



Original Article

Spanish Scientific Research Output on Tuberculosis Indexed in MEDLINE, 1997–2006

José Manuel Ramos, ^{a,*} Mar Masiá, ^a Sergio Padilla, ^a Eduardo García-Pachón, ^b and Félix Gutiérrez ^a^aUnidad de Enfermedades Infecciosas, Hospital General Universitario de Elche, Alicante, Spain^bSección de Neumología, Hospital General Universitario, Elche, Alicante, Spain

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ABSTRACT

Objective: To analyze Spanish scientific research output related to tuberculosis during the 10-year period from 1997 through 2006 and to consider it within the context of European Union (EU) productivity.

Material and Methods: The bibliometric study was based on a search of the MEDLINE database, using the PubMed search interface. Search terms were *tuberculosis* or *tuberculous* appearing in any database field.

Results: Of 35 735 titles retrieved, 1191 were by Spanish authors. This represented 4.1% of world output. Spain, accounting for 13.5% of EU scientific output in this area, was the third most productive EU country; 610 (51.2%) of the papers were published in English and 581 (48.8%) in Spanish. The number of papers published remained steady over the 10-year period. The first author's specialty was usually microbiology (225 documents, or 20.6%), followed by internal medicine (154, or 14.1%), and respiratory medicine (117, 10.7%). Journals publishing the largest numbers of papers on tuberculosis were *Medicina Clínica* and *Enfermedades Infecciosas y Microbiología Clínica* with 78 (6.5%) each, *Anales de Medicina Interna* with 72, *Revista Clínica Española* with 64, and *Archivos de Bronconeumología* with 63. The most productive provinces were Madrid and Barcelona, with 272 (22.8%) and 256 (21.5%) papers, respectively. The most productive institutions were hospitals, with 900 titles (75.6%), followed by universities, with 132 (11.1%).

Conclusions: Tuberculosis research in Spain has taken place at a steady rate over the last 10 years and has accounted for a substantial proportion of EU research in this field. Half the papers by Spanish authors were found in international journals published outside Spain. The majority of papers were from authors working in hospitals.

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Producción española sobre tuberculosis a través del MEDLINE (1997-2006)

RESUMEN

Introducción: El objetivo del estudio ha sido analizar la producción científica española sobre tuberculosis durante una década (1997–2006) y contextualizarla en el marco de la Unión Europea (UE).

Material y métodos: Se ha realizado un estudio bibliométrico a través de la base de datos MEDLINE vía PubMed, mediante la búsqueda de “*tuberculosis*” o “*tuberculous*” en cualquier campo de la base de datos.

Resultados: Se recopilaron 35.735 documentos que trataban sobre tuberculosis, de los cuales 1.191 (el 4,1% de la producción mundial) fueron publicados por autores españoles. España fue el tercer país con más documentos de la UE, con el 13,5%. El 51,2% (n = 610) se publicaron en inglés y el 48,8% (n = 581) en español. El número de documentos fue constante a lo largo de los años. La especialidad del primer firmante más frecuente fue microbiología, con 225 documentos (20,6%), seguida de medicina interna (n = 154; 14,1%) y neumología (n = 117; 10,7%). Las revistas con un mayor número de documentos publicados fueron *Medicina Clínica* y *Enfermedades Infecciosas y Microbiología Clínica*, con 78 (6,5%) cada una, *Anales de Medicina Interna* (n = 72), *Revista Clínica Española* (n = 64) y ARCHIVOS DE BRONCONEUMOLOGÍA (n = 63). Las provincias más productoras fueron Madrid y Barcelona, con 272 (22,8%) y 256 (21,5%) documentos publicados, respectivamente. Las instituciones más productivas fueron los hospitales, con 900 documentos (75,6%), seguidos de las universidades, con 132 (11,1%).

Conclusiones: La investigación sobre tuberculosis en España ha sido constante a lo largo de los últimos 10 años y ha supuesto una aportación importante en el conjunto de la UE. La mitad de las publicaciones españolas se hicieron en revistas extranjeras y procedían predominantemente de los hospitales.

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Palabras clave:

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* Corresponding author.

E-mail address: jramosrincon@yahoo.es (J.M. Ramos).

