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ORIGINAL ARTICLE

## What is the future of primary care research?

*Probably fairly bright, if we may believe the historical development*

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### Abstract

**Objective.** To study one aspect of the development of primary care research from 1975 to 2003. **Design.** Quantitative bibliometric study. **Setting.** Pub Med database. **Subjects.** Four Nordic countries (Denmark, Finland, Norway, and Sweden), seven countries from the rest of Europe (Belgium, France, Germany, Italy, the Netherlands, Spain, and the UK), and seven countries from the rest of the world (Australia, Canada, India, Japan, New Zealand, South Africa, and the USA). **Main outcome measures.** Number of primary healthcare publications per million inhabitants. Percentage of publications in primary healthcare of all publications in human medicine. **Results.** In 2003, New Zealand, the UK, and Australia were in the lead, with barely 20 primary care publications per million inhabitants, followed by Norway, Sweden, the Netherlands, and Denmark, where the corresponding figure was around 10. A vigorous increase in publications from 1975 to 2003 was clearly seen in most of the countries. However, during the same period the proportion of publications from primary care in relation to all publications in human medicine was only moderately increased, or virtually unchanged. **Conclusion.** It is believed that primary care research has a future, and it is hoped it may even be bright. However, searching Pub Med gave but one aspect of the historical development, and in particular the comparisons between countries may be questionable.

**Key Words:** *Family medicine, general practice, primary health care, Pub Med, research*

Primary care research has been a subject of animated discussion in recent years, both nationally and internationally [1–9], and editorials have even questioned whether it has any future [3,5]. However, if our predictions about the future are to be as accurate as possible, it is essential to be familiar with the historical development. We therefore searched the Pub Med database looking for traces of primary care research in the form of published articles, and we chose the last three decades, since this is the period when academic primary care has emerged, at least in Europe. Our aim was to get a quick and simple, but well-standardized, overview of one quantitative aspect of the development of primary care research.

Primary care research has been a subject of animated discussion in recent years, and editorials have even questioned whether it has any future.

- The Pub Med database was searched looking for traces of primary care research in the form of published articles.
- In the last three decades, scientific publications from primary care have grown from virtually none at all to an impressive number.
- Thus, it is believed that primary care research has a future, and it is hoped it may even be bright.

## Material and methods

We searched the Pub Med database (<http://www.ncbi.nlm.gov/entrez/query.fcgi>) for all publications in human medicine ("human") for the years 1975 ("1975-01-01 to 1975-12-31"), 1980, 1985, 1990, 1995, 2000, and 2003, for four Nordic countries (Denmark, Finland, Norway, and Sweden), seven countries from the rest of Europe (Belgium, France, Germany, Italy, the Netherlands, Spain, and the UK), and seven countries from the rest of the world (Australia, Canada, India, Japan, New Zealand, South Africa, and the USA). The name of the country could be found in the text of the article or in the author's address (i.e. "Sweden OR Sweden [ad]"). To yield articles from primary care only, the search was then limited to "primary health care OR family medicine OR general practice".

Population figures for the years 1975 to 2000 were taken from United Nations Population Information Network (<http://www.un.org/popin>), and for 2003 from Unicef (<http://unicef.org/infobycountry>). For the Nordic countries, we also related the number of published articles from primary care to the number of general practitioners working in each country [10].

## Results

If we look at the number of published articles (Table I), we see that two countries stand out as large-scale producers of primary care research, foremost the USA, but also the UK. In all countries, the number of published articles from primary care multiplied from 1975 to 2003.

If the number of published articles is related to the number of inhabitants in the respective countries, we obtain a different picture (Figure 1). Now it is New Zealand, the UK, and Australia that are in the lead, with barely 20 publications per million inhabitants in 2003, followed by Norway, Sweden, the Netherlands, and Denmark, where the corresponding figure is around 10. The vigorous increase in publications during the three decades is clearly seen in most of the countries.

