

# How academic is internal medicine in the Netherlands? A bibliometric analysis

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One of the most tangible 'production units' of science is research publications, and indeed the number of publications and the amount of citations these papers generate are often used as indicators of quantity and quality of research. Worldwide research efforts have increased over the last decades, resulting in an almost exponential increase in publications. Indeed, the number of PubMed entries reflecting medical-biological publications has rapidly increased over the last period; in 2008 PubMed indexed 769,009 articles, a figure that is almost double the number that was collected in 1998 (429,217). Despite often heard wailing and whining, clinical research has retained its position in the biomedical research output and has even grown substantially compared with fundamental research.<sup>1</sup> The position of the Netherlands in clinical research is traditionally strong and recent analyses show that this has not changed in the last few years.<sup>2,3</sup> In fact, in the field of Internal Medicine, the Netherlands occupies a third position in terms of impact and has a relatively high number of publications per 10,000 population (*table 1* and *figure 1*). Interestingly, several analyses have shown that this is not related to the financial input of the government in biomedical research. Instead, the amount of money from governmental sources is relatively small in the Netherlands

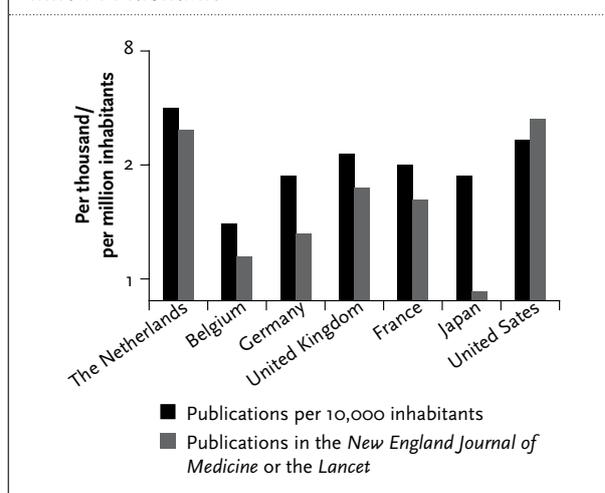
compared with almost any other European country and the US.<sup>4,5</sup> In comparison with other countries in the world, the Netherlands also has a relatively high number of publications in the two leading clinical journals (the *New England Journal of Medicine* and the *Lancet*). A subdivision of the publications over various subdisciplines of Internal Medicine shows the strongest areas of Internal Medicine in the Netherlands as compared with Europe and the United States (*figure 2*). Interestingly, these figures coincide with the number of publications of each of these subdisciplines in the *Netherlands Journal of Medicine*.<sup>6</sup>

Bibliometrics may also provide some insight into the research productivity of Dutch physicians working in various subdisciplines of medicine. *Figure 3* provides an estimate of the average number of publications per staff member per five years in the eight academic departments of Internal Medicine in the Netherlands. It should be mentioned that this type of analysis may harbour some inaccuracies, as it is not always clear to which (sub)department a given staff member belongs

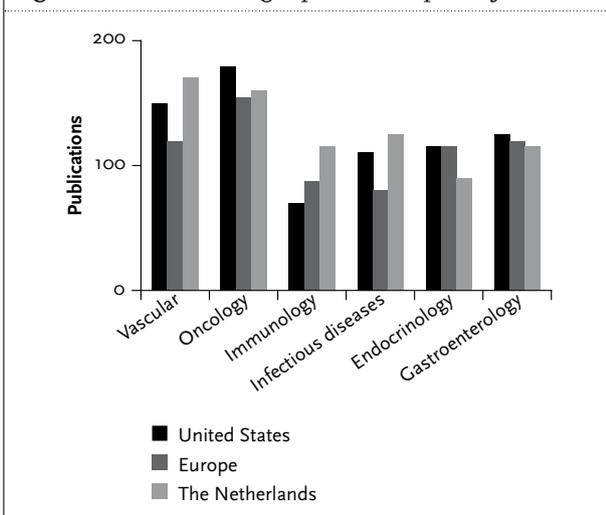
**Table 1.** Top 10 countries worldwide in terms of average number of publications on Internal Medicine