Introduction

Tuberculosis numbers among the most highly prevalent infectious diseases. It constitutes a major health problem throughout the world and is the leading cause of death from infection in adults. Around 8.8 million new cases of tuberculosis were estimated to have occurred in 2005, with the heavier burden falling to countries where social and health care conditions are poor, particularly in Africa, Asia, and South America.¹ The highest incidences in Western Europe are found in Spain and Portugal.¹

Tuberculosis has played an undeniably important role in our history and figures greatly in both our scientific and nonscientific literature. This disease, approached from a multidisciplinary perspective, involves specialists from various branches of both clinical practice (pulmonologists, infectious disease specialists, and internists) and social medicine (epidemiologists and preventive medicine specialists). For this reason, we can assume that authors in many health care disciplines and institutions are studying and publishing on this topic.²

Bibliometry evaluates qualitative variables related to scientific publication. Numerous bibliometric studies have looked at Spanish scientific research output in a range of biomedical journals^{3,4} and scientific disciplines or medical specialties.⁵⁻⁸ Some have focused on specific problems or diseases.⁹⁻¹¹ The Spanish output on tuberculosis, however, has never been analyzed in depth. The aim of this study was to analyze Spanish publications related to tuberculosis in the 10-year period from 1997 through 2006, using the MEDLINE database as the source of information.

Material and Methods

The literature search was performed in MEDLINE on January 2, 2008 using the PubMed portal (<http://www.ncbi.nlm.nih.gov>), which is provided by the US National Library of Medicine (NLM). The bibliographic information for titles retrieved was downloaded from PubMed into the program Reference Manager, version 11. The search strategy was to request documents with the terms *tuberculosis* or *tuberculous* appearing in any database field, with limits set for 1997 through 2006. For each title retrieved, we recorded authors, title, journal, publication type, abstract, the institutional affiliations of the author, the journal's abbreviated name, medical subject headings (MeSH) or controlled vocabulary from the thesaurus of terms, and language of publication.

We then added other fields, including the first author's specialty, the category of the institution and its location (including the Spanish autonomous community and province). Research centers were grouped into the following types: university, hospital, Spanish National Research Council (CSIC) facility, primary care facility, and other public or private facilities. Retrieved titles in which the first author's affiliation named both a university hospital and a university were assigned to the hospital category. The knowledge field assigned to the document was identified based on the tree structure of the NLM's MeSH, or thesaurus of terms. In accordance with the discipline of the first author, documents were classified as emerging from basic biomedical sciences, clinical medicine, or social medicine, following the criteria of Gómez Caridad et al.¹²

The research output of each European Union (EU) country was studied relative to its economic and demographic characteristics and its tuberculosis caseload. Each country's gross domestic product (GDP) was obtained from the World Development Indicators 2006 database.¹³ Population statistics for 2006 were taken from the same source. The number of tuberculosis cases in each country in 2005 was taken from the World Health Organization 2007 global tuberculosis surveillance report.¹

Data collected were analyzed with SPSS software, version 12.0 for Windows (SPSS Inc, Chicago, Illinois, USA). The χ^2 test with Yates' correction was used to compare categorical variables.

Results

Spanish Scientific Research Output on Tuberculosis Compared With World and EU Productivity

A total of 35 735 titles related to tuberculosis were retrieved from the MEDLINE database. The most common language of publication was English (77.3%), followed by Russian (5.3%), Japanese (3.6%), and French and Spanish (3.3% each). We were able to locate the institutional affiliation of the first author for 29 323 titles. The United States was the single most productive country, with 6150 papers published. The pre-enlargement 15-member EU produced 8095 papers (27.3%), the 25-member EU produced 635 more, and the 27-member EU only 150 more. Spain, with 1191 papers ranked third in the 27-member EU, accounting for 13.5% of the total output, after the United Kingdom and France. With 4.1% of world output, Spain ranked seventh, falling behind India, Japan, and China. After adjusting for population and GDP, Spain was in fourth and third place, respectively. After adjusting for number of tuberculosis cases, however, Spain fell to fifteenth position (results summarized in Table 1).

Description of the Spanish Research Output

The number of papers produced in Spain has held steady over the years, whereas worldwide productivity has been increasing (Figure 1). The total number of Spanish publications per year ranged from 95 in 2002 to 138 in 1997. Regarding language of publication, 51.2% (n=610) of the Spanish authors' papers were in English and 48.8% (n=581) were in Spanish. Regarding types of article, 305 (25.6%) were case reports, 151 (12.7%) were review articles, and 28 (2.4%) were clinical trials. Research grants supported 285 (23.9%) of these publications.

