

# Collaboration on HIV/AIDS research in Latin America and the Caribbean: comparison of regional and international databases.

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## *Abstract*

This paper presents the results of a research in progress on HIV/AIDS research in developing countries. In this case, the paper refers to the collaboration patterns found among researchers in the Latin American and Caribbean regions. A bibliographic search in both, regional (Latin American and Caribbean Database on the Health Sciences–LILACS) and international (MEDLINE) databases for the period 1982-2005 was conducted. The goal being to compare patterns of collaboration found among regional countries through both databases. Bibexcel 2001 was used to generate the registry files needed for the following indicators: authorship; country of publication; type of documents; subject content of the publications, and language. Results described that collaboration was more visible in MEDLINE than in LILACS. It was also found that the USA was the leading country in collaboration with all the 12 countries analysed. The paper further discusses on the implications of this type of research for developing countries and provides practical applications of the results derived from the study.

## *1. Introduction*

International collaboration in health research has been an important issue of discussion among scientists. It has been shown that this type of collaboration provides among other benefits, better visibility and major citations to those publications derived from this type of communication [1, 2]. Overall international scientific collaboration is growing as a percentage of all scientific activity. Reasons for collaboration go beyond scientific compatibility and complementarity. According to a report from the World Bank 2001 [3], such reasons vary from geographic proximity, to history, common language, specific problems and issues, expertise, and research equipment, databases and laboratories. When scientific motives drive the research, scientists report that shared interest in the research problem is the leading reason for collaboration.

International collaboration in health research among scientists of developed and developing countries has also been an issue of discussion [2, 4-7]. During the so called *scientific colonialism* it was the northern; i.e., developed country collaborator who dictated the scientific agenda execution, as funding came mainly from the northern institutions. Developing country researchers were left at the

mercy of their northern partners [8]. Clearly, there are brighter signs today that northern partners are willing to transform such dubious north-south collaborations into what is now often referred to as *true partnership* [3, 9].

## 2. *HIV/AIDS in the Latin America and Caribbean (LAC) regions*

After twenty years of the AIDS epidemic, HIV has spread worldwide and become one of the leading causes of death in many countries [10]. Although the impact of the HIV/AIDS epidemic in LAC has not yet reached the magnitude evident in Africa, HIV is well established and in danger of spreading rapidly in the absence of effective responses. An estimated 1.7 million adults and children with HIV/AIDS live in Latin America and an additional 440 000 live in the Caribbean. In LAC, the number of deaths attributable to AIDS in 2004 exceeded 100 000 [11].

In addition to the challenges posed by the varied epidemiological patterns of spread and high seroprevalence rates, preventive efforts in LAC are impacted by economic, political and sociocultural factors [12-14]. Unequal economic development in the region, coupled with the perception that HIV was not a serious problem, led to a slow governmental response to the HIV epidemic in many LAC countries [12]. Although some data are available, the region lacks a well-functioning surveillance system that could be used to track the current dynamics of the epidemic and effectively plan prevention efforts [15]. Political instability, high levels of unemployment, guerrilla warfare, and the extreme poverty of many LAC countries have spurred population mobility, a significant factor in the spread of HIV.

## 3. *Collaboration research on HIV/AIDS*

Information regarding HIV/AIDS in the LAC regions abounds. International and non-governmental organizations have conducted several studies on HIV/AIDS research in developing countries. These studies however are mainly focused on the clinical management, epidemiological data, or social support needed to instrument health strategies to combat AIDS. To our surprise no studies have been conducted on the scientific work undertaken in developing countries to fight against AIDS. Is there a direct relationship between incidence/prevalence of HIV/AIDS and scientific production in these countries? Is local scientific production being used locally/regionally? Is language a barrier to have access to such production? How do HIV/AIDS researchers collaborate amongst them in developing countries?

