books.

The inventory identified a total of 652 projects; however, 68 were found to be ineligible and another 23 projects were considered to be part of a broader research undertaking that had already been reported to the inventory and thus were viewed as part of a single project. Therefore, the final sample size available for analysis was 561.

The first HIV research project in Latin America and the Caribbean was started in 1983. Since then 560 other research projects have been initiated up until 1991, the cutoff date of the inventory. The majority of these projects (73.6%) were begun in 1989 or thereafter, and only about one-third (34.8%) had been completed by the time the inventory was compiled.

Brazil and Mexico, with 143 and 135 research projects respectively, account for half (49.6%) of all HIV research projects in LAC. Another 20% of all projects were conducted in countries located in the Caribbean, 11.2% in the Andean subregion, 10.5% in the Southern Cone, and 8.9% in Central America.

A total of 1,630 researchers were involved in these projects, 388 of whom were principal investigators of one or more projects. The majority of the principal

investigators (90.5%) were natives of the country in which the study was conducted. Over one-third of the projects (37.9%) were conducted by researchers within academic institutions; roughly another third of the projects (32.4%) were carried out under the auspices of governmental public health institutions such as local or national epidemiology services. In addition, 20% of the projects were conducted in clinical health care settings having no academic affiliation, while the remainder (10%) were conducted primarily by nongovernmental organizations.

Research Areas And Topics

Of the 561 HIV research projects, 38.5% were classified as epidemiological, 30.1% as social, behavioral, or interventional; and 23.5% as clinical. Subject areas studied less frequently were diagnostic procedures (4.5%) and basic science projects (3.4%), including HIV genetic variability studies.

In the epidemiology area, topics typically explored included HIV seroprevalence and epidemiological descriptions of the HIV situation, usually from epidemiological surveillance sources. Seroprevalence studies account for 18.7% of all research projects making seroprevalence along with knowledge, attitudes and practices (KAP) of respondents the most frequently studied topics. Twelve of the seroprevalence surveys were linked to a behavioral questionnaire.

In the area of social, behavioral, and intervention research, 105 projects, or 18.7% of all projects, surveyed the HIV-related KAP of respondents. The majority of the studies in the area of clinical and drug development addressed the frequency of occurrence of clinical manifestations of HIV infection either by anatomic system or specific opportunistic infectious agent. This issue accounted for 16.6% of all 561 projects, making it the third most broadly investigated topic. The rest of the studies in this area focused on the efficacy of either antiviral drugs or drugs that treat opportunistic infections related to HIV infection.

Study Methodology

Study design varied among the research projects reported to the inventory. About 60% were cross-sectional in design; approximately 19% had longitudinal designs, including most natural history studies and 23 clinical trials; and 4.3% had retrospective designs. Nearly 10% of the studies were either case reviews or analyses of registries and other secondary data sources.

Almost half of the studies (49.4%) were based on convenience samples. Of the cross-sectional studies, 52% recruited convenience samples. These included the seroprevalence and KAP surveys, as well as those descriptive studies exploring the clinical manifestations

of HIV infection by either anatomic system or specific opportunistic infection agent.

About 30% of the studies had sample sizes smaller than 100, and another 29% had sample sizes between 100 and 400. In contrast, 24% of the research projects had sample sizes greater than 1000 subjects. Projects with sample sizes greater than 400 were more likely to research epidemiologic topics. In fact, unlinked seroprevalence surveys had large sample sizes since samples were usually obtained from screening programs such as those of blood banks. Sample sizes of 400 or more were also more likely to have cross-sectional rather than longitudinal or retrospective designs. In addition, they were associated with probability samples rather than nonprobability samples and with selection of subjects on the basis of their HIV status.

Brazil, Mexico and the Caribbean account for almost 90% of the funds spent on HIV-related research (Table 1). Close to two-thirds of all projects (65.2%) reported external funding only or a combination of external and internal funding. Almost one-fourth (23.4%) reported only internal funding while 11.4% did not provide their funding source. External funding of projects totaled \$US 26,914,814, with international funding providing more than half of this amount (59%).

International funding was the sole source of funds for 41.3% of the 366 projects funded by external sources. Among projects receiving external support, another 12.3% obtained partial funding from an international source along with national funding, while 42.0% relied exclusively on a national source of funding. The

Table 1. Distribution of external funds of projects, by subregion.