Table 2 shows the contents of the articles by knowledge area according to the term thesaurus (MeSH classifications) used by MEDLINE. Thus, 235 papers (20.2%) were related to antitubercular agents, 172 (14.8%) to the human immunodeficiency virus (HIV), and 135 (11.6%) to AIDS. Pulmonary tuberculosis was the type on which the largest proportion of retrieved titles (23.3%, n=272) focused. Pleural (3.9%) and osteoarticular (3.1%) tuberculosis followed at some distance. Microbiology was the subject of 29.2% of the papers, epidemiology 28.3%, and prevention and control 8.5%. Animal research gave rise to 6.8% of the published papers, although only 2.4% concerned veterinary medicine.

The specialty of the first author was available for 1092 of the 1191 publications retrieved. Figure 2 shows the distribution by first author's specialty. The largest proportion consisted of articles reporting research in the area of microbiology, with 225 papers (20.6%). The next-ranked specialist fields were internal medicine (n=154 publications, 14.1%), pulmonology (n=117, 10.7%), infectious diseases (n=108, 9.9%), and public health and epidemiology (n=103, 9.4%). Seven hundred six first authors (64.6%) named internal medicine as their discipline, 275 (25.2%) were in basic science disciplines, and 111 (10.2%) were in social medicine.

The papers were published in 280 journals, 2.7% of which were electronic. Table 3 shows the names of the international and Spanish journals publishing more than 5 of these papers. The leading journals were Spanish. Sharing first place were *Medicina Clínica* and *Enfermedades Infecciosas y Microbiología Clínica*, with 78 (6.5%) articles each, and these were followed by *Anales de Medicina Interna* (n=72), *Revista Clínica Española* (n=64), and *Archivos de Bronconeumología* (n=63). The 2 leading English language journals

Table 1
Absolute and Weighted Scientific Research Output on Tuberculosis in the Countries of the European Union Plus Iceland, Norway, and Switzerland, 1997–2006

	No. of Publications	Rank	Publications/ Million Population	Publications/ US \$1 Billion GDP	Publications/ 100 Tuberculosis Cases
Austria	101	16	12.26	0.31	10.72
Belgium	245	8	23.37	0.62	18.42
Denmark	220	9	40.53	0.80	54.19
Finland	81	167	15.41	0.39	24.77
France	1335	2	21.87	0.60	17.13
Germany	949	4	11.52	0.33	15.95
Greece	147	11	13.23	0.60	8.00
Ireland	122	15	28.98	0.55	24.25
Italy	871	5	14.87	0.47	22.48
Luxembourg	2	25	4.33	0.05	3.77
The Netherlands	435	6	26.57	0.66	38.22
Portugal	139	12	13.13	0.72	4.02
Spain	1191	3	27.35	0.97	10.06
Sweden	193	10	21.34	0.50	36.07
United Kingdom	2064	1	34.19	0.88	24.30
EU-15	8095	—	20.91	0.60	16.70
Cypruss	1	26	1.31	0.06	2.86
Slovakia	16	21	2.97	0.34	1.74
Slovenia	17	20	8.50	0.49	5.92
Estonia	8	24	5.97	0.49	1.49
Hungary	56	18	5.57	0.50	2.61
Latvia	9	23	3.94	0.45	0.62
Lithuania	26	19	7.65	0.87	1.21
Malta	0	27	—	—	—
Poland	372	7	9.76	1.10	34.70
Czech Republic	130	14	12.72	0.92	12.26
EU-25	8730	—	18.93	0.61	15.01
Bulgaria	14	22	1.82	0.44	0.46
Romania	136	13	6.31	1.12	0.47
EU-27	8880	—	18.11	0.62	9.83
Iceland	7	—	23.41	0.44	87.50
Norway	184	—	39.80	0.59	76.35
Switzerland	422	—	56.71	1.11	79.92

Abbreviations: EU, European Union; GDP, gross domestic product.

