

Dermatological scientific production from European Union authors (1987–2000)

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To evaluate the contribution to international dermatological literature made by authors from European Union (EU) countries. Using MedLine, a selection was made of articles by EU authors published between 1987 and 2000 in 32 dermatological journals, classified as such by the Institute for Scientific Information. Overall 19,225 documents were published by European authors in the selected dermatological journals from 1987 to 2000. The leading countries in terms of output were the United Kingdom, Germany, Italy and France. The leading countries in number of articles after taking into account the gross domestic product and the population were Denmark, Finland and Sweden. The main journals were the *British Journal of Dermatology* (14.5% of articles from European authors), *Contact Dermatitis* (13.7%), *Journal of Investigative Dermatology* (7.3%), *Journal of American Academy of Dermatology* (6.4%), and *Acta Dermato-Venereologica* (6.1%). The country with the highest output of papers by journal was the United Kingdom (11 journals) followed by Germany (9 journals), Italy (6 journals), France (3 journals), Spain (2 journals) and Sweden (1 journal). In conclusions: the scientific production of European Union research on dermatology is highest in northern countries.

Introduction

Biomedical research projects normally lead to publications in the scientific literature,¹ and these are often used as a measure of the success of the work.² However, they are really only the first step in the dissemination and application of the results of the research.¹ In recent years there has been an evident interest in developing scientific indicators, capable of facilitating the analysis of the results of research activities.³ Bibliometry enables scientific activity to be quantified by means of different indicators of production, circulation, consumption and repercussion.⁴ In spite of its known limitations, bibliometric analysis constitutes a procedure of great utility in evaluating health sciences.^{2–4} At the present time the European contribution to international literature is probably expanding⁵ as compared with that of other leading countries.

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To date, some studies on European scientific production in biomedicine and life sciences,⁶ as well as in certain medical disciplines such as cardiology,⁷ oncology,⁸ gastroenterology,⁹ neurology,¹⁰ respiratory medicine,⁴ or rheumatology,¹¹ are available.

In the field of dermatology, there have been several bibliometric articles published focusing on citation analysis in clinical dermatological journals,^{12,13} top cited authors in dermatology^{14,15}, growth of international contributors to dermatological literature,¹⁶ organizational impact in the dermatological literature¹⁷ and an article about authors' contributions in a specific journal (*Dermatologic Surgery*).¹⁸ There are also some editorials on some bibliometric indexes in the dermatological literature.¹⁹ However, little specific information exists about European scientific activity in this field, and there is no study on the participation of each European country in international dermatological journals.

The objectives of this study were to evaluate the distribution of European papers published in dermatological journals over 14 years, by means of bibliometric indicators of production.

Methods

For this evaluation we made a search of documents published in English from 1987 to 2000 which were included in the MedLine database, using WebSPIRSTM, version 4.3, from Silver Platter International NV (U.S.A.), updated in September 2001. The search strategy was based on three fields: journal, place and country of authors' work and period of time. Delimitation of the dermatology field was made according to the journals, adhering to the classification of the journals into categories by the *Journal Citation Reports* (JCR) of *Science Citation Index*.²⁰ As such, we selected all those journals included in the "Dermatology & Venereal Diseases" category of the JCR in the year 2000, which were contained in the MedLine database. When a journal had changed its name, we also selected its previous name if it was included in MedLine, and in this case the two were considered the same journal. The following is a list of such cases: *Dermatologica*/*Dermatology*, *Genitourinary Medicine*/*Sexually Transmitted Infection*, *Journal of Dermatology and Surgical Oncology*/*Dermatologic Surgery*, *Photodermatology*/*Photodermatology*, *Photoimmunology & Photomedicine*, and *Skin Pharmacology*/*Skin Pharmacology and Applied Skin Physiology*. Furthermore, we excluded from this study: 1) journals included in the JCR but not in the MedLine database (*Journal of Dermatological Treatment*, *Journal of Society Cosmetic and Chemists* and *Journal of Cosmetic Science*), and 2) journals included in the JCR in a language other than English (*Annales de Dermatologie et de Venereologie*, and *Der Hautarzt*). The complete list of the 32 journals analyzed is shown in Table 1.