The Information Science Programme of the Research Division of the Hospital General de Mexico in Mexico City, has undertaken as a research line, the instrumentation of a bibliometric analysis of HIV/AIDS production in developing countries. As a result of this work, previous results have been published on the existing situation regarding African countries and LAC countries [16-20]. However, up to date no research has been conducted on the patterns of collaboration among HIV/AIDS researchers both, north-south and south-south. The identification of such patterns can provide appropriate indicators for decision makers to take action in health policy on HIV/AIDS.

## 4. *Purpose*

The purpose of this work is to present the preliminary results of a bibliometric research in progress on HIV/AIDS research in developing countries. For the purpose of this paper, only the collaboration patterns found among researchers in Latin America and the Caribbean regions are described.

## 5. *Method*

A literature search was conducted in MEDLINE and LILACS (Latin American Literature in the Health Sciences) on HIV/AIDS research papers, as generated in 12 Latin American and the Caribbean (LAC) countries for the period 1982-2005. The goal being to compare the patterns of publication; visibility either local or international; and collaboration as reflected in MEDLINE and LILACS. The countries were selected according to HIV/AIDS incidence and prevalence rates, as reported by the Pan American Health Organization /World Health Organization 2004 and 2005 [21, 22]. The U.S. National Library of Medicine's Medical Subject Headings (MeSH) geographic descriptors for Latin America and the Caribbean were used to identify participating countries. These countries were the following in alphabetical order: Argentina, Brazil, Chile, Colombia, Cuba, Dominican Republic, Haiti, Honduras, Jamaica, Mexico, Peru, and Venezuela.

The following indicators were selected and analysed throughout the study for each country: authorship; country of publication; subject descriptors; year of publication; type of documents; and when possible, author affiliation. References retrieved from each database were ordered and tabulated to identify the above mentioned indicators. This was done with the use of Excel 2000 and Bibexcel 2001. Rank distributions for each of the indicators were obtained and comparisons between the databases used and country were made, accordingly.

In order to analyse country collaboration, the approach used varied according to each database structure; for example, while MEDLINE provides adscription fields for the first author, LILACS has no adscription fields where to search an author affiliation. Here, the method being used to identify collaboration is through the validation of affiliation data against either original printed sources from the hospital's library collection or else, through the internet to open public access of full text journals or via our electronic library in the hospital. Due to this complexity, the results derived from the analysis in this database are not completed yet. Collaboration comparisons by database will therefore be presented in other report in the near future.

It is important to mention that one limitation of our study was the fact that MEDLINE provides information of the adscription field to only the first author. In order to overcome this limitation, the following approach was used to obtain collaboration patterns of countries, as reflected in MEDLINE:

- a) Scientific production by country, by adscription field of the first author.
- b) Those references where at least one of the 12 selected countries were retrieved but no adscription field was indicated, then country data was obtained through free text word search to all the fields of a reference; for example, place of publication, subject descriptors, and source. This was further validated against the full text of the documents involved via the Internet or else, through the printed access to the journals in our collection.
- c) When the adscription field did not correspond with any of the 12 participating countries in our study, then the identification of collaboration of any of the 12 countries was validated through the access to the full text of the articles in the Internet, looking at the author's addresses for this purpose. This approach functioned well when any country, apart from the 12 selected, was identified in the adscription field; i.e, first author in a publication. For example, a paper published by an author from United States of America (first author in the adscription field) in collaboration with Mexico (as a second or third co-author in the same paper).

## 6. *Results*

A total of 5,860 HIV/AIDS references were retrieved from MEDLINE and LILACS, as generated by 37 LAC countries for the period 1982-2005. Overall, MEDLINE contributed with 3 735 (63.7%) references and LILACS with 2 127 (36.3%). When a selection of the 12 participating countries in the study was made within each database, the following results were obtained: MEDLINE contributed with 3 234 (86.58%) references; and LILACS with 1 744 (81.99%). The distribution of countries by amount of publications and database, varied considerably. Similarly, the incidence/prevalence rates of

HIV/AIDS in these countries fluctuated significantly. Table 1., provides a distribution of the HIV/AIDS publications of participating countries according to database used and incidence/prevalence rates. Here we can see the high visibility of Haiti in MEDLINE (r3) as compared with LILACS (r11); and contrasting with Haiti's high incidence rate (r1) and prevalence rate (r1).

