# Authorship patterns of the literature on HIV/AIDS in Eastern and Southern Africa: an exposition of the responsible authors, institutions and countries, 1980-2005

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*Received: 5th October 2007*
*Accepted: 30th November 2007*

*Research is commonly evaluated through an analysis of research outputs (i.e. theses and dissertations, papers in scholarly journals and conference proceedings, etc.) and research outcomes (i.e. new discoveries, Nobel prize winners, graduating students, new developments of drugs, etc.) using research units (e.g. persons or bodies responsible, sources in which the findings are published, medium of communication, nature of information conveyed, timing and frequency with which information is conveyed, amount of information conveyed, etc). Some of the methods of research evaluation that have been proposed and are commonly used include peer-review and informetric approaches. This paper reports findings of an informetric study of HIV/AIDS literature published by and on Eastern and Southern Africa in order to find out the number of countries engaged in the publication of HIV/AIDS literature; the most productive authors, institutions and countries; and the countries in which the literature is published. A comparison is made between regional (i.e. African) and foreign (or international) productivity. Results indicate that foreign authorship dominates the scene and that majority of the publications are published in foreign countries. The implications of this pattern of publication for researchers based in Africa are discussed. Finally, recommendations based on the findings are provided.*

**Key Words:** Authorship patterns; Eastern and Southern Africa; HIV/AIDs; Informetrics

## 1 Introduction

It is readily acknowledged that research, when correctly designed and executed, builds knowledge because it represents an objective investigation of facts about a certain subject. It also presents answers to an otherwise difficult and complex topical issue, situation or phenomenon. To a large extent, research in a given country is embodied in a variety of document types, which include journal articles, reviews, and – especially in the case of biomedical research – newspaper articles and letters. An evaluation of the literature can thus be used to measure and/or evaluate research output over a given period of time. Some of the research units that form part of the subjects of research evaluation processes are authors (individuals or group), countries (i.e. geographical locations), and/or institutions (e.g. academic, industry, etc.).

A number of governments have put in place mechanisms and systems for evaluating research performance both within and outside their territories. A good example is the National Research Foundation (NRF) of South Africa whose main tasks include: evaluation and rating of researchers; provision of relevant information on the standing and rating of researchers to NRF management; providing advice and guidance for programme-based evaluation processes; providing criteria, processes and procedures for programme and institutional appraisals and undertaking selected appraisals; undertaking programme evaluations and reviews; and conducting periodic evaluation of the national research facilities (National Research Foundation, 2007). When conducting its evaluation, the Foundation uses various approaches such as peer review and informetric measurements. All this is done in order to "demonstrate the relevance and value of its activities and the judicious use of the public funds entrusted to it" (National Research Foundation, 2007). Similarly, donor institutions and countries are particularly keen on monitoring and evaluating research that they have funded in developing countries. This has put the funded researchers, institutions and countries under great pressure from both the donors, and the general public. In turn, countries are asking institutions that have received research funds to give an account of them, an aspect that has also affected HIV/AIDS researchers. According to Brown (1993:12), "AIDS researchers around the world are under greater pressure than ever before to justify their existence". This applies to institutions and countries that have received HIV/AIDS research funds. Researchers' continued funding has drawn a lot of interest from the public who question the rationale for the large sums of money channeled to AIDS research given that neither a vaccine nor cure has yet been discovered. Scientists, in turn, blame the public for its unrealistic expectations (Brown, 1993). Previous studies (e.g. *The Scientist*, 1999) have shown that the contribution of African authors, institutions and countries in scientific productivity is low. The top ranking individuals and institutions in these studies are largely based in developed

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countries. Little is known about the scientific productivity of African authors, institutions and countries. To the best of our knowledge, no study has been conducted to measure the performance of individual authors, institutions and countries involved in HIV/AIDS research in and about E&S Africa. An evaluation of the performance of HIV/AIDS researchers, conducting research in and about E&S Africa, both within and outside institutions based in the region, therefore becomes important.

The purpose of this paper was to evaluate the performance of individual authors, institutions and countries in terms of their productivity, the objectives being: (a) to identify the most prolific authors, countries and institutions that publish HIV/AIDS literature specific to E&S Africa; and (b) to compare the productivity of regional authors, institutions, and countries with those of their foreign counterparts. In view of these broad aims, the following research sub-questions were used to inform the study:

- How many countries are involved in the publication of HIV/AIDS research about E&S Africa? How many of these are foreign or African countries?
- Which are the most productive countries (as authors)?
- In which countries is E&S African literature on HIV/AIDS mostly published?
- Which are the most prolific international and regional institutions?
- Who are the most productive authors of HIV/AIDS literature?

## 2 Literature review

### 2.1 Evaluation of research performance: an overview

Authors', institutional and country research performance evaluation is conducted for various reasons depending on the objectives of the evaluating body or person. The driving force behind most research performance evaluations, however, appears to be associated with research funding. As Geisler (2001:39) observes, "all organizations that fund and conduct scientific research are increasingly 'under the gun' to better evaluate the performance of their programs.... they must account for their expenditures and must justify their investment decisions". This therefore means that both parties (donors and receivers) are equally concerned with the use of research funds. Jacobs (2000) opines that research productivity studies and their accruing results enable policy makers to evaluate their decisions on the awarding of grants to individuals, institutions and even countries. The Organization for Economic Co-operation and Development [OECD] (1997:5) puts it thus, "in OECD member countries, there is an increasing emphasis on accountability, as well as on the effectiveness and efficiency of government-supported research". The Organization further outlines some of the purposes for which governments conduct research evaluations as follows:

1. optimizing their research allocations when faced with budget stringencies;
2. re-orienting their research support;
3. rationalizing or downsizing research organizations; and
4. augmenting research productivity

The evaluation of researchers' performance may be used to identify individuals for recruitment/employment. The most prolific individuals are more likely to secure jobs, particularly in institutions that place high regard on the researchers' productivity and scientific impact. Results from informetric evaluations of authors would therefore assist in identifying and recruiting graduate students and professors whose areas of interest and research experience complement an institution's, department's or university's focus. Many are job advertisements that emphasize authors' research productivity, aside from their academic qualification and work experience, especially on the part of universities.

The evaluation of researchers' productivity may also assist researchers when they attempt to identify individuals with whom they can collaborate. It may also lead to established partnerships with companies that have related research interests. Collaboration between industry and university can be improved if researchers with common interests in these institutions are identified.

Academic recruitment, promotions and tenure largely depend on an individual's research performance. Worldwide, university policies have been formulated in order to aid in proper recruitment, promotion and tenure. Although sometimes violated, these policies have to a large extent regulated how universities are run, especially with regard to recruitment and promotions. According to Lancaster (1991), evaluating individual, institutional and country productivity and impact involves: an analysis of the number of publications produced; and assessing how much of the work is individual, group or organizational. Jacobs (2002) explains that researchers' scientific productivity is measured in terms of the researchers' published scientific output and technical output. Garfield (1996) and the OECD (1997) also identify researchers, institutions and countries as levels and entities of research performance evaluations.

Although there is general consensus regarding the need and importance of evaluating researchers (i.e. both individual and corporate), opinions are divided on how to evaluate research performance in a "*viable yet acceptable manner*" (Geisler, 2001:39). In other words, what is the most effective and appropriate research method that can be used to measure performance? Some of the mechanisms or approaches to evaluating scientific research that have been proposed by various studies include bibliometric/informetric analysis, expert review (peer-review), economic rate of return, case studies, retrospective analysis (Committee on Science, Engineering, and Public Policy [COSEPUP], 2004) and questionnaire surveys (Garfield, 1996; Jacobs, 2000). Brown (1993) identifies three main approaches to evaluating scientific productivity besides the use of opinion polls, namely, peer review and the analysis of competition for funds.