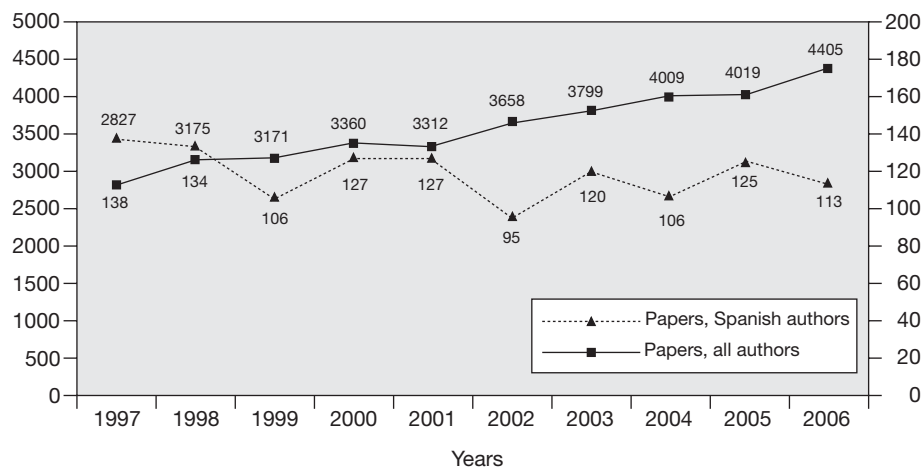


Figure 1. Spanish (triangles) and world (squares) scientific research output on tuberculosis (number of articles) in the 10-year period from 1997 through 2006.

were *International Journal of Tuberculosis and Lung Diseases* (n=60) and *Journal of Clinical Microbiology* (n=41).

The most productive provinces were Madrid and Barcelona, with 272 (22.8%) and 256 (21.5%) publications, respectively. Those provinces were followed by A Coruña with 64 published papers (5.4%), and Alicante, Seville, and Valencia, with 49 (4.1%) each. The Spanish autonomous communities with the largest research output were Catalonia, with 281 publications (23.6%), and Madrid, with 272 (22.8%). They were followed by Andalusia with 145 (12.25%), the Community of Valencia with 106 (8.9%), and Galicia with 97 (8.1%), as shown in Table 4.

The 1191 published papers originated in 270 Spanish institutions. By type of institution, the most productive were hospitals with 900 publications (75.6%), followed by universities with 132 (11.1%), public entities with 94 (7.9%), and at some distance primary care clinics and CSIC facilities with 20 (1.7%) and 14 (1.2%), respectively. Papers originating in universities accounted for 18.4% of the publications in international journals and 3.4% of those in Spanish national ones ($P<.001$). Table 5 shows a list of Spanish institutions where 10 or more papers on tuberculosis originated, distributed according to whether the papers were published by international or Spanish journals.

Table 2
Subject Areas Covered in 1160 Publications on Tuberculosis, 1997–2006, According to Medical Subject Headings (MeSH)

MeSH	No. of Articles	%
Tuberculosis	367	31.5
<i>Mycobacterium tuberculosis</i>	307	26.3
Antitubercular agents	235	20.2
Human immunodeficiency virus	172	14.8
AIDS	135	11.6
Tuberculin test	68	5.2
Multidrug-resistant tuberculosis	50	4.3
<i>Mycobacterium</i> infections	41	3.7
Tuberculosis, bovine	13	1.1
Clinical thesaurus (controlled vocabulary)		
Tuberculosis, pulmonary	272	23.3
Tuberculosis, pleural	46	3.9
Tuberculosis, osteoarticular	36	3.1
Tuberculosis, miliary	32	2.7
Tuberculosis, meningeal	29	2.5
Tuberculoma	26	12.2
Tuberculosis, gastrointestinal	23	2.0
Tuberculosis, cutaneous	23	2.0
Lymphadenitis, tuberculous	22	1.9
Tuberculosis, spinal	17	1.5
Peritonitis, tuberculous	12	1.0
Tuberculosis, ocular	7	0.6
Tuberculosis, renal	7	0.6
Tuberculosis, spinal	6	0.5
Tuberculosis, hepatic	6	0.5
Tuberculosis, urogenital	6	0.5
Tuberculosis, central nervous system	4	0.3
Mastitis, tuberculous	3	0.3
Tuberculosis, female genital	2	0.2
Pericarditis, tuberculous	2	0.2
Tuberculosis, oral	2	0.2
Tuberculosis, endocrine	1	0.1
Silicotuberculosis	1	0.1
Other thesauri and nomenclatures		
Microbiology	340	29.2
Epidemiology	330	28.3
Prevention and control	99	8.5
Transmission	57	4.9
Veterinary medicine	28	2.4
Animals	79	6.8