Table 1: Bibliometric analysis of HIV/AIDS research in Latin America and the Caribbean for the period 1982-2005. Distribution and comparison of scientific production in 12 countries; incidence and prevalence rates.

Country	r	Scientific Production (Medline)	r	Scientific Production (Lilacs)	r	Incidence (1 million hab) *	r	Prevalence adult (15-49)**
Brazil	1	1296	1	774	3	177,8	5	0,7
Mexico	2	499	2	246	4	157,7	7	0,3
Haiti	3	409	11	12	1	517,2	1	5,6
Argentina	4	235	3	164	7	43,1	5	0,7
Cuba	5	150	9	37	11	23,7	8	0,1
Jamaica	6	119	10	21	2	407,3	4	1,2
Chile	7	106	4	145	10	37,6	7	0,3
Peru	8	103	6	108	9	40,1	6	0,5
Colombia	9	101	7	54	12	13,2	5	0,7
Dominican Rep.	10	84	12	11	6	63	3	1,7
Venezuela	11	79	5	133	8	41,9	5	0,7
Honduras	12	53	8	39	5	144,9	2	1,8

\* Source: OPS, 2005.

r= rank

\*\* Source: UNAIDS, 2004.

Lilacs =( Latin American and Caribbean Literature in the Health Sciences)

Overall, the type of documents published in MEDLINE corresponded mainly to journal articles (86.15%), letters (5.60%), and news (2.88%). In LILACS, journal articles were less significant than in MEDLINE (57.17%), while monographs (20.70%), monograph series (7.51%), and thesis (5.91%) were more visible. The language of publication also had important differences when comparing results between MEDLINE and LILACS. While in MEDLINE English (75.78%), Spanish (13.60%) and Portuguese (7.60%) were the main languages found; in LILACS this distribution changed as follows: Spanish (53.73%); Portuguese (38.70%); and English (7.45%).

Authorship in MEDLINE was distributed as follows: 633 articles (19.57%) were published by one author; 2371 (73.32%) by two or more authors; and 230 (7.11%) were anonymous. A total of 838 references retrieved from LILACS on the other hand, corresponded to publications significantly published by one author (48.05%). The rest 906 (51.95%), derived from the collaboration of two or more authors. Table 2, provides these comparisons, distributed by country of publication and database. Clearly, collaboration is more visible in MEDLINE than in LILACS. This pattern may be influenced by the type of documents included in each database; for example by the increased amount of monographs (20.70%) found in LILACS. The authorship of these monographs however needs to be further analysed in order to conclude on the above.

Table 2: HIV/AIDS research collaboration in Latin America and the Caribbean. Distribution of authorship by country and database (MEDLINE/LILACS, 1982 - 2005).