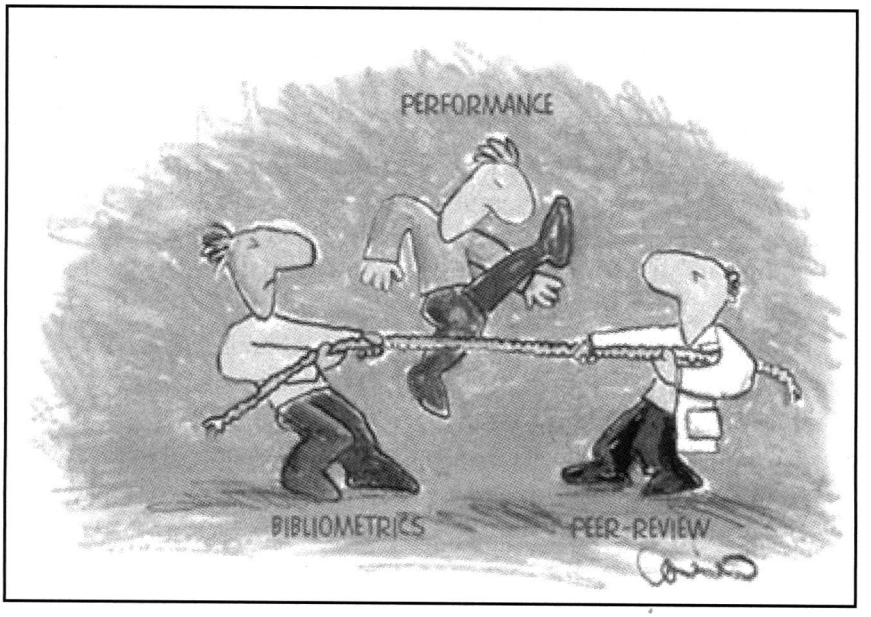


**Figure 1 Bibliometrics** versus **peer-review** approaches to evaluating research **performance** (Source: Geisler, 2001:39)

Arguments in favor of one or another of these approaches have lately dominated opinions in scientific literature. For instance, as recently as in 2000, Thomas J. Phelan set in motion a debate on appropriate methodologies for evaluating institutional performance (Phelan, 2000). He prefers the use of bibliometric measures (i.e. publication and citation data) to the peer-review method as a means of evaluating scientific productivity, especially when dealing with aggregated units of research. He believes that peer review, despite its long history, is, at best, extremely imperfect in evaluating a collection of works such as that produced by a department or by an individual over a career. He suggests instead the use of citation and publication analyses, which form part of the informetric/bibliometric methodologies.

Responding to Phelan's sentiments, Kostoff (2000) defends the use of peer-review, both for single and aggregated research units. He argues that other approaches to research evaluation (i.e. publications, patents, citations and other output and outcome metrics) can successfully be used to supplement but not replace peer-review. Other criticisms that have been leveled against the peer-review method include: the partiality of peers; the 'old boy' network which often results in older, entrenched fields receiving greater recognition than new, emerging areas of research; the 'halo' effect which may result in a greater likelihood of funding being made available to more visible scientists and higher status departments and institutions; reviewers often have fairly different ideas about what aspects of research they are assessing, what criteria they use and how these should be interpreted; the assumption that a high level of agreement exists among scientists about what constitutes good quality work, who is doing it and where promising lines of enquiry lie may not hold in new specialties; and resource inputs to the review process, both in terms of administrative costs and scientists' time, are considerable but ignored (King, 1987).

As in the peer-review method, bibliometric approaches have their limitations. According to Kostoff (2001), the choice of important bibliometric indicators to use for research performance measurement can prove to be problematic. In addition, controversy surrounds their use as measures of researchers', institutional and country research performance. This leads Eugene Garfield, a man credited for the founding of the Institute of Scientific Information and the development of the citation indexes that are extensively used in the analysis of scientific literature as a measure of research performance, to wonder whether or not bibliometric indicators really do provide the best measure (Garfield, 1989).

Few studies have analyzed HIV/AIDS literature in order to identify the contributing authors, institutions and countries, especially in developing countries. At the international level, a study was conducted in 1996 (*The Scientist*, 1996) to identify, among other issues, the most productive and influential institutions and scientists in HIV/AIDS research. The study examined 34,000 research papers (only "discovery papers", i.e. original research was analyzed) from the Science Indicators database (*Science Citation Index*) and was limited to papers published between 1993 and 1995. Letters, reviews, editorials and notes were excluded. Grouping the institutions into two categories – those that produced more than 250 papers and those that produced between 100 and 249 papers each – the study identified the National Cancer Institute as the most productive, while the National Allergy and Infectious Diseases (NIAID) topped the list in the citations-per-paper category. Authors from medical institutes such as NIAID and Aaron Diamond AIDS Research Center topped the list of most productive authors. They included Anthony S. Fauci (Director of NIAID) and David Ho (Aaron Diamond AIDS Research Center) who each recorded 83 publications. African institutions and authors based in the continent did not feature in the study, most likely because the study presented only the institutions and authors producing 20 or more articles.

Unlike this study, the use of the MEDLINE database's AIDS-subset (AIDSLINE) to conduct informetric analyses of HIV/AIDS literature has shown that researchers and institutions in Africa actually contribute substantially to the growth and development of HIV/AIDS research. For instance, Onyancha & Ocholla's (2004) study identified at least 6 institutions based in Kenya and Uganda that produced 20 or more papers between 1980 and 2002. These include the University of Nairobi (Kenya, 99), Kenya Medical Research Institute (KEMRI) (Kenya, 32), Makerere University (Uganda, 72), The AIDS Support Organization (TASO) (Uganda, 40), Medical Research Council (Uganda, 36) and Ministry of Health (Uganda, 33). In a study conducted by Macias-Chapula & Mijangos-Nolasco (2002) on HIV/AIDS literature about Central Africa, the University of Kinshasa was one of the local institutions that produced more than 20 articles, having yielded 22 records. Others, such as Cameroon's University of Yaoundee (18) and the Yaoundee National AIDS Control Program (17); and the Democratic Republic of the Congo's SIDA Project (16) at Kinshasha and Mama Yemo hospital (12) were among the local institutions that produced more than 10 publications.

Onyancha (2006:58) analyzed theses and dissertations and research projects produced by Masters and Doctoral students and other researchers in South African institutions of higher learning in order to "study how the universities, in particular, and other institutions, in general, in South Africa have helped to empower the South African community's HIV/AIDS workforce in the AIDS war". The study identified leading institutions and individuals behind HIV/AIDS research in the country between 1986 and 2004. The most productive institution was the University of South Africa which produced a total of 140 records followed by the University of Witwatersrand (123), the then Rand Afrikaans University (108), the then University of Natal (106), and the University of Pretoria (80), etc. Several study leaders led by JPJ Theron, AD Stuart, H Strydom and I Eloff were involved in guiding students to conduct the researches.

## 3 Methods and procedures

This work takes the form of a basic descriptive informetric study. Descriptive informetrics is an "expression that refers to the collection of descriptive information about documents" in order to provide such information as "bodies responsible for the production and transmission of the information; form of transmission; medium of communication; nature of information conveyed; timing and frequency with which information is conveyed; amount of information conveyed; and geographical origin" (Diodato, 1994:15). This study focuses on the first aspect, i.e. bodies responsible for the production and transmission of HIV/AIDS information through the published literature. The Anglo-American Cataloguing Rules (2003: Appendix D-8) defines the statement of responsibility as "a statement, transcribed from the item being described, relating to persons responsible for the intellectual or artistic content of the item, to corporate bodies from which the content of the item emanates, or to persons or corporate bodies responsible for the performance of the content of the item". It is on this basis that we focused on three entities, namely individual authors, institutions and countries involved in the publication of HIV/AIDS documents about E&S Africa, where the term 'documents' comprises abstracts of published items; journal articles; bibliographies; biographical items; reviews (i.e. art exhibit, book, database, film, hardware, theater, television, radio and video reviews); editorial material; excerpts; meeting abstracts; notes; and reprints. The use of the term "Countries" as producers of HIV/AIDS literature is two-fold, i.e. countries in which HIV/AIDS literature about E&S Africa was authored [countries as "authors"] and countries in which the HIV/AIDS literature was published [countries as "publishers"]. Whereas the former analysis provided E&S African countries' HIV/AIDS research output, the latter analysis provided information on the countries most commonly used to publish HIV/AIDS research.