Table 1. List of journals analyzed in the study with country of publication and period included in *Journal Citation Reports* (JCR) and MedLine

Journal title	Country of publication	Period included in JCR	Period included in MedLine
<i>Acta Dermato-Venereologica</i>	Norway	87-00	87-00
<i>American Journal of Dermatopathology</i>	USA	87-00	87-00
<i>Archives of Dermatological Research</i>	Germany	87-00	87-00
<i>Archives of Dermatology</i>	USA	87-00	87-00
<i>British journal of Dermatology</i>	UK	87-00	87-00
<i>Burns</i>	UK	87-00	87-00
<i>Clinical and Experimental Dermatology</i>	UK	87-00	87-00
<i>Clinics in Dermatology</i>	USA	87-00	87-00
<i>Contact Dermatitis</i>	Denmark	87-00	87-00
<i>Current Problems in Dermatology</i>	Switzerland	00	87-00
<i>Cutis</i>	USA	87-00	87-00
<i>Dermatologic Clinics</i>	USA	87-00	87-00
<i>Dermatologica / Dermatology</i>	Switzerland	87-91/92-00	87-91/92-00
<i>European Journal of Dermatology</i>	France	96-00	98-00
<i>Experimental Dermatology</i>	Denmark	99-00	92-00
<i>Genitourinary Medicine / Sexually Transmitted Infection</i>	UK	87-95/ 98-00	87-97/98-00
<i>International Journal Dermatology</i>	USA	87-00	87-00
<i>Journal Dermatological Science</i>	Ireland	97-00	90-00
<i>Journal of Dermatology and Surgical Oncology / Dermatologic Surgery</i>	USA	87-94/95-00	87-94/95-00
<i>Journal of Cutaneous Pathology</i>	Denmark	87-00	87-00
<i>Journal of Investigative Dermatology</i>	USA	87-00	87-00
<i>Journal of the American Academy of Dermatology</i>	USA	87-00	87-00
<i>Journal of the European Academy of Dermatology and Venereology</i>	Netherlands	99-00	98-00
<i>Leprosy Review</i>	UK	87-00	87-00
<i>Melanoma Research</i>	UK	96-00	91-00
<i>Mycoses</i>	Germany	88-00	88-00
<i>Pediatric Dermatology</i>	USA	87-00	87-00
<i>Photodermatology/ Photodermatology, Photoimmunology & Photomedicine</i>	Denmark	87-89/95-00	87-89/90-00
<i>Seminars in Cutaneous Medicine and Surgery</i>	USA	87-00	87-00
<i>Sexually Transmitted Diseases</i>	USA	87-00	87-00
<i>Skin Pharmacology/ Skin Pharmacology and Applied Skin Physiology</i>	Switzerland	95-97/98-00	88-9/98-00
<i>Wound Repair and Regeneration</i>	USA	95-00	98-00

USA: United States of America, UK: United Kingdom

The place of work (country) was obtained from the first authors of the documents (letters and editorials were not included), so the country of the first signing author was considered the country of origin of the article. In order to limit the search to those documents in which the first signing institution belonged to the European Union (EU), the following terms were entered in the “institutional address” field (“AD” field): “Austria”, “Belgium”, “Denmark”, “Finland”, “France”, “Germany” (or “FRG” or “F.R.G” or “DDR” or “D.D.R” or “G.R.D” or “GRD”), “Greece”, “Ireland”, “Luxembourg”, “Netherlands” (or “Holland”), “Portugal”, “Spain”, “Sweden”, “United Kingdom” (or “U.K” or “UK” or “Great Britain” or “GB” or “England” or “Wales” or “Scotland” or “N Ireland” or “North Ireland”). The documents from “England”, “Wales”, “Scotland” and “Northern Ireland” were grouped under the “United Kingdom” heading.

In the case of the journals *British Journal of Dermatology* and *Genitourinary Medicine/Sexually Transmitted Infection*, which were published in the United Kingdom, we carried out a manual review of the documents in the database to determine the country of the first author due to the heterogeneity of the institutional addresses, (for example, in many cases the province appeared instead of the country of origin). As in the previous section we only located documents with an institutional address (separate “AD”) in MedLine, that is to say original articles, clinical revisions and notes. We included all authors (dermatologists and non-dermatologists) with citable documents published in the selected journals.

The global production was evaluated considering the number of documents as well as economic and population parameters. The economic parameter in this study was the mean of the gross domestic product (GDP) in 1992, according to the Atlas of the World Bank 1994,²¹ and the GDP in 1999, according to the Atlas of World Bank 2000.²² This economic index was expressed as number of published documents/100,000 million dollars of GDP. The population parameter for the period 1987–2000 was the mean of the national population in 1992 of each country, according to the Atlas of World Bank 1994,²³ and the national population in 1999, according to the Atlas of World Bank 2000.²² This index was expressed as number of published documents/1,000,000 inhabitants.