For the Nordic countries, we also related the number of published articles to the number of practising general practitioners. In 2003, the figure for Norway was 25.1 publications per 1000 general practitioners, compared with 21.1 for Sweden, 13.0 for Denmark, and 7.6 for Finland. The corresponding figures per million inhabitants were 12.6, 11.6, 9.5, and 7.1, respectively.

If the number of primary care publications is set in relation to the total number of publications in human medicine, we obtain yet another picture of how research has developed in primary care (Figure 2). In the majority of countries studied, we now see a moderately increased, or virtually unchanged, proportion of publications from primary care from 1975 to 2003. At the end of the study period, New Zealand tops the table with 4.6%, followed by Australia (3.8%), the UK (3.6%), Norway (2.8%), and South Africa (2.6%).

Finally, for the Nordic countries in the year 2003, we looked at the proportion of articles from primary care published in English. The difference no doubt consists chiefly of articles written in the country's own language. Almost all Finnish publications

Table I. Primary care publications by country and year from 1975 to 2003.

Country	Number						
	1975	1980	1985	1990	1995	2000	2003
Denmark	6	16	15	43	40	54	51
Finland	1	0	3	11	26	26	37
Norway	5	7	23	46	53	81	57
Sweden	2	6	25	53	69	92	103
Belgium	0	1	1	6	13	22	24
France	0	4	7	10	33	46	77
Germany	13	10	8	27	52	77	122
Italy	1	0	2	14	17	35	48
Netherlands	3	5	14	42	103	143	159
Spain	0	1	3	53	73	105	91
UK	84	135	227	391	636	889	1038
Australia	16	22	20	60	141	200	322
Canada	13	16	25	43	124	172	211
India	3	10	31	34	25	25	33
Japan	0	12	22	7	7	20	11
New Zealand	5	11	10	33	28	53	78
South Africa	4	1	6	13	26	33	32
USA	121	206	230	337	1175	1471	1557