Subregion	Total \$US	%	Study average
Brazil	10,842,999	40.3	169,422
Mexico	6,340,804	23.6	117,422
Caribbean	6,512,923	24.2	108,549
Andean Region	1,348,871	5.0	30,656
Southern Cone	1,226,300	4.6	23,138
Central America	642,917	2.4	18,369

remaining 4.4% of the projects with external funds did not disclose whether their funding source was national or international.

Projects results were communicated in a variety of ways. About one-fourth of the studies (25.7%) primarily reported their results in abstracts in proceedings of scientific meetings; approximately 8% published articles in national scientific journals, and 4.8% in scientific journals outside LAC. The remainder (60.4%) had not published their studies.

After adjustment for completion of the project the likelihood that a project would publish its results in journals and meetings inside and outside the Region increased if funding was obtained from an international source.

It was also shown that affiliation with an academic institution increased the likelihood that study's results would be published in a scientific journal outside Latin America and the Caribbean. Selection of the sample on the basis of HIV status also increased the likelihood of publication.

The PAHO inventory shows that 64% of all HIV-related research projects describe the magnitude and characteristics of the HIV problem in each country. This pattern is common to epidemiological, clinical and behavioral research areas. Epidemiological description of the problem has been provided by seroprevalence and descriptive studies based on surveillance sources, while the majority of social and behavioral studies have described the KAP of specific groups or the population at large. Finally, most clinical studies have focused on descriptions of HIV-associated clinical manifestations.

This major research effort describing the HIV problem in LAC is a response to the need for basic information in order to initiate the planning of control programs in LAC countries. Such information is vital for determining the magnitude of the epidemic, producing baseline data to measure the efficacy of intervention programs, targetting certain high-risk behaviors for educational intervention, and establishing patterns of clinical manifestations associated with HIV disease. The fact that 73.4% of the projects were started between 2 and 2.5 years before the inventory was conducted corroborates the idea that HIV research in LAC is in its initial stages, and is therefore addressing only the most pressing needs for planning preventive and health care programs.

However, LAC countries must also confront other challenges in HIV research: understanding the virus's pathogenesis and natural history, developing and evaluating preventive strategies, and testing therapies and vaccines. Using broad criteria, 26.7% of the projects would be ranked as research priorities according to the Global Program on AIDS of the World Health Organization. Conversely, following a pattern observed in other developing countries, very few of the projects in LAC address such priority topics as the design and evaluation of HIV preventive interventions, or the impact of HIV infection and care of HIV infected persons. Furthermore, projects addressing vaccine or

drug development issues account for 8% of the projects. Emphasis on the latter area is important, since advances in early diagnosis and clinical management of HIV disease achieved in more developed countries are unaffordable to most people in need of them in LAC.

Because of the wealth of seroprevalence and KAP studies, many of the projects are cross-sectional surveys, and others are small sample clinical case-reviews which have been the traditional form of clinical research in LAC. However, to face the new research challenges in LAC, other study designs are needed.

Continued funding is key to sustaining research efforts in LAC. Total reported expenditure on HIV research in LAC was roughly \$US 27 million for the period 1983-1991. This figure probably underestimates real expenditure since it only takes into account external funding. Nevertheless, it is a small amount compared to the HIV research expenditures in more developed countries. For example, Canada, a country with 10 times fewer reported cumulative AIDS cases than LAC, provided \$US 30 million for HIV research between 1988 and 1991.

In summary, despite some limitations of scientific structures, the results of this study highlight the achievements of HIV research in LAC, nurtured in a rich tradition of health research. The results of this study tell as well of the challenges that lie ahead for HIV research in LAC. Issues such as the efficacy of behavioral and clinical interventions and the natural history of the disease need to be addressed more frequently, using appropriate methodological designs. To respond to these needs, continued funding is required. Although international funding has already provided some support for these efforts, resources devoted to research in LAC countries are meager compared to those of the more developed countries. Similar inequalities in HIV-related scientific production between developing and more developed countries have been documented elsewhere. They should be addressed as yet another facet of health inequalities that the HIV pandemic is producing on a global scale.

(Source: AIDS Program, Division of Communicable Diseases Prevention and Control, PAHO.)

The list of 19 references that document this article is available on request from the AIDS Program, Division of Communicable Diseases Prevention and Control, PAHO, 525 Twenty-third Street, NW, Washington, DC 20037, USA.