Data was extracted from the MEDLINE (MEDlars onLINE), Science Citation Index (SCI), and Social Sciences Citation Index (SSCI) databases using search terms that included terms by which HIV/AIDS was known at the beginning of the epidemic. The SCI and SSCI databases are produced by Thomson Scientific (formerly and herein referred to as ISI –

Institute for Scientific Information) while the MEDLINE database is created by the National Library of Medicine. A total of 22 terms representing names of 18 countries and geographic regions in Eastern and Southern Africa and 26 HIV/AIDS keywords were used to download relevant records from the three databases. The HIV/AIDS-related keywords included: Acquired Immunodeficiency Syndrome; Acquired Immunologic Deficiency Syndrome; Central Nervous system AIDS Arteritis; AIDS Dementia Complex; AIDS Seropositivity; HIV Seroprevalence; Immunologic Deficiency Syndromes; HIV receptors; Human Immunodeficiency Viruses; Human T-Cell Lymphotropic Virus Type III; Human T-Cell Leukemia Virus Type III; Reverse Transcriptase Inhibitors; etc. Utmost care was taken to include as many variations of these terms as possible. For instance, examples of term variations of HIV include human immune deficiency virus; human immunodeficiency virus; HIV; immunodeficiency virus, human; viruses, human immunodeficiency; virus, human immunodeficiency; etc.

An advanced search mode was adopted in searching for and extracting the records. The searches were conducted within the Title, Abstract, Keywords and Subject fields using the following field tags: TI, AB (in the case of MEDLINE), TS (in the case of ISI) and SU (in the case of MEDLINE). In addition, the author address field was used to download records that are authored by individuals who are affiliated with institutions that are located in Eastern and Southern Africa, by using the following search queries: AF='country name' (in the case of MEDLINE) and AD='country name' (in the case of ISI) databases where AF and AD denote the Author Address field which lists the institution of affiliation or, in the case of MEDLINE, address of the first author.

The following approaches were used to calculate the total number of records for each author, institution and/or country:

1. The country in which the journal is published was used to determine the country of publication of the respective records.
2. The total number of records each institution has authored was obtained by counting the number of records in which a particular institution appears in a record's address field
3. Each country's contribution was calculated based on the number of records in which the country name appears in the authors' address field.
4. Authors' names and number of the total number of records each author has written were obtained from the authors' field.

The analysis described in bullet no. 2 and 3 targeted only the data that was obtained from ISI's databases and therefore excluded MEDLINE because the latter provides only the first author's address, thereby leaving out the addresses of co-authors.

In order to obtain the frequencies (i.e. the total number of records each author, institution and/or country contributed) a complete count of the records (sometimes referred to as normal count) was adopted. This approach's rule is to "count every author fully whenever he/she appears, whether or not there is multiple authorship, i.e. allocate a full count of one whenever the author appears in a record" (Diodato, 1994:48). The same procedure was used to allocate records to institutions and countries. The following illustration, for example, yields a total of five entries (one for each institution). Kenya and Netherlands will also be counted once even though both countries appear several times in the address field.

C1
KIT, Dept Biomed Res, NL-1105 AZ Amsterdam, Netherlands.
CRDR, Kenya Med Res Inst, Nairobi, Kenya.
KIT, Royal Trop Inst, Dept Hlth, Amsterdam, Netherlands.
CDC, Nairobi, Kenya.
NLTP, Minist Hlth, Nairobi, Kenya.

Data was analyzed using Sitkis version 1.5 ©2005, Microsoft Office Access ©2003, Microsoft Office Excel ©2003 and Bibexcel ©2005 in order to obtain the frequencies of occurrence with regard to the following: the number of participating countries; the most productive regional and international countries and institutions; the countries in which most authors publish their literature; and the most prolific authors.

## 4 Presentation of findings

This section provides results as follows: number of countries responsible for the production of the literature on HIV/AIDS in and about E&S African countries; most productive regional countries (as authors); most productive foreign countries

(as authors); countries of publication (as publishers); most productive regional institutions; most productive foreign institutions

### 4.1 Number of countries producing literature on HIV/AIDS in E&S Africa

Table 1 shows the number of countries involved in the production of HIV/AIDS literature on E&S Africa in three categories, namely, E&S African countries, countries from other regions of Africa and foreign countries. South Africa was the leading country with a total of 85 contributing countries: 13 (15.29%) from E&S Africa, 16 (18.82%) other African countries and 56 (65.88%) foreign countries. Kenya registered a total of 71 countries followed by Uganda (69), Tanzania (68), Zambia (58), Zimbabwe (56) and Malawi (51). In the bottom half of the Table are regions which had few countries from which HIV/AIDS papers on Eastern and Southern Africa originated. These included Lesotho (18), Namibia (16), Somalia (10), Angola (9), and Eritrea (3). Every country has received interest or attention from all over the world except for Somalia, Angola and Eritrea which had no interest from African countries apart from the E&S African countries.

**Table 1** HIV/AIDS research in E&S Africa: number of contributing countries

| | E&S African countries | | Rest of Africa | | Foreign | | TOTAL |
|---|---|---|---|---|---|---|---|
| Researched country | No. of Countries | % of Total | No. of Countries | % of Total | No. of Countries | % of Total | |
| South Africa | 13 | 15.29 | 16 | 18.82 | 56 | 65.88 | 85 |
| Kenya | 12 | 16.90 | 13 | 18.31 | 46 | 64.79 | 71 |
| Uganda | 11 | 15.94 | 14 | 20.29 | 44 | 63.77 | 69 |
| Tanzania | 12 | 17.65 | 17 | 25.00 | 39 | 57.35 | 68 |
| Zambia | 10 | 17.24 | 13 | 22.41 | 35 | 60.34 | 58 |
| Zimbabwe | 13 | 23.21 | 12 | 21.43 | 31 | 55.36 | 56 |
| Malawi | 12 | 23.53 | 8 | 15.69 | 31 | 60.78 | 51 |
| Ethiopia | 10 | 26.32 | 3 | 7.89 | 25 | 65.79 | 38 |
| Botswana | 11 | 35.48 | 2 | 6.45 | 18 | 58.06 | 31 |
| Mozambique | 6 | 26.09 | 1 | 4.35 | 16 | 69.57 | 23 |
| Swaziland | 8 | 36.36 | 1 | 4.55 | 13 | 59.09 | 22 |
| Sudan | 4 | 20.00 | 2 | 10.00 | 14 | 70.00 | 20 |
| Lesotho | 7 | 38.89 | 2 | 11.11 | 9 | 50.00 | 18 |
| Djibouti | 3 | 18.75 | 5 | 31.25 | 8 | 50.00 | 16 |
| Namibia | 7 | 43.75 | 1 | 6.25 | 8 | 50.00 | 16 |
| Somalia | 2 | 20.00 | 0 | 0.00 | 8 | 80.00 | 10 |
| Angola | 2 | 22.22 | 0 | 0.00 | 7 | 77.78 | 9 |
| Eritrea | 2 | 66.67 | 0 | 0.00 | 1 | 33.33 | 3 |

### 4.2 Distribution of the literature by regional countries (as authors)

Productivity by regional countries yielded a total of 43 African countries (illustrated in Table 2 column 1) that produced the literature on HIV/AIDS in E&S African countries, implying therefore that only 10 (18.87%) independent countries from the continent did not participate in HIV/AIDS research about the two regions. Table 2 provides countries that authored 12 or more papers about E&S African countries as indexed in the ISI indexes. South Africa led with a total of 2189 papers distributed, in descending order, as follows: South Africa (1929), Zimbabwe (43), Tanzania (42), Uganda (39), Kenya (29), and so on. In second position was Kenya which posted a total of 843 records, 714 of which were produced by Kenya. Kenya's other highest productivity was on Tanzania and Uganda which yielded 30 papers each. Other regional countries that conducted research in and about E&S African countries include Uganda (717), Tanzania (540), Malawi (487), Zambia (407), and Zimbabwe (400), etc.