Descriptive statistics were computed by standard methods. All data were entered into a computer spreadsheet (Microsoft Excel). The quantitative variables were expressed as absolute and relative frequencies.

Results

Overall, 19,225 documents were published by EU authors in the selected dermatological journals from 1987 to 2000. All the EU countries, except Luxembourg, were represented (Table 2). The leading countries in terms of output were the United

Kingdom (26.7% of papers), Germany (16.7%), Italy (11.5%) and France (9.2%). The ratio of the number of dermatological papers published to the GDP showed a mean value of 248.5 articles/ 100,000 million dollars for the EU; with Denmark ranking first (539.0), followed by Finland (500.0) and Sweden (434.4). The ratio of the number of dermatological papers published to the population of the country, in millions of inhabitants, was 51.9 articles / million inhabitants for the EU; with Denmark ranking first (164.0 articles / million inhabitants), followed by Sweden (127.7) and Finland (119.6) (Table 2).

Table 2. Comparison of scientific production in dermatologic journals of different countries of the European Union (EU) between 1987 and 2000

Country	Number of articles	% (EU=100)	Articles/100,000 million dollars GDP	Articles/ million population
Austria	593	3.1	308.2	75.1
Belgium	638	3.3	277.3	63.8
Denmark	820	4.3	539.0	164.0
Finland	598	3.1	500.0	119.6
France	1767	9.2	130.5	30.5
Germany	3202	16.7	162.4	39.9
Greece	171	0.9	171.7	16.3
Ireland	102	0.5	178.6	27.6
Italy	2206	11.5	189.9	38.1
Luxembourg	0	0.0	0.0	0.0
Netherlands	1290	6.7	370.3	83.2
Portugal	137	0.7	152.8	13.6
Spain	1445	7.5	262.8	37.0
Sweden	1124	5.8	494.0	127.7
United Kingdom	5132	26.7	434.4	88.2
European Union	19225	100.00	248.5	51.9

GDP: gross domestic product

Table 3 shows the distribution of papers according to the journal in which they were published. A total of 53.9 % of all publications appeared in six journals: *British Journal of Dermatology* (2,779 papers), *Contact Dermatitis* (2,631), *Journal of Investigative Dermatology* (1,408), *Journal of American Academy of Dermatology* (1,237), *Acta Dermato-Venereologica* (1,164), and *Dermatologica/Dermatology* (1,148). Only two of these six journals are edited in USA (*Journal of Investigative Dermatology*, and *Journal of American Academy of Dermatology*); the others are published in Europe.

Table 3. Distribution of the articles published in each dermatologic journal and percentages of articles by authors from European Union (EU)

Journal title	N°	%	Impact factor*
<i>British Journal of Dermatology</i>	2779	14.46	1.878
<i>Contact Dermatitis</i>	2631	13.69	0.849
<i>Journal of Investigative Dermatology</i>	1408	7.32	4.052
<i>Journal of American Academy Dermatology</i>	1237	6.43	1.724
<i>Acta Dermatologica-Venereologica</i>	1164	6.05	1.016
<i>Dermatologica</i> ^a	1148	5.97	0.840
<i>Clinical and Experimental Dermatology</i>	964	5.01	0.612
<i>Genitourinary Medicine</i> ^b	818	4.25	1.253
<i>Archives Dermatology Research</i>	759	3.95	1.203
<i>International Journal of Dermatology</i>	610	3.17	0.633
<i>Burns</i>	589	3.06	0.381
<i>Archives of Dermatology</i>	535	2.78	2.194
<i>Mycoses</i>	528	2.75	0.502
<i>American Journal of Dermatopathology</i>	406	2.11	0.932
<i>Melanoma Research</i>	349	1.82	1.598
<i>Photodermatology</i> ^c	321	1.67	0.860
<i>Pediatric Dermatology</i>	316	1.64	0.553
<i>Clinics in Dermatology</i>	305	1.59	0.536
<i>Skin Pharmacology</i> ^d	290	1.51	0.811
<i>Journal of Cutaneous Pathology</i>	288	1.50	1.161
<i>European Journal of Dermatology</i>	284	1.48	0.535
<i>Experimental Dermatology</i>	228	1.19	2.309
<i>Current Problems in Dermatology</i>	196	1.02	0.167
<i>Journal of Dermatology and Surgical Oncology</i> ^e	195	1.01	0.727
<i>Sexually Transmitted Diseases</i>	176	0.92	2.078
<i>Journal of European Academy of Dermatology</i>	172	0.89	0.571
<i>Cutis</i>	145	0.75	0.379
<i>Dermatology Clinic</i>	131	0.68	0.727
<i>Journal of Dermatology Science</i>	123	0.64	0.864
<i>Leprosy Review</i>	74	0.38	0.949
<i>Wound Repair and Regeneration</i>	30	0.16	0.477
<i>Seminars in Cutaneous Medicine and Surgery</i>	26	0.14	0.696