Country	Anon	1 Author				2 - 5 Authors				6 + Authors				Total Documents			
		M	%	L	%	M	%	L	%	M	%	L	%	M	%	L	%
Brazil	78	198	15,28	395	51,03	553	42,67	286	36,95	467	36,03	93	12,02	1296	40,07	774	44,38
Mexico	50	83	6,40	95	12,27	241	18,60	124	16,02	125	9,65	27	3,49	499	15,43	246	14,11
Haiti	31	119	9,18	7	0,90	145	11,19	4	0,52	114	8,80	1	0,13	409	12,65	12	0,69
Argentina	6	24	1,85	66	8,53	76	5,86	69	8,91	129	9,95	29	3,75	235	7,27	164	9,40
Cuba	7	46	3,55	11	1,42	66	5,09	22	2,84	31	2,39	4	0,52	150	4,64	37	2,12
Jamaica	8	33	2,55	6	0,78	39	3,01	11	1,42	39	3,01	4	0,52	119	3,68	21	1,20
Chile	15	22	1,70	88	11,37	40	3,09	41	5,30	29	2,24	16	2,07	106	3,28	145	8,31
Peru	4	21	1,62	72	9,30	30	2,31	28	3,62	48	3,70	8	1,03	103	3,18	108	6,19
Colombia	11	27	2,08	22	2,84	32	2,47	25	3,23	31	2,39	7	0,90	101	3,12	54	3,10
Dominican Rep.	8	28	2,16	8	1,03	32	2,47	3	0,39	16	1,23	0	0,00	84	2,60	11	0,63
Venezuela	4	19	1,47	43	5,56	28	2,16	65	8,40	28	2,16	25	3,23	79	2,44	133	7,63
Honduras	8	13	1,00	25	3,23	18	1,39	13	1,68	14	1,08	1	0,13	53	1,64	39	2,24
Total	230	633		838		1300		691		1071		215		3234		1744	
%	7,11	19,57		48,05		40,20		39,62		33,12		12,3		100		100	

Anon= anonymous M= Medline L = LILACS (Latin American and Caribbean Literature in the Health Sciences)

Regarding the subject content of the production, MEDLINE showed a major concentration of descriptors related to HIV Infections, Risk Factors, AIDS epidemiology, prevention and control, transmission, complications and etiology; Sexual Behavior, Homosexuality and Pregnancy. LILACS results on the other hand showed a rather disperse distribution of the descriptors, mainly limited to AIDS epidemiology, prevention and control, transmission and complications. Descriptors related to Health Education, Sexually Transmitted Diseases, Condoms, Prostitution, and Organizations ranked with less than 15 references each, in the period 1982-2005, in both databases. Table 3, provides an overall distribution of descriptors as compared by database used.

Table 3: HIV/AIDS in 12 Latin American and Caribbean Countries. Distribution of main descriptors as found in MEDLINE and LILACS, 1982-2005\*.

Medical Subject Headings	Medline	Lilacs
Research Support, Non-U.S. Gov't	839	
HIV Infections /epidemiology	503	9
Risk Factors	477	103
Acquired Immunodeficiency Syndrome /epidemiology	455	403
Developing Countries	402	
Prevalence	326	27
Sexual Behavior	290	61
Research Support, U.S. Gov't, P.H.S.	287	
HIV Infections	280	5
Virus Diseases	274	
Comparative Study	254	
HIV Infections /transmission	253	3
Disease	246	
Acquired Immunodeficiency Syndrome	240	547
HIV Infections /prevention & control	232	6
Acquired Immunodeficiency Syndrome /prevention & control	230	286
Acquired Immunodeficiency Syndrome /transmission	227	158
HIV-1 /genetics	135	
HIV Infections /complications	127	4
Latin America	113	
Acquired Immunodeficiency Syndrome /complications	103	165
North America	88	8
Homosexuality	77	18
Pregnancy	60	
Acquired Immunodeficiency Syndrome /etiology	51	
Acquired Immunodeficiency Syndrome /immunology	47	30
Health Education	12	45
Sexually Transmitted Diseases	11	72
HIV		225
Acquired Immunodeficiency Syndrome /diagnosis		117
Sexually Transmitted Diseases /prevention & control		62
Other	1277	705
Total	7916	3059

\*Order by rank distribution in Medline.

Results derived from the collaboration of the 12 participating countries showed the following pattern in MEDLINE:

Overall, the 12 countries collaborated with six or more countries.

Brazil was head of the list with 26 countries in collaboration, followed by Haiti with 18.

In Eighth countries, namely Brazil, Mexico, Argentina, Cuba, Jamaica, Colombia, Chile and Venezuela, the first author of a paper in collaboration corresponded to the adscription field of a native author in that country. The national/international nature of this collaboration remains to be explored.

