

PubMed database (Table 1), currently featuring over 18.7 million bibliographic references from 1950 onward, it appears that the (adjusted) overall increase of listed papers from 1995–2004 is roughly the same as that reported for the African papers (39.64% vs. 41.29%). The increase of the average number of papers per journal and the emergence of new (often open access) journals indexed in PubMed are probably major factors to account for this trend. As is clear from column 4, the annual increase of records does not show a stable pattern (e.g., ranging from 0.12%–8.26% in just 3 years, then back to 2.30%).

Moreover, the correct identification of publication years for the last decade can constitute a potential pitfall when using PubMed as a tool for bibliometric applications. With the practice of listing “Epub before print” descriptions, both the date of the online posting of individual papers and the date of their actual publication in a complete issue are included in the date fields. For many papers, this results in 2 different years of publication (e.g., e-publication on November 12, 2007, and publication of the full issue on February 15, 2008; the reverse also occurs, but apparently to a far lesser extent). In this way, a naive search for publication years may yield up to 10% incorrectly accorded bonus records (e.g., year 2007 in Table 1). This double publication year phenomenon starts around the year 2000 and becomes really conspicuous from the year 2005 onward. For the adjustments in Table 1, I have given priority to the most recent year as the “true” date of publication, but this may be too simple a rule to correctly pinpoint them all.

Another complication for date searching in post-1999 publications is that there is always a difference in the number of articles retrieved using the “date of publication” limit and the number retrieved using the “date of publication [dp]” field, which gets increasingly larger over time. Differences of several hundreds of records per year occur. Although this difference represents less than 0.1% of

Pubmed growth patterns and visibility of journals of Sub-Saharan African origin

In their extensive analysis of African biomedical publications, Hofman et al. [1] found that in ten years’ time (1995–2004), the number of publications with authors from Sub-Saharan Africa (SSA) indexed in PubMed had increased by more than 40%. As they correctly indicate, PubMed is not an ideal database to monitor the geographical distribution of authors, as only 1 address per paper is included (and not in a standardized way). But still, when looking at the 10 most prolific SSA countries, an increase from 2,073 papers listed in 1995 to 2,929 papers in 2004 suggests that the international visibility of African research is clearly on the rise.

Yet if one takes a closer look at the distribution patterns of the

Table 1
Evolution of the number of PubMed records 1989–2008 (counted on April 1, 2009)

Year	Records count	Adjusted count	% increase	Free full text	% increase	% of total
1989	396,370	396,370	4.42	42,259	6.60	10.66
1990	403,295	403,295	1.75	43,575	3.11	10.80
1991	405,072	405,072	0.44	45,734	4.95	11.29
1992	409,430	409,430	1.08	49,721	8.72	12.14
1993	417,195	417,195	1.90	51,063	2.70	12.24
1994	427,536	427,536	2.48	54,285	6.31	12.70
1995	437,884	437,884	2.42	58,326	7.44	13.32
1996	447,486	447,486	2.19	66,960	14.80	14.96
1997	448,027	448,027	0.12	76,067	13.60	16.98
1998	466,517	466,517	4.13	89,165	17.22	19.11
1999	484,418	484,396	3.83	96,174	7.86	19.85
2000	526,002	524,410	8.26	105,857	10.07	20.19
2001	539,890	536,453	2.30	112,383	6.16	20.95
2002	557,484	551,418	2.79	119,628	6.45	21.69
2003	587,361	577,058	4.65	125,105	4.58	21.68
2004	629,353	611,450	5.96	134,052	7.15	21.92
2005	689,753	646,365	5.71	144,701	7.94	22.39
2006	735,242	673,476	4.19	148,652	2.73	22.07
2007	767,304	694,126	3.07	157,838	6.18	22.74
2008	802,701	741,264	6.79	109,397	-30.69	14.76

Year: year of publication.

Records count: number of records per publication year.

Adjusted count: number of records per publication year after deduplication (see text).

% increase: compared to the previous publication year (for adjusted counts).

Free full text: number of publications freely available from PubMed Central.

% increase: percentage of PubMed Central publications compared to the previous publication year (for adjusted counts).

% of total: percentage of PubMed Central publications compared to all PubMed records in the same publication year.

the annual totals, it is difficult to decide which method is the most accurate. I have chosen the "limits" technique, invariably yielding the largest numbers of records.

Table 1 also shows a relatively stable availability of free full-text—as indicated by the "Links to free full text" limits option—for around 20%–23% of all listed papers for the last decade. Counts were made at the end of the first quarter of 2009, so the apparent setback in 2008 probably reflects the embargoes of 6–12 months of many semi-open access journals (e.g., those cohosted in the PubMed Central repository). For the penultimate decade, relative full-text availability is much lower but still over 10%. As this period largely predates the web era, the results of retrospective digitization are clearly visible. Both PubMed and PubMed Central are continually being updated with older material (but again a very small fraction of total updates).

Sub-Saharan Africa

Searching PubMed's Journals database, I was able to identify 30

different journals from SSA countries currently indexed, which seems compatible with the 27 reported by Hofman et al. for 2008 [1]. Nigeria and South Africa each featured 9 journals; Kenya, Senegal, and Tanzania were represented by 2; and Ethiopia, Madagascar, Malawi, Mali, Uganda, and Zimbabwe each had a single journal. So journals from 11 SSA countries are currently indexed in PubMed (out of a total of over 80 different countries worldwide). Sixty percent of the indexed SSA journals are concentrated in 2 countries, and over 75% of the SSA countries are not represented at all. In 2003, Jimba et al. [2] pleaded for the inclusion in PubMed of at least 1 medical journal per country to highlight its autonomous research capacity. Adding less than 30 journals to the current 5,375 would thus suffice to realize this noble ideal for SSA; that is, if each country publishes at least 1 quality biomedical journal.

The ISI Web of Knowledge covers a larger number of journals (about 8,500) than PubMed, but as a major multidisciplinary database, it also covers far more re-

search fields. Only 4 of the 30 SSA biomedical journals discussed above are indexed in Web of Knowledge, all of them originating from South Africa. As ISI Web of Knowledge gives more complete information on (all) author addresses, it is superiorly suitable to retrieve and analyze the impact of SSA authors publishing in the higher end international journals. The locally published literature, however, remains almost completely ignored.

A more complete resource for searching local journals is CABI's Global Health database, which covers most of the 30 SSA biomedical journals indexed by PubMed and several additional ones, though not necessarily cover-to-cover. Embase and Scopus are Elsevier's major alternatives to PubMed (but I was not able to consult these databases due to lack of subscriptions). Yet another option is the African Index Medicus, but this is a much smaller database that only aims to mine the regional literature that is not covered by PubMed. As such it constitutes a local supplement to PubMed, with no pretensions of becoming an

alternative. African Journals Online offers free visibility and searchability and (paid) access to over 340 African journals (but its scope is not limited to biomedical sciences).

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References

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