### 4.3 Distribution of the literature by foreign countries (as authors)

In the foreign countries category, a total of 77 countries produced papers on HIV/AIDS in E&S Africa. The USA was the most prolific with a total of 2429 papers in the ISI databases. Her highest contribution was on South Africa (536) followed by Uganda (505), Kenya (407), Tanzania (288), Zambia (180) and Zimbabwe (157), etc. Second was England which produced a total of 1412 papers, including 309 on South Africa, 261 on Uganda, 192 on Kenya, 186 on Tanzania, 173 on Zambia, and 156 on Malawi, etc. Switzerland, which held the third position, had 365 papers which were distributed as follows: 65 papers each for South Africa and Uganda, while Kenya's and Tanzania's share was 57 and 45 papers, respectively. Other countries that produced a relatively large number of papers on E&S Africa were the Netherlands

(349), Canada (336), France (279), Belgium (279), Sweden (246), Germany (173), Norway, (121), Australia (108), and Thailand (101), etc. The least productive foreign countries were Kuwait, Latvia, Lithuania, Martinique, Myanmar, Philippines, Saudi Arabia, Sri Lanka, and Tajikstan, which produced one paper each.

**Table 2** Most productive regional countries (as authors)

| Contributing country (Researcher) | Country of research focus (Researched) | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ANG | BW | DJ | ER | ETH | KE | LE | MAL | MOZ | NAM | SOM | S. AFR | SUD | SW | TZ | UG | ZAM | ZIM | TOTAL |
| South Africa | 1 | 13 | 2 | 1 | 6 | 29 | 10 | 19 | 8 | 7 | 1 | 1929 | 3 | 10 | 42 | 39 | 26 | 43 | 2189 |
| Kenya | 0 | 2 | 0 | 0 | 2 | 714 | 0 | 13 | 1 | 0 | 0 | 24 | 1 | 0 | 30 | 30 | 20 | 6 | 843 |
| Uganda | 0 | 1 | 0 | 0 | 3 | 22 | 0 | 9 | 1 | 0 | 0 | 21 | 0 | 0 | 36 | 599 | 15 | 10 | 717 |
| Tanzania | 0 | 0 | 0 | 0 | 3 | 20 | 0 | 4 | 1 | 0 | 0 | 12 | 0 | 2 | 436 | 47 | 7 | 8 | 540 |
| Malawi | 0 | 1 | 0 | 0 | 1 | 21 | 1 | 379 | 2 | 1 | 0 | 24 | 0 | 2 | 16 | 16 | 10 | 13 | 487 |
| Zambia | 0 | 4 | 0 | 0 | 0 | 20 | 0 | 6 | 0 | 0 | 0 | 20 | 0 | 0 | 11 | 17 | 314 | 15 | 407 |
| Zimbabwe | 0 | 4 | 0 | 0 | 2 | 10 | 1 | 8 | 0 | 1 | 0 | 35 | 0 | 2 | 10 | 23 | 15 | 289 | 400 |
| Ethiopia | 0 | 2 | 1 | 0 | 205 | 4 | 0 | 3 | 0 | 0 | 0 | 2 | 2 | 0 | 11 | 8 | 2 | 3 | 243 |
| Botswana | 0 | 74 | 0 | 0 | 2 | 2 | 4 | 2 | 0 | 1 | 0 | 10 | 0 | 8 | 3 | 1 | 1 | 1 | 109 |
| Cameroon | 0 | 0 | 3 | 0 | 1 | 10 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 7 | 9 | 8 | 1 | 42 |
| Mozambique | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 26 | 0 | 0 | 3 | 0 | 1 | 1 | 1 | 1 | 0 | 36 |
| Egypt | 0 | 0 | 11 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 2 | 1 | 6 | 0 | 0 | 4 | 1 | 1 | 30 |
| Swaziland | 0 | 4 | 0 | 0 | 0 | 0 | 5 | 2 | 0 | 1 | 0 | 6 | 0 | 9 | 1 | 0 | 0 | 2 | 30 |
| Nigeria | 0 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 1 | 0 | 13 | 0 | 0 | 1 | 1 | 2 | 4 | 27 |
| Zaire | 0 | 0 | 1 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 6 | 6 | 1 | 27 |
| Sudan | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 22 | 0 | 0 | 2 | 0 | 0 | 26 |
| Rwanda | 0 | 1 | 0 | 0 | 0 | 4 | 0 | 4 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 7 | 4 | 1 | 24 |
| Namibia | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 13 | 0 | 2 | 0 | 1 | 2 | 0 | 0 | 1 | 22 |
| Burkina Faso | 0 | 0 | 0 | 0 | 6 | 0 | 1 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 5 | 0 | 1 | 3 | 21 |
| Lesotho | 0 | 3 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 1 | 0 | 5 | 0 | 4 | 0 | 0 | 0 | 1 | 21 |
| Gambia | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 3 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 5 | 2 | 0 | 20 |
| Senegal | 0 | 0 | 1 | 0 | 0 | 4 | 0 | 1 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 3 | 2 | 0 | 17 |
| Ghana | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 1 | 3 | 0 | 2 | 15 |
| Benin | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 4 | 0 | 13 |
| Cent Afr Rep | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 3 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 5 | 0 | 0 | 12 |

4.4 Distribution of the literature by countries of publication (as publishers)

The country of publication for HIV/AIDS papers was included in the analysis in order to identify countries in which HIV/AIDS research is published and disseminated. Table 4 identifies a total of 51 such countries. In descending order of the overall rank, the USA published the largest number of papers in both databases (i.e. MEDLINE 2209, ISI 2679). Great Britain was in 2nd position with 2123 papers in the MEDLINE and 2116 papers in ISI databases, followed by South Africa [in the order of MEDLINE, ISI] (609, 560), France (122, 213), Kenya (168, 163), Canada (199, 27), the Netherlands (124, 99), Switzerland (105, 96), Denmark (66, 60), and Zimbabwe (107, 18), etc. Other African countries that published HIV/AIDS papers originating from and about E&S African countries include Ethiopia (43, 60), Nigeria (21, 0), Malawi (6, 0), Egypt (4, 0), and Uganda (1, 0).

4.5 Distribution of the literature by regional institutions (as authors)

Only data that was collected from the ISI databases was analyzed to obtain the most prolific regional institutions in terms of the number of publications each institution produced. Table 5 provides a list of the top 20 institutions. The University of Witwatersrand was the most productive, with a total of 460 papers, followed by the University of Nairobi (425), University of KwaZulu Natal [including the then University of Natal] (381), University of Cape Town (331), Makerere

University (287), and the University of Zimbabwe (237). In positions 7 and 8 were non-academic institutions, namely, the Ministry(ies) of Health and Uganda Virus Research Institute, which produced a total of 206 and 196 papers, respectively. Others in this category include the Kenya Government Medical Research Center (160), Kenya Medical Research Institute (103), the South African Institute for Medical Research (94), and the National Institute of Virology (81). Another notable category that performed well was hospitals which included Baragwanath Hospital (75), Muhimbili Medical Center (74), Coast Provincial General Hospital (43), Mulago Hospital (42), Tygerberg Hospital (42), Hlabisa Hospital (32), and the Jomo Kenyatta National Hospital (20). At the bottom of the Table are four institutions which were among the first to author HIV/AIDS papers, but afterwards appeared to disappear from the scene. These are Somerset Hospital (9), Groote Schuur Hospital (4), HF Verwoerd Hospital (4), and the Red Cross War Memorial Childrens Hospital (4), all of which are located in South Africa.