On the contrary, in four of the 12 countries, namely Haiti, Peru, Dominican Republic and Honduras, the adscription of the first author corresponded to the USA. This was found in the following proportion: Haiti (24.38%); Peru (33.01%); Dominican Republic (30.95%); and Honduras (32.08%).

The influence of the USA in the rest of the countries was as follows: Brazil (9.33%); Mexico (17.84%); Argentina (8.51%); Cuba (16.67%); Jamaica (18.49%); Colombia (15.84%); Chile (8.49%); and Venezuela (15.38%).

Overall, the collaboration of the 12 countries with other countries than the USA, was only significant in (1) Haiti, where France, Canada and Switzerland collaborated with 6.16% of the publications; (2) Peru, where Switzerland, Italy, the U.K., and Colombia together collaborated with 8.73% of the publications; (3) Argentina, where Spain, the U.K., and Sweden collaborated with 6.38% of the publications; (4) Chile, where Australia, Peru, Argentina and Switzerland collaborated with 8.50% of the publications; (5) Venezuela, where Spain and Brazil collaborated with 7.69% of the publications; and (6) Colombia, where Cuba and France collaborated with 5.94% of the publications.

The other six countries, namely Brazil, Mexico, Cuba, Jamaica, Dominican Republic and Honduras, reported a more fragmented collaboration with their correspondent countries.

Overall, it was found that little collaboration was found among LAC countries, i.e., South-South, collaboration was minimal.

## 7. *Discussion*

The increasing number of linkages between researchers in scientifically advanced and developing countries is reflected in the number of papers co-authored across national borders. In general, scientists in advanced countries are most likely to collaborate with those in other advanced nations. However, this number includes scientists originally from scientifically developing and lagging countries who work or study in advanced nations [1]. Clearly, information and communications technologies have been highly influential although not decisive, in encouraging international collaborations in developing countries [23].

Collaboration trends in health research in the LAC regions have been reported to increase in the last decades [24]. This has also been found regarding HIV/AIDS research in the LAC regions [16-20]. Although the risk behaviors and biological markers that fuel the epidemic are widespread, many Latin American countries have not yet faced a full-scale AIDS epidemic. In the majority of the countries, the epidemic is still concentrated in high-risk populations. According to the World Bank, although the number of men living with AIDS outweighs the number of women in all LAC countries, the gender gap is closing, and in some countries, the effect of AIDS on rural communities is increasing rapidly [15]. The results derived from our study indicate that there is no research output from either MEDLINE or LILACS so as to identify research lines oriented to these issues.

Results indicated that local production on AIDS as seen through LILACS, is less likely to be related to collaboration studies. Further analysis needs to be conducted however in order to identify the distribution of this pattern through type of documents and over the period of study. A similar analysis needs to be conducted in MEDLINE in order to identify the relationship between collaboration over time and relationship with subject content. Up to date it is unknown if such collaboration is national or international since not all of the references in MEDLINE provide co-author affiliations. This is an important limitation of our study. Similarly, the lack of the adscription field in LILACS represents another serious limitation to conduct this type of research. Clearly, BIREME needs to take action in this issue so as to integrate certain searchable fields to support bibliometric and scientometric studies of this kind. In this effort, editors and authors need to orchestrate actions in order to fulfill the needed data in each publication.

These preliminary results have implications for LAC and developing countries working on HIV/AIDS research. The identification of collaboration patterns can be used as an indicator of positive impact on capacity building. This is not necessarily on a north-south basis but also on a south-south collaboration alliance. Health managers and policy makers can use among other, the indicators used in this study so as to identify strengths and weaknesses in their research programmes to increase national capacity and to address key problems that have not been researched on a national or international scenario. Finally, researchers will find it useful to identify from a bibliometric analysis, the state of the art in HIV/AIDS research collaboration so as to focus on the research lines needed to improve international actions and capacity building to fight against AIDS.

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