Discussion

Studies of scientific research output based on variables known as bibliometric indicators are of increasing interest. These indicators can be classified either as measures of productivity, referring to the number of publications, or as measures of publication impact.¹⁴ A limitation of such output indicators is that they rely on databases for information, and there is the possibility that duplicate entries may be present.^{14,15} In spite of the limitations of bibliometric analysis and of abuses in its application,^{14,16} the results give us a picture of a country's research output and allow us to compare one country with another.¹⁴ Furthermore, bibliometrics can be used to assess the outcome of economic investment in research and may be of assistance in planning scientific policy.¹⁴

Two studies of scientific research output—one by Gagnon et al¹⁵ based on MEDLINE and the other by Camí et al¹⁷ based on the databases of the Institute for Scientific Information—agree that Spain ranks eleventh in world productivity and seventh in EU output. Our study finds Spain ranking seventh in the world and third in the EU with regard to tuberculosis research. When economic and population parameters are taken into consideration, Spain maintains its position. However, when the tuberculosis caseload is factored in, Spain's rank drops to 15th. These results suggest that Spain's rank among EU countries seems to be better in the area of tuberculosis research than it is in other medical specialties. Although the periods studied by various authors have not been identical, Spain has been found to rank eighth in respiratory system research¹⁸; seventh in surgery,¹⁹

gastroenterology,²⁰ and public health²¹; and sixth in oncology²² and rheumatology.²³ It is important to remember that Spain and Portugal have the highest incidences of reported cases of tuberculosis in Western Europe.¹

Spanish research output in other disciplines has increased over the years.^{6,7,10,11} Camí et al,¹⁷ analyzing biomedical research productivity between 1994 and 2002, noted that Spanish authors increased their output 4-fold during that study period, although the volume of tuberculosis research published did not increase. This may be due to greater control of the disease in recent years, leading to a reduction in the number of cases reported.²⁴

With regard to the topics of published papers, a noteworthy observation was that 20.2% were concerned with antitubercular agents and 20% were by authors in the field of microbiology. *HIV* was included as a key word in 14.8% of the papers, and that percentage was higher than the rate of *HIV*-associated tuberculosis cases (9%) for 2005 and 2006.²⁴ Nearly a third of the publications touched on microbiology or epidemiology, and somewhat less than 10% dealt with prevention and control of the disease. The proportion of papers on epidemiology was greater than the proportion authored by epidemiologists or public health workers, indicating that clinicians and microbiologists are also working on epidemiology or that epidemiologists are collaborating with them, information not included in the database used.

We should note that half the journals publishing these papers are Spanish. *Medicina Clínica* and *Enfermedades Infecciosas y Microbiología Clínica* shared first place based on the number of papers appearing during the period of study. The next-ranked journals were *Anales de Medicina Interna*, *Revista Clínica Española*, *Archivos de Bronconeumología*, and *International Journal of Tuberculosis and Lung Diseases*. In this group, only *Anales de Medicina Interna* does not have an impact factor.

Most publications emerged from hospitals. University and other public institutions accounted for smaller proportions of the research output. The predominance of the hospital sector indicates that clinical issues are the main focus of tuberculosis research in Spain.¹⁷ The lower share for university-based research would indicate that researchers in the basic biomedical sciences here are doing less work on tuberculosis. The larger proportion of university-based research found in international journals would reflect the greater concern of universities for the international repercussion of their research (reflected by impact factor), given that Spanish journals with an impact factor are few.

Hospital Germans Trias i Pujol in Badalona was the most productive research center. Although that hospital has only 643 beds and serves a health care area of 200 000 inhabitants, it is more highly invested in tuberculosis research than larger hospitals and has built up a team working on aspects of basic science relevant to this disease. The second most productive center was Hospital Ramón y Cajal in Madrid, which nearly always takes the lead among hospitals with the largest research output.^{12,17} In third place was Complejo Hospitalario de Santiago, a hospital with over 1000 beds in a province (A Coruña) and an autonomous community (Galicia) with the highest rates of tuberculosis in Spain.²⁴ However, an accurate, prudent interpretation of research center ranks should take into consideration that a facility's overall research output is usually related to the size of its investigative organization and to the level of dedication to research as reflected in the assignment of human resources.¹⁷

Most tuberculosis research publications came from Madrid and Barcelona, as is the case for Spanish biomedical research overall, in other disciplines and in specific areas.^{5-12,17} This is attributable to the location of most of the research-oriented hospitals and universities in those provinces.¹⁷ The next most productive provinces are A Coruña, Alicante, Seville, and Valencia—always in terms of absolute numbers of published papers.