**Table** 3 Most productive foreign countries (as authors)

| | Country of research focus (Researched) | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Contributing country (Researcher) | ANG | BW | DJ | ER | ETH | KE | LE | MAL | MOZ | NAM | SOM | S.AFR | SUD | SW | TZ | UG | ZAM | ZIM | TOTAL |
| USA | 1 | 66 | 14 | 0 | 28 | 407 | 6 | 187 | 16 | 5 | 5 | 536 | 18 | 10 | 288 | 505 | 180 | 157 | 2429 |
| England | 0 | 10 | 0 | 0 | 19 | 192 | 2 | 156 | 7 | 4 | 0 | 309 | 6 | 6 | 186 | 261 | 173 | 81 | 1412 |
| Switzerland | 0 | 8 | 1 | 0 | 10 | 57 | 1 | 43 | 3 | 2 | 1 | 65 | 3 | 4 | 45 | 65 | 32 | 25 | 365 |
| Netherlands | 0 | 4 | 0 | 0 | 69 | 49 | 0 | 34 | 2 | 1 | 1 | 47 | 4 | 2 | 67 | 41 | 11 | 17 | 349 |
| Canada | 0 | 9 | 0 | 0 | 7 | 172 | 0 | 9 | 2 | 0 | 0 | 53 | 0 | 0 | 20 | 36 | 7 | 21 | 336 |
| France | 2 | 0 | 4 | 0 | 16 | 30 | 0 | 17 | 3 | 0 | 0 | 73 | 5 | 0 | 38 | 62 | 11 | 18 | 279 |
| Belgium | 0 | 0 | 2 | 0 | 6 | 83 | 0 | 11 | 2 | 1 | 1 | 40 | 0 | 2 | 35 | 27 | 26 | 10 | 246 |
| Sweden | 3 | 2 | 1 | 3 | 47 | 21 | 0 | 3 | 8 | 0 | 0 | 10 | 1 | 0 | 76 | 30 | 15 | 15 | 235 |
| Germany | 1 | 0 | 0 | 0 | 3 | 13 | 0 | 6 | 1 | 6 | 0 | 44 | 1 | 9 | 35 | 47 | 1 | 6 | 173 |
| Norway | 0 | 4 | 0 | 0 | 14 | 4 | 0 | 4 | 6 | 0 | 1 | 8 | 3 | 1 | 42 | 17 | 7 | 10 | 121 |
| Australia | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 14 | 2 | 0 | 0 | 53 | 0 | 0 | 6 | 12 | 6 | 5 | 108 |
| Thailand | 0 | 3 | 0 | 0 | 2 | 18 | 0 | 7 | 0 | 0 | 0 | 22 | 0 | 0 | 11 | 22 | 4 | 12 | 101 |
| Italy | 1 | 1 | 0 | 0 | 2 | 16 | 0 | 1 | 3 | 0 | 2 | 17 | 2 | 0 | 5 | 35 | 6 | 5 | 96 |
| Denmark | 0 | 1 | 0 | 0 | 5 | 15 | 0 | 2 | 0 | 0 | 0 | 3 | 0 | 0 | 29 | 4 | 6 | 17 | 82 |
| Scotland | 0 | 0 | 0 | 0 | 1 | 5 | 0 | 1 | 0 | 0 | 0 | 12 | 0 | 0 | 8 | 24 | 10 | 4 | 65 |
| Brazil | 0 | 1 | 0 | 0 | 1 | 10 | 0 | 3 | 1 | 0 | 0 | 21 | 0 | 0 | 3 | 16 | 2 | 3 | 61 |
| Israel | 0 | 4 | 0 | 0 | 22 | 1 | 0 | 2 | 0 | 0 | 0 | 20 | 1 | 0 | 1 | 2 | 3 | 1 | 57 |
| India | 0 | 4 | 0 | 0 | 1 | 4 | 0 | 5 | 0 | 0 | 0 | 10 | 1 | 0 | 9 | 14 | 2 | 5 | 55 |
| Japan | 0 | 2 | 2 | 0 | 2 | 11 | 0 | 1 | 0 | 1 | 0 | 7 | 0 | 0 | 5 | 7 | 9 | 1 | 48 |
| Spain | 1 | 1 | 0 | 0 | 0 | 3 | 1 | 1 | 3 | 0 | 0 | 16 | 0 | 1 | 3 | 14 | 4 | 0 | 48 |
| Finland | 0 | 0 | 1 | 0 | 5 | 6 | 0 | 6 | 0 | 1 | 0 | 2 | 0 | 0 | 4 | 3 | 3 | 2 | 33 |
| Ireland | 0 | 0 | 0 | 0 | 2 | 7 | 0 | 1 | 0 | 0 | 0 | 4 | 0 | 0 | 2 | 3 | 0 | 1 | 20 |
| Luxembourg | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 13 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 19 |
| Argentina | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 11 | 0 | 0 | 1 | 3 | 2 | 0 | 18 |
| Mexico | 0 | 1 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 6 | 1 | 0 | 1 | 4 | 1 | 1 | 18 |
| Peoples Rep China | 0 | 1 | 0 | 0 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 9 | 0 | 1 | 2 | 0 | 0 | 0 | 17 |
| Wales | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 4 | 0 | 0 | 0 | 6 | 0 | 0 | 1 | 0 | 2 | 0 | 16 |
| Peru | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 4 | 0 | 1 | 3 | 2 | 2 | 0 | 1 |

**Table 4** Distribution of HIV/AIDS records by country of publication (as publishers)

| | | MEDLINE (N=6178) | | | ISI (N=6367) | | |
|---|---|---|---|---|---|---|---|
| | Country | Rank | Papers | % | Rank | Papers | % |
| 1 | USA | 1 | 2209 | 35.76 | 1 | 2679 | 43.36 |
| 2 | Great Britain | 2 | 2123 | 34.36 | 2 | 2116 | 33.23 |
| 3 | South Africa | 3 | 609 | 9.86 | 3 | 560 | 8.80 |
| 4 | France | 7 | 122 | 1.97 | 4 | 213 | 3.45 |
| 5 | Kenya | 5 | 168 | 2.72 | 5 | 163 | 2.64 |
| 6 | Canada | 4 | 199 | 3.22 | 11 | 27 | 0.44 |
| 7 | Netherlands | 6 | 124 | 2.01 | 6 | 99 | 1.60 |
| 8 | Switzerland | 9 | 105 | 1.70 | 7 | 96 | 1.55 |
| 9 | Denmark | 10 | 66 | 1.07 | 9 | 60 | 0.97 |
| 10 | Zimbabwe | 8 | 107 | 1.73 | 12 | 18 | 0.29 |
| 11 | Germany | 11 | 47 | 0.76 | 8 | 67 | 1.08 |
| 12 | Ethiopia | 13 | 43 | 0.70 | 9 | 60 | 0.97 |
| 13 | Norway | 12 | 45 | 0.73 | 10 | 52 | 0.84 |
| 14 | Ireland | 14 | 34 | 0.55 | 10 | 52 | 0.84 |
| 15 | Australia | 16 | 17 | 0.28 | 15 | 8 | 0.13 |
| 16 | Nigeria | 15 | 21 | 0.34 | 22 | - | 0.00 |
| 17 | Israel | 18 | 13 | 0.21 | 16 | 7 | 0.11 |
| 18 | Japan | 17 | 14 | 0.23 | 18 | 5 | 0.08 |
| 19 | Italy | 19 | 11 | 0.18 | 15 | 8 | 0.13 |
| 20 | India | 22 | 7 | 0.11 | 14 | 10 | 0.16 |

Note: 17 papers in MEDLINE and 3 papers in ISI were excluded from the analysis for lack of data