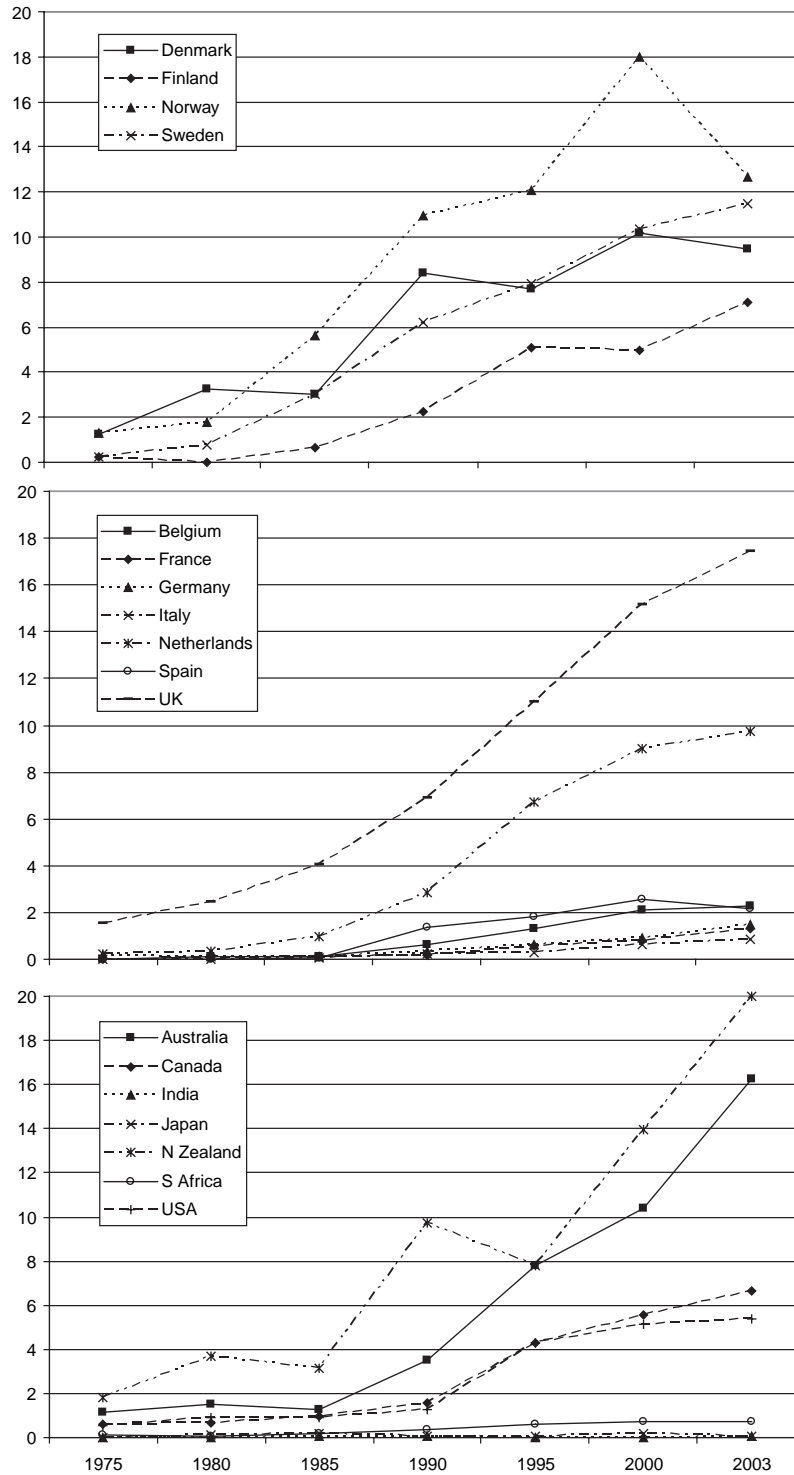


Figure 1. Primary healthcare publications per million inhabitants from 1975 to 2003.

(97%) were in English, compared with 61% for Denmark, 59% for Sweden, and 56% for Norway.

**Discussion**

We wanted a quick but nevertheless standardized picture of the development of research in primary

care in a number of selected countries, and we have obtained this. On the one hand we see an impressive development in the number of publications in the field in most of the countries studied, but on the other hand the development seems to be very modest if we relate it to the simultaneous growth in the entire field of human medicine. Primary care has