*Impact factor of journal is the mean of the years 1987–2000

^a: Includes *Dermatology*

^b: Includes *Sexually Transmitted Infection*

^c: Includes *Dermatologic Surgery*

^d: Includes *Photodermatology, Photoimmunology & Photomedicine*

^e: Includes *Skin Pharmacology and Applied Skin Physiology*

Table 4. First country in number of articles and normalized by gross domestic product (GDP) and inhabitants in each journal

Journal title	First country in number of articles	First country normalized by GDP	First country normalized by population
<i>Acta Dermato-Venereologica</i>	Sweden	Sweden	Denmark
<i>American Journal of Dermatopathology</i>	Italy	Austria	Austria
<i>Archives of Dermatological Research</i>	Germany	Finland	Finland
<i>Archives of Dermatology</i>	France	Austria	Austria
<i>British journal of Dermatology</i>	UK	Finland	Denmark
<i>Burns</i>	UK	UK	UK
<i>Clinical and Experimental Dermatology</i>	UK	UK	UK
<i>Clinics in Dermatology</i>	UK	Greece	Netherlands
<i>Contact Dermatitis</i>	Italy	Finland	Finland
<i>Current Problems in Dermatology</i>	Germany	Austria	Austria
<i>Cutis</i>	Spain	Spain	Denmark
<i>Dermatologic Clinics</i>	UK	Ireland	Ireland
<i>Dermatologica</i> ^a	Germany	Belgium	Belgium
<i>European Journal of Dermatology</i>	France	Finland	Finland
<i>Experimental Dermatology</i>	Germany	Denmark	Denmark
<i>Genitourinary Medicine</i> ^b	UK	UK	UK
<i>International Journal Dermatology</i>	Italy	Greece	Greece
<i>Journal Dermatological Science</i>	Germany	Sweden	Sweden
<i>Journal of Dermatology and Surgical Oncology</i> ^c	Italy	Netherlands	Netherlands
<i>Journal of Cutaneous Pathology</i>	Spain	Austria	Austria
<i>Journal of Investigative Dermatology</i>	Germany	Austria	Austria
<i>Journal of the American Academy of Dermatology</i>	Germany	Austria	Denmark
<i>Journal of the European Academy of Dermatology and Venereology</i>	Italy	Ireland	Ireland
<i>Leprosy Review</i>	UK	Netherlands	Netherlands
<i>Melanoma Research</i>	Germany	Sweden	Sweden
<i>Mycoses</i>	Germany	Germany	Germany
<i>Pediatric Dermatology</i>	Italy	Spain	Spain
<i>Photodermatology</i> ^d	UK	Finland	Finland
<i>Seminars in Cutaneous Medicine and Surgery</i>	UK	Austria	Austria
<i>Sexually Transmitted Diseases</i>	UK	Finland	Finland
<i>Skin Pharmacology</i> ^e	France	Greece	Denmark
<i>Wound Repair and Regeneration</i>	UK	Finland	Finland

UK: United Kingdom

Not included Luxembourg because there is no article from this country in the journal analyzed.

^a: Includes *Dermatology*

^b: Includes *Sexually Transmitted Infection*

^c: Includes *Dermatologic Surgery*

^d: Includes *Photodermatology, Photoimmunology & Photomedicine*

^e: Includes *Skin Pharmacology and Applied Skin Physiology*

Table 4 shows the countries with the highest number of articles published in each journal, in absolute numbers and after adjusting for the GDP and population. The countries with the largest number of papers by journal were the United Kingdom in 11 journals, followed by Germany in 9 journals, Italy in 6 journals, France in 3 journals, Spain in 2 journals, and Sweden in 1 journal. After adjusting for the GDP, Austria and Finland were the leading countries in number of articles in 6 journals each. The leading countries in number of articles per million inhabitants were: Denmark, Finland, and Austria in 6 journals each; followed by the Netherlands and the United Kingdom in 3 journals each; Ireland and Sweden in 2 journals each; and Belgium, Germany, Greece and Spain in 1 journal each.