Country	Impact	Citations	Average number of publications
Sweden	21.17	81,722	3860
United States	20.83	2,015,339	96,733
The Netherlands	20.26	80,119	3954
Denmark	16.71	52,182	3123
United Kingdom	15.26	601,286	39,411
Italy	12.53	61,332	4893
Canada	12.45	155,665	12,507
Australia	10.33	91,193	8825
Switzerland	8.40	63,230	7527
Japan	7.35	32,475	3483

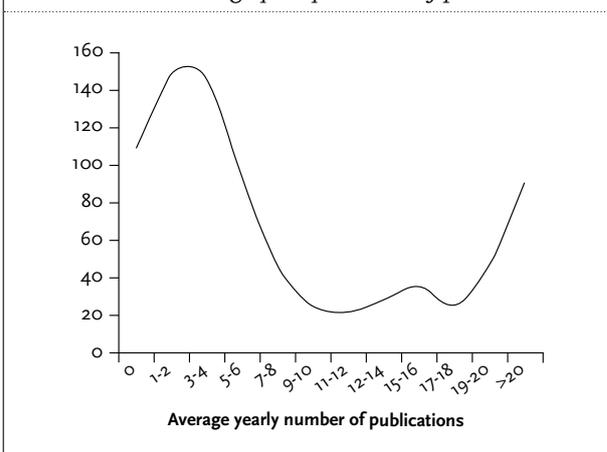
**Figure 1.** Research output as reflected by publications per 10,000 inhabitants and number of publications in the *New England Journal of Medicine* or the *Lancet* per million inhabitants



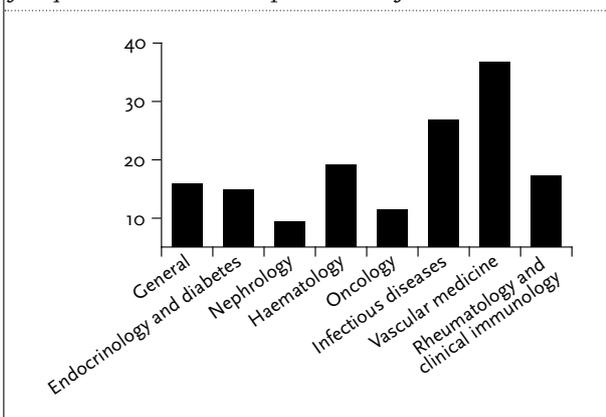
**Figure 2.** Relative strength per subdiscipline of medicine



**Figure 4.** Frequency of staff members in academic departments of Internal Medicine in the Netherlands related to their average yearly number of publications



**Figure 3.** Number of publications per staff member per five years in academic departments of internal medicine



**Figure 5.** Average yearly number of publications and the age of the academic internist in the Netherlands



and only tenured staff has been included in the analysis. Even more interesting is the frequency of staff members with a given yearly average number of publications in the academic departments (figure 4). By far the most academic internists publish approximately two to seven papers each year, but apparently there is not a normal distribution. A group of about 110 academic internists do not publish at all, which may be due to the fact that these internists devote their time exclusively to patient care and teaching. In contrast, there is a substantial group of academic researchers in the departments of Internal Medicine that publishes more than 20 articles per year. Interestingly, the yearly number of publications varies with age, peaking between 40 and 55 years and, somewhat surprisingly, thereafter declining (figure 5). A potential explanation for this decline may be that senior staff members have to devote more time to management of their department and can thus spend less time on research.<sup>7</sup> It should be mentioned, however, that in the group with more than 20 publications per year the age group of older than 55 years is overrepresented.

Taken together, there is ample reason to be proud of the position of research in Internal Medicine in the Netherlands. Obviously, it is a challenge for the next decades to maintain this position and to become even more productive while keeping up the high quality.

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