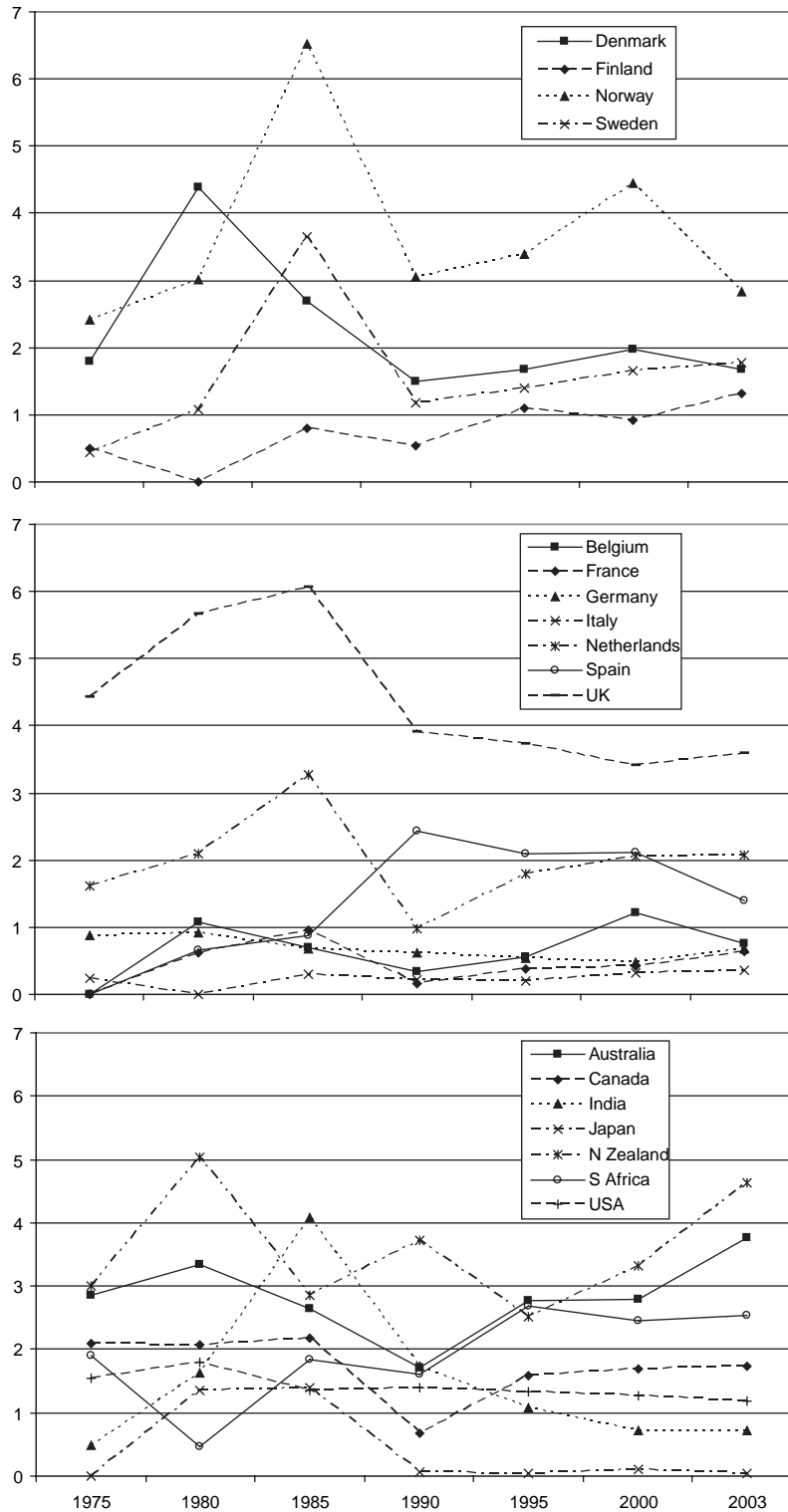


Figure 2. Primary healthcare publications as a percentage of all publications from 1975 to 2003.

thus grown scientifically but has not succeeded in catching up with other areas in medicine.

We have studied only one of several possible quantitative aspects of the scientific development, namely, the rise in the number of articles in Pub Med, the biggest and most accessible of the medical

databases. This means that we have missed articles indexed only in, for example, Embase. Other possible quantitative measures would be the number of new doctoral dissertations or the size of available research funding, but to ascertain that would require personal contacts with a huge number of depart-

ments of family medicine/general practice/primary care in the 18 studied countries. Even more important, but much more labour-intensive, would be to try to study the quality of the presented research, but that too was beyond the scope of our study.

We related the number of publications to the number of inhabitants in each country, an uncontroversial and easily accessible measure. For the Nordic countries we had, in addition, access to relatively certain and comparable figures for the number of general practitioners [10]; in this comparison the gap between the countries widened. We do not know what the outcome of the same comparison would have been in other countries. We nevertheless believe that the most logical procedure is to relate to the number of inhabitants, at least if we want to compare countries in different parts of the world with widely differing healthcare systems.

In the course of the study we had repeated contacts with Customer Service at the National Library of Medicine, in order to ensure as good a search strategy as possible. The delimitation of the topic with the search words "primary health care OR family medicine OR general practice" seemed rather obvious early on, although there were plenty of possible alternatives. The search strategy, on the other hand, was more debatable when it came to delimiting the different countries, for example, Sweden. We finally concluded that "Sweden OR Sweden [ad]" was the simplest alternative, which would nevertheless give a reasonable result. This means that our search may include articles which contain the word "Sweden" in the text, even if the authors come from other countries, and that we may miss relevant articles with Swedish authors if the word "Sweden" is not mentioned in the text and/or if "Sweden" is not in the address.