Discussion

Our study shows that in the years studied (1987–2000), all EU countries, except for Luxembourg, published papers on dermatology. Large countries, such as Germany, the United Kingdom, Italy and France occupied the top four places for absolute number of papers. But if we consider these results in relation to the number of inhabitants or the GDP, the top four places correspond to small northern countries: Denmark, Sweden, Finland and the Netherlands.

These findings for dermatological research are in agreement with the data obtained for all the other biomedical areas,^{8,11} since the greatest producers in biomedicine were the United Kingdom, Germany, France, Italy and the Netherlands.⁶ However, it should be pointed out that in the dermatological field, Spain surpassed the Netherlands. Nevertheless, further investigations should be done in order to determine the evolution of the production of EU countries⁴ and other countries such as Switzerland, Norway and the new EU countries.^{8,11}

Differences in productivity between countries have been associated with differences in the respective medical systems and others factors such as language, training and funding.^{24,25} There are numerous reasons for these results, but probably the most important is that the journals with the largest readership are published in English speaking countries and therefore the bibliometric analysis is biased toward English language journals.¹¹ However, it must be taken into account that English is now the universal scientific language and that future bibliometric analysis will be done considering journals in this language. Obviously, research activities and the resulting research products (i.e., publications) are naturally influenced by available resources,²⁶ the feasibility of biomedical research relies heavily on financial support. In this respect, the GDP may serve as an index for a nation's budget for research, but it would be more interesting to see the geographical variation after adjustment for the nation's budget for biomedical research.²⁶

And it is possible that in small countries in northern Europe the resources are better distributed and a higher percentage of the GPD is assigned to scientific research.^{8,11} However, in this study it is not possible to establish any relationship between resources and scientific production.

It should be remembered, as pointed out by Thompson,²⁴ that the number of publications does not necessarily reflect the quality or the usefulness of the published data. The impact factor of on particular journal itself may not necessarily reflect the quality of its articles, but it is a useful measure of the quality of research products. Seventeen of the 32 (53%) dermatological journals analyzed, with 9,207 of the 19,225 (48.3%) papers published, have an impact factor corresponding to the year 2000 equal to or greater than 1.0, which indicates that approximately half of the publications will never be quoted by other researchers.^{23,24}

We are aware that the method we used has several limitations. Despite this, however, this type of study has shown that such an approach provides useful information for the evaluation of productivity, and may well constitute a good general guideline in an era of cost-effectiveness and quality control. These limitations start with the criteria for selection of the journals and the database used for the study. The MedLine database was chosen as it is the most accessible and utilized biomedical database by the medical community,²⁷ and because it was demonstrated to be suitable for bibliometric studies of scientific production in biomedicine from European countries.²⁸ However, it should be borne in mind that only the address of the first author appears in the MedLine database. Therefore, our method attributes the article to the country of the first author only, although we are aware that sometimes an article is written by various authors coming from different countries.^{1,28} However, it seems reasonable to infer that during international collaborations, the same number of papers will be written by all the coworkers, at least when a rather long period is taken into account, as in our case. Furthermore, with our strategy we did not consider dermatological papers which were published in journals of general medicine and other specialties, or those published in dermatological journals when they were not included in the JCR or included in the JCR but not in MedLine. There are other biases to consider, since in journals classified as dermatological journals according to the JCR, we found some documents published by plastic surgeons, mycologists and basic investigators, but not dermatologists. In this study we considered only journals classified as dermatological journals by the JCR and included in MedLine. This method has some drawbacks and does not cover all the dermatological production in the period (1987–2000), but the identification of dermatological papers in other journals is complicated and was not undertaken in this study. Another bias is that we only selected articles in the English language, so we excluded the documents published in the journals *Der Hautarzt* and *Annales de Dermatologie et de Venereologie* edited in

Germany and France, respectively. This has resulted in a lower production from these two countries and some others; for example, Luxembourg has no papers in English, all the documents are published in French.

In conclusion, we consider that the present study gives a fairly complete and reliable overview of the dermatological research in Europe in the years 1987 to 2000.

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