**Table 5** Most productive regional institutions

| NO. | RANK | INSTITUTION | 1981-1985 | 1986-1990 | 1991-1995 | 1996-2000 | 2001-2005 | TOTAL |
|---|---|---|---|---|---|---|---|---|
| 1 | 1 | Univ Witwatersrand | 1 | 28 | 61 | 120 | 250 | 460 |
| 2 | 2 | Univ Nairobi | - | 35 | 105 | 132 | 153 | 425 |
| 3 | 3 | Univ Kwazulu Natal (Univ Natal) | - | 7 | 32 | 119 | 230 | 381 |
| 4 | 4 | Univ Cape Town | 4 | 5 | 27 | 78 | 217 | 331 |
| 5 | 5 | Makerere Univ | - | 7 | 51 | 88 | 148 | 287 |
| 6 | 6 | Univ Zimbabwe | - | 11 | 59 | 58 | 109 | 237 |
| 7 | 7 | Minist Hlth | - | 9 | 47 | 63 | 87 | 206 |
| 8 | 8 | Uganda Virus Res Inst | - | - | 22 | 57 | 117 | 196 |
| 9 | 9 | Univ Stellenbosch | 2 | 5 | 11 | 43 | 104 | 165 |
| 10 | 10 | Kenya Govt Med Res Ctr | - | 14 | 59 | 21 | 66 | 160 |
| 11 | 11 | Univ Malawi | - | - | 12 | 48 | 89 | 149 |
| 12 | 12 | Muhimbili Univ | - | - | 20 | 55 | 73 | 148 |
| 13 | 13 | Univ Zambia | - | 13 | 45 | 27 | 61 | 146 |
| 14 | 14 | Univ Addis Ababa | - | 5 | 24 | 28 | 47 | 104 |
| 15 | 15 | Kenya Med Res Inst | - | 9 | 59 | 25 | 10 | 103 |
| 16 | 16 | Univ Teaching Hosp | - | 6 | 11 | 29 | 55 | 95 |
| 17 | 17 | S African Inst Med Res | 2 | 11 | 15 | 45 | 21 | 94 |
| 18 | 18 | Univ Pretoria | 4 | - | 10 | 20 | 51 | 85 |
| 19 | 19 | Natl Inst Virol | - | 8 | 24 | 31 | 26 | 81 |
| 20 | 20 | Baragwanath Hosp | - | - | 12 | 15 | 48 | 75 |
| | | Somerset Hosp | 2 | - | - | - | 7 | 9 |
| | | Groote Schuur Hosp | 1 | 3 | - | - | - | 4 |
| | | Red Cross War Mem Childrens | 1 | - | - | - | 3 | 4 |
| | | Hf Verwoerd Hosp | 3 | - | - | - | - | 3 |

**Table 6** Most productive foreign institutions

| NO. | RANK | INSTITUTION | 1986-1990 | 1991-1995 | 1996-2000 | 2001-2005 | TOTAL |
|---|---|---|---|---|---|---|---|
| 1 | 1 | Ctr Dis Control & Prevention | 3 | 31 | 82 | 136 | 252 |
| 2 | 2 | Johns Hopkins Univ | 4 | 26 | 69 | 142 | 241 |
| 3 | 3 | London Sch Hyg & Trop Med | 6 | 11 | 73 | 146 | 236 |
| 4 | 4 | WHO | 4 | 34 | 50 | 119 | 207 |
| 5 | 5 | Univ Washington | 8 | 31 | 50 | 117 | 206 |
| 6 | 6 | Harvard Univ | - | 17 | 36 | 131 | 184 |
| 7 | 7 | Univ Manitoba | 22 | 58 | 50 | 45 | 175 |
| 8 | 8 | Columbia Univ | - | 8 | 39 | 112 | 159 |
| 9 | 8 | Univ Liverpool | - | 9 | 59 | 91 | 159 |
| 10 | 9 | Case Western Reserve Univ | 3 | 20 | 52 | 52 | 127 |
| 11 | 10 | Karolinska Inst | - | 31 | 38 | 55 | 124 |
| 12 | 11 | Univ Calif San Francisco | - | 15 | 35 | 69 | 119 |
| 13 | 12 | Univ Oxford | - | 5 | 38 | 69 | 112 |
| 14 | 13 | Univ Amsterdam | - | 17 | 28 | 61 | 106 |
| 15 | 14 | Inst Trop Med | 4 | 31 | 22 | 41 | 98 |
| 16 | 15 | Univ N Carolina | - | 5 | 21 | 70 | 96 |
| 17 | 16 | Fred Hutchinson Canc Res Ctr | - | 3 | 9 | 66 | 78 |
| 18 | 17 | Univ Alabama | - | 11 | 14 | 49 | 74 |
| 19 | 18 | NIAID | 4 | 15 | 16 | 38 | 73 |
| 20 | 19 | Stanford Univ | - | 11 | 21 | 35 | 67 |

### 4.6 Distribution of the literature by foreign institutions (as authors)

Table 6 provides the 20 most productive foreign institutions. Only one foreign institution was involved in the authorship of HIV/AIDS papers before 1986, notably WEIZMANN INST SCI (Israel). The entry of foreign institutions/organizations into the authorship of AIDS papers about E&S Africa appears to have occurred in the late 1980s. The period witnessed a large number of papers being authored by the University of Manitoba (Canada), which contributed 22 papers between 1986 and 1990, followed by the University of Washington (8) and the University of London's SCH HYG & TROP MED (6). Thereafter, more and more institutions became involved in the production of HIV/AIDS papers in the region, as illustrated by the growth of papers and institutions in subsequent years. Overall, the CTR DIS CONTROL & PREVENTION was the most productive with 252 papers, followed by JOHNS HOPKINS UNIV (241), LONDON SCH HYG & TROP MED (236), the WHO (207), UNIV WASHINGTON (206), HARVARD UNIV (184), UNIV MANITOBA (175), and COLUMBIA UNIV (159), etc.

### 4.7 Distribution of the literature by individual authors

Table 7 provides the top 30 most productive authors. Ranked in terms of the number of publications, in the order of ISI then MEDLINE, is Plummer FA (ISI 147, MEDLINE 106) followed by Ndinya-Achola JO (141, 99), Kreiss JK (116, 68), Whitworth JAG (111, 100), Bwayo JJ (108, 94), and Harries AD (102, 47), HM Coovadia (98, 70), RJ Hayes (95, 63), CF Gilks (87, 62), and D Serwadda (67, 67), just to name a few.

## 5 Discussion of the findings

The results presented in section 4 provide a detailed evaluation of the authors', institutional and country scientific productivity of HIV/AIDS literature in E&S Africa between 1980 and 2005. Seemingly, a sizable number of countries from all over the world are currently involved in HIV/AIDS research in the region. A total of 120 countries (43 African and 77 foreign countries) – including the countries within the scope of this study – have thus far participated. This large number of countries from which HIV/AIDS literature on E&S Africa originate may be attributed to the increasing impact of the disease in E&S Africa. These two geographic regions are reported to have the highest prevalence rate of HIV/AIDS in the world (UNAIDS 2003), a scenario which may have called for concerted efforts from all stakeholders from within and outside E&S Africa in the fight against HIV/AIDS. Consequently, South Africa – a country whose prevalence rate is high – registered the highest number of country participants (85), followed by Kenya (71) where HIV/AIDS has been declared a national epidemic. Uganda's case may, however, be different. The countries conducting HIV/AIDS research about the

country may have been thrilled by the country's success story in curbing the epidemic (Onyancha & Ocholla, 2004) and may not necessarily be due to the high levels of the prevalence rate, although this may still apply.