#### *Validation of Swedish data*

Although it would have been desirable to validate all the data for all the countries and all the years, that would be far beyond the simple aim of this study. We have nevertheless tried to validate the data for Sweden for 2003, chiefly in order to shed light on all the potential limitations of our study.

We thus listed authors, title, and journal for each of the 100 Swedish articles that we found in Pub Med for 2003; we did not, however, retrieve the abstract or the main text. When we repeated the same search a few weeks later, the number had increased to 103, and this is the figure we later used in the study. It may be that the indexing for 2003 was still in progress.

Of the 100 articles, 2 had only foreign authors and thus should not have been included at all. These were international comparisons that mentioned "Sweden" in the text. Of the remaining 98, 41 were published in Swedish (and 1 in Danish, but with a Swedish first author), and of these only 5 were original articles, while the rest were classified as discussion papers. Of 56 original articles published in English, 17 were judged not to deal with primary care, so there remained 39 Swedish original articles published in international journals (apart from the 5 above-mentioned original articles in the Journal of the Swedish Medical Association).

It is thus the case that we in Sweden chiefly publish our original articles in English. Our departments of general practice/family medicine are usually part of larger institutions, so the distinction between primary care research and other research can be difficult. Swedish researchers in general practice/family medicine have by tradition done a great deal of their research with colleagues from other specialities, and for that reason too it is sometimes difficult to determine whether an individual article is actually about primary care and its situation. We have not studied what other countries are like in this respect.

Whether articles of a debating character should be included when it comes to assessing the development of a subject can also be discussed, but we would claim that academic discussion is an important part of scientific development.

After contact with the six university departments of general practice/family medicine in Sweden we were able to consult their lists of publications for 2003. Here too we contented ourselves with the authors, title, and journal for each article. On the other hand, we did not contact the many, usually rather small, research units in Swedish primary care, since we reckoned that the majority of researchers there were also attached to one of the universities.

Of the 104 original articles published in international journals, 37 were deemed not to concern primary care. The number of Swedish original publications measured in this way was thus 67, to be compared with 39 in our search as described above. Of the 67 articles, 55 were not in our Pub Med search, and of the 39, 27 were not in the departments' lists of publications. All in all, then, we found 94 (55+27+12) international original articles from Swedish primary care for 2003, to be compared with the figure of 100 (or 103), which was the point of departure in this attempt at validation.

This exercise has thus taught us as ordinary primary care researchers that searching a medical

database is not entirely without complications, and that even well-thought-out search strategies can sometimes give unexpected results. Researchers in other fields have had similar experiences when they have used bibliometric measures to study their speciality [11–14]. Two of these studies [11,13] tried to elucidate not only the quantity of research but also the quality.

Recently, a comparison of the total amount of biomedical research (from 1994 to 2004) originating from the European Union and the United States was published [15]. In that study, the adjusted (population size and gross domestic product) publication indicators favoured the Scandinavian countries, especially Sweden, and the Netherlands.

#### *Concluding remarks*

After the rather dismal reading above, dare we trust our figures at all? Yes we can; although their exactitude can be discussed, we think that they are in the right order of size. We also believe that they give a reasonably good picture of the development within each country. On the other hand, we must of course be much more cautious when comparing different countries. The picture we paint of primary care and its research in the different countries nevertheless agrees well with our experience of many years of work in the European General Practice Research Network [16].

To sum up, in many countries, the development of primary care research seems quite impressive, even if we take into account the fact that other research in human medicine has also developed vigorously. In the last three decades, scientific publications from primary care have grown from virtually none at all to an impressive number. Thus, the historical development indicates that primary care research has a future, and we believe it may be bright. More funding opportunities and specific research training will hopefully make it even brighter [16,17].

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