**Table 7** Most productive authors: ranked by the total number of publications in the ISI's Science Indicators

| | | | ISI (N=6336) | | MEDLINE (N=5708) | |
|---|---|---|---|---|---|---|
| No | Rank | Name of author | Papers [y] | % | Papers | % |
| 1 | 1 | PLUMMER, FA | 147 | 2.32 | 106 | 1.86 |
| 2 | 2 | NDINYA-ACHOLA, JO | 141 | 2.23 | 99 | 1.73 |
| 3 | 3 | KREISS, JK | 116 | 1.83 | 68 | 1.19 |
| 4 | 4 | WHITWORTH, JAG | 111 | 1.75 | 100 | 1.75 |
| 5 | 5 | BWAYO, JJ | 108 | 1.70 | 94 | 1.65 |
| 6 | 6 | HARRIES, AD | 102 | 1.61 | 47 | 0.82 |
| 7 | 7 | COOVADIA, HM | 98 | 1.55 | 70 | 1.23 |
| 8 | 8 | HAYES, RJ | 95 | 1.50 | 63 | 1.10 |
| 9 | 9 | GILKS, CF | 87 | 1.37 | 62 | 1.09 |
| 10 | 10 | SERWADDA, D | 67 | 1.06 | 67 | 1.17 |
| 11 | 10 | MANDALIYA, K | 67 | 1.06 | 41 | 0.72 |
| 12 | 10 | WILKINSON, D | 67 | 1.06 | 41 | 0.72 |
| 13 | 11 | FAWZI, WW | 66 | 1.04 | 43 | 0.75 |
| 14 | 12 | GRAY, RH | 65 | 1.03 | 67 | 1.17 |
| 15 | 13 | SEWANKAMBO, NK | 63 | 0.99 | 67 | 1.17 |
| 16 | 14 | WAWER, MJ | 62 | 0.98 | 60 | 1.05 |
| 17 | 14 | RICHARDSON, BA | 62 | 0.98 | 39 | 0.68 |
| 18 | 15 | SALANIPONI, FML | 61 | 0.96 | 29 | 0.51 |
| 19 | 16 | OVERBAUGH, J | 57 | 0.90 | 29 | 0.51 |
| 20 | 17 | KARIM, SSA | 56 | 0.88 | 50 | 0.88 |
| 21 | 17 | MOODLEY, J | 56 | 0.88 | 30 | 0.53 |
| 22 | 18 | MSAMANGA, GI | 55 | 0.87 | 38 | 0.67 |
| 23 | 18 | TAHA, TET | 55 | 0.87 | 43 | 0.75 |
| 24 | 19 | WOOD, R | 54 | 0.85 | 39 | 0.68 |
| 25 | 20 | BIBERFELD, G | 53 | 0.84 | 46 | 0.81 |
| 26 | 21 | FONTANET, AL | 52 | 0.82 | 40 | 0.70 |
| 27 | 21 | COUISIOUDIS, A | 52 | 0.82 | 35 | 0.61 |
| 28 | 22 | JACKSON, JB | 51 | 0.80 | 34 | 0.60 |
| 29 | 22 | BROADHEAD, RL | 51 | 0.80 | 41 | 0.72 |
| 30 | 22 | MMIRO, F | 51 | 0.80 | 29 | 0.51 |

The most productive regional (African) countries were led by South Africa, Kenya, Uganda, Tanzania, Malawi, Zambia, Zimbabwe, Ethiopia, Botswana, and Cameroon. All these countries, save one (i.e. Cameroon), were the focus of this study. South Africa was found to be the most productive, perhaps as a result of the country's improved research units, i.e., the medical research centers and well-funded universities' research programs. South Africa is assumed to have one of the "*largest and most well-developed education networks, especially in tertiary education, in Sub-Saharan Africa*" (Onyancha, 2006:57). Consequently, the education system, whose universities were recently highly ranked (Institute of Higher Education, Shanghai Jiao Tong University [2004]; InternetLab, 2005), has attracted both lecturers and students from other countries who are conducting HIV/AIDS research in the country. Comparatively the frequency of occurrence of regional countries in the address fields was less than that of the foreign countries, implying that regional countries were less productive than their foreign counterparts. This can be attributed to several factors. According to Mweene (n.d.), effective research in Africa has been hindered by lack of funds and basic facilities, the intellectual and physical isolation of researchers, insufficient personnel to run programs, fragmentation of effort in research, lack of vision and direction by the governments of Africa, and the poor self-image of the region in basic research.

Table 2 also shows that the highest number of records in each country was produced by the respective country as shown by highlighted figures in the Table. For instance, out of the 2189 papers that South Africa produced, 1929 were about South Africa. This pattern, in our opinion, should be naturally expected. Researchers tend to conduct research in

and about the country of residence or citizenship. The most productive foreign country was found to be the USA (2429), followed by England (1412 papers). These two countries recorded a total of 3841 postings which accounted for 54.55% of the total foreign hits (i.e. 7041). This high productivity by foreign countries may partly be attributed to the funding that these countries allocate towards HIV/AIDS research in developing countries in general, and African countries in particular. The pattern may also be attributed to the participation of African students and professionals residing or working in the USA and Great Britain. This observation can be explained better by looking at the following facts reflected in a jointly authored booklet by the Commonwealth Scholarship Commission & Economic and Social Research Council (n.d.:4):

- African institutions are increasingly dependent on foreign expertise. Africa employs up to 150,000 expatriate professionals at a cost of $4bn a year. The expatriates may be authoring HIV/AIDS papers in the name of the parent country.
- There are more African scientists and engineers in the USA than in the entire continent.
- Some 70,000 highly qualified African scholars and experts leave their home countries every year to work abroad, often in more developed countries.
- Since 1990, Africa has been losing 20,000 professionals each year.
- Over 30,000 professionals reside outside Africa.
- 35% of total overseas development aid to Africa is spent on expatriate professionals.
- 70,000 PhDs of African origin are currently in the USA.

With such a large number of African professionals residing in developed countries, and an equally large number of expatriates working in Africa, the pattern of productivity witnessed in this study may not be surprising.

The distribution of papers by the countries of publication was meant to determine countries or geographic regions in which HIV/AIDS research by and about E&S Africa is published and disseminated. It is our belief that the place of publication of the research findings is important in research evaluation since the place of publication affects access and thus decision making processes. Take for instance a situation where all HIV/AIDS research about a particular country (say country A) is published in a foreign country (e.g. country B). In the first place, these research findings are supposed to assist country A in her formulation of policies regarding intervention programs. It would be extremely difficult to access the journals in which these research findings are published, especially if these journals require subscription fees (which in most cases are exorbitant), thus negatively impacting on the implementation of the recommendations made therein. Results in Table 4 show that, just as in the analysis of the most productive countries, most HIV/AIDS papers were published in foreign countries. It is also worth noting therefore that some papers originated from foreign countries and were actually published in the same category of countries. This is especially true in the case of foreign countries which have access to quality journals to publish in. Unlike foreign countries, most of the papers produced regionally were published in foreign countries. This pattern may be attributed to the desire of local researchers to publish their research findings in foreign-based journals which are thought to have a larger circulation status, and better reliability and credibility than locally published journals.

The findings on institutional productivity demonstrated that the highest ranking institutions were based in the countries of research focus. The University of Witwatersrand led, followed by the University of Nairobi, University of KwaZulu Natal, University of Cape Town and Makerere University. All these institutions produced more papers than the highest ranking foreign institution, i.e. the CTR DIS CONTROL & PREVENTION, which produced 252 papers. It was observed that the dominant institutions (i.e. high ranking institutions) were universities in the case of regional institutions. In fact, all the top 6 of the top 20 high ranking institutions were universities. The implication of this is that universities are the primary producers of HIV/AIDS research. We could not, however, ascertain the type of research (i.e. basic/pure or applied) conducted at the universities. Another category of high ranking institutions that conduct research in E&S Africa is that of hospitals or government laboratories. These include the Ministries of Health in various countries, i.e., the Uganda Virus Research Institute, Kenya Government Medical Research Center, Kenya Medical Research Institute, South African Institute of Medical Research, the National Institute of Virology, Baragwanath Hospital and Muhumbili Medical Center, to name a few. A further observation that can be made with regard to the regional institutions is that all the top 20 ranking institutions were located in the countries under investigation. This corresponds with the results on the most productive regional countries. As regards foreign institutions, similar patterns were observed, although the non-university institutions also featured prominently (a similar situation was found in the analysis of regional institutions). For example, the CTR DIS CONTROL & PREVENTION was first in the list of the most productive foreign institutions, with 252 papers. Other non-university institutions include the World Health Organization, Fred Hutchinson Cancer Research Center, NIAID, Blood Transfusion Services, and the Family Health Institute.

An analysis of the most productive authors was initially meant to offer insights into the performance of African authors and compare their performance with that of their foreign colleagues. "*African authors*" refers to citizens and/or residents of African countries living or working within or outside Africa. None of the databases used for data collection provided exhaustive information for such an analysis. The ISI databases came close to offering such information by providing the authors' institutional affiliations and the authors' addresses. However, since the list of authors and that of the institutions did not match, we could only use the corresponding author's address field to obtain a partial picture. We resorted to guessing the author's category of affiliation by examining the names of authors. It is worth noting that the latter approach is flawed since it is presently not easy to identify African authors by use of only the authors' names (e.g. surnames). An attempt, though, was made to identify African authors by using our own knowledge of African names and the corresponding author's field which provides institutional and country affiliation in the records. Looking at Table 7 and using the corresponding author's field in the ISI databases, approximately 19 (33.9%) African authors, who produced over 38 papers, were identified. They were led by Ndinya-Achola JO (University of Nairobi, Kenya) and Bwayo JJ (University of Nairobi, Dept Med Microbiology). This figure, although highly doubtful, shows commendable participation from regional authors/researchers.

In conclusion, it is noted that a large percentage of research findings are published in foreign countries. Although this pattern is healthy as far as international visibility and the impact of HIV/AIDS research conducted in and about Africa is concerned, it nevertheless denies policy and decision makers in Africa free access to the research findings that were specifically meant to improve health standards in their respective countries. In order to allow international visibility and impact, as well as provide free access to the findings, it is highly recommended that authors/researchers be encouraged by way of incentives to present the findings in regionalized conferences, and publish them in both print and electronic conference proceedings while publishing the papers in foreign sources. Another option is to publish their papers through Open Access (OA) platforms. The University of Maryland (2004) opines that with OA, works are created with no expectation of direct monetary gain and made available at no cost to the reader on the Internet for the purposes of education and research. OA therefore permits users to read, download, copy, distribute, print, search, or link to the full texts of works, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the Internet itself. This may seem to be an infringement of the author's copyright. But according to the Unievrsity of Maryland (2004: para 3-4):

> Authors own the original copyright in their works. In the process of publishing, authors can transfer to publishers the right for publishers to post the work freely on the Web, or authors can retain the right to post their own work on institutional or disciplinary servers. They (authors) [do] retain control over the integrity of their work and have the right to be properly acknowledged and cited.

Institutional repositories are other avenues through which researchers can disseminate their research findings without infringing copyright laws. Results also show that countries that publish the majority of publications were, to a large extent, the most productive (as authors) in terms of the number of HIV/AIDS records. This may mean that HIV/AIDS research is conducted by African authors who reside in foreign countries, or foreign authors who have an interest in the HIV/AIDS situation in the region. Further research is, however, recommended in order to determine the authors' nationality (country of origin). This generally act as an indicator of the knowledge transfer and sharing processes which are very vital in solving complex phenomena. Equally important, a citation analysis of the HIV/AIDS publications should be conducted to determine the influence of HIV/AIDS research in and about Eastern and Southern Africa in the world of science.

## References


Anglo-American cataloguing rules. (2003). Chicago: American Library Association

Brown, P. (1993). Has the AIDS research epidemic spread too far? *New Scientist*, 138(1873), 12-15

Committee on Science, Engineering, and Public Policy [COSEPUP]. (2004). Implementing the Government Performance and Results Act: a status report. Washington, D.C.: National Academy of Sciences

Commonwealth Scholarship Commission & Economic and Social Research Council. (nd.). *African Universities: Supporting future generations*. London: Commonwealth Scholarship Commission

Diodato, V. (1994). *Dictionary of Bibliometrics*. New York: Haworth

Garfield, E. (1989). Evaluating research: Do bibliometric indicators provide the best measure? *Current Contents*, 3-10

Garfield, E. (1996). Citation indexes for retrieval and research evaluation. Paper presented at Consensus Conference on the Theory and Practice of Research Assessment, Capri., October 7th, 1996. Retrieved February 6, 2003, from *http://garfield.library.upenn.edu*

Geisler, E. (2001). The Mires of Research Evaluation. *The Scientist,* 15(10), 39-41

Institute of Higher Education, Shanghai Jiao Tong University (2004). The academic ranking of World Universities. Retrieved 10 April, 2006, from *http://ed.sjtu.edu.cn/ranking.htm*

InternetLab. (2007). Webometrics ranking of world universities. Retrieved 10 April, 2007, from *http://www.webometrics.info/*

Jacobs, D. (2000). Institutional status, funding and grading in relation to faculty research productivity. *Progress in Library and Information Science in Southern Africa: proceedings of the first biennial DISSAnet conference*, 143-153. Glenstantia: Infuse

Jacobs, D. (2002). Scientometrics of genetic research and development in South Africa, 1990-2001. In: T. Bothma & A. Kaniki eds. *Progress in Library and Information Science in Southern Africa: proceedings of the second biennial DISSAnet conference*, 93-103. Glenstantia: Infuse

King, J. (1987). A review of bibliometric and other science indicators and their role in research evaluation. *Journal of Information Science*, 13, 261-276

Kostoff, R. N. (2000). Evaluating productivity. *The Scientist*, 14(20), 4

Kostoff, R. N. (2001). Science and Technology Metrics. Retrieved April 11, 2002, from Defence Technical Information Center. Information for the Defence Community Website *http://www.dtic.mil/dtic/kostoff/Metweb5_IV.htm*

Lancaster, F.W. (1991). *Bibliometric methods in assessing productivity and impact of research*. Bangalore: Sarada Ranganathan Endowment for Library Science

Mweene, H.V. (n.d). Basic science research: The case for a regional approach. Retrieved April 1, 2003, from *http://www.iitap.iastate.edu/reports/stafrica/HabatwaDARed.html*

National Research Foundation. (2007). About the evaluation centre. Retrieved 15 October, 2007, from *http://evaluation.nrf.ac.za/Content/About/About.htm*

Onyancha, O.B. (2006). Empowering the South African community in the AIDS war: an informetric-case study of HIV/AIDS research projects, with special reference to masters and doctoral dissertations and theses. *South African Journal of Libraries and Information Science*, Vol. *71(2): 56-7*

Onyancha, O.B. & Ocholla, D.N. (2004). A comparative study of the literature on HIV/AIDS in Kenya and Uganda: A bibliometric study. *Library & Information Science Research*, 26(2004), 434-447

Organization for Economic Co-operation and Development [OECD]. (1997). *The evaluation of scientific research: selected experiences*. Paris: Organization for Economic Co-operation and Development.

Phelan, T. J. (2000). Evaluation of scientific productivity. *The Scientist*, 14(19), 39-41

Popescu, I. I. (2002). Science journal ranking by average impact factors. Retrieved August 26, 2005, from *http://www.geocities.com/iipopescu/Jo_rankingb.htm*

The Scientist. (1996). Citation analysis reveals leading institutions, scientists researching AIDS. *The Scientist*, 10(15), 12-13

UNAIDS. (2003). AIDS epidemic update: December 2003. Retrieved December 18, 2003, from *http://www.unaids.org/wad/2003/Epiupdate2003_en/Epi03_03_en.htm#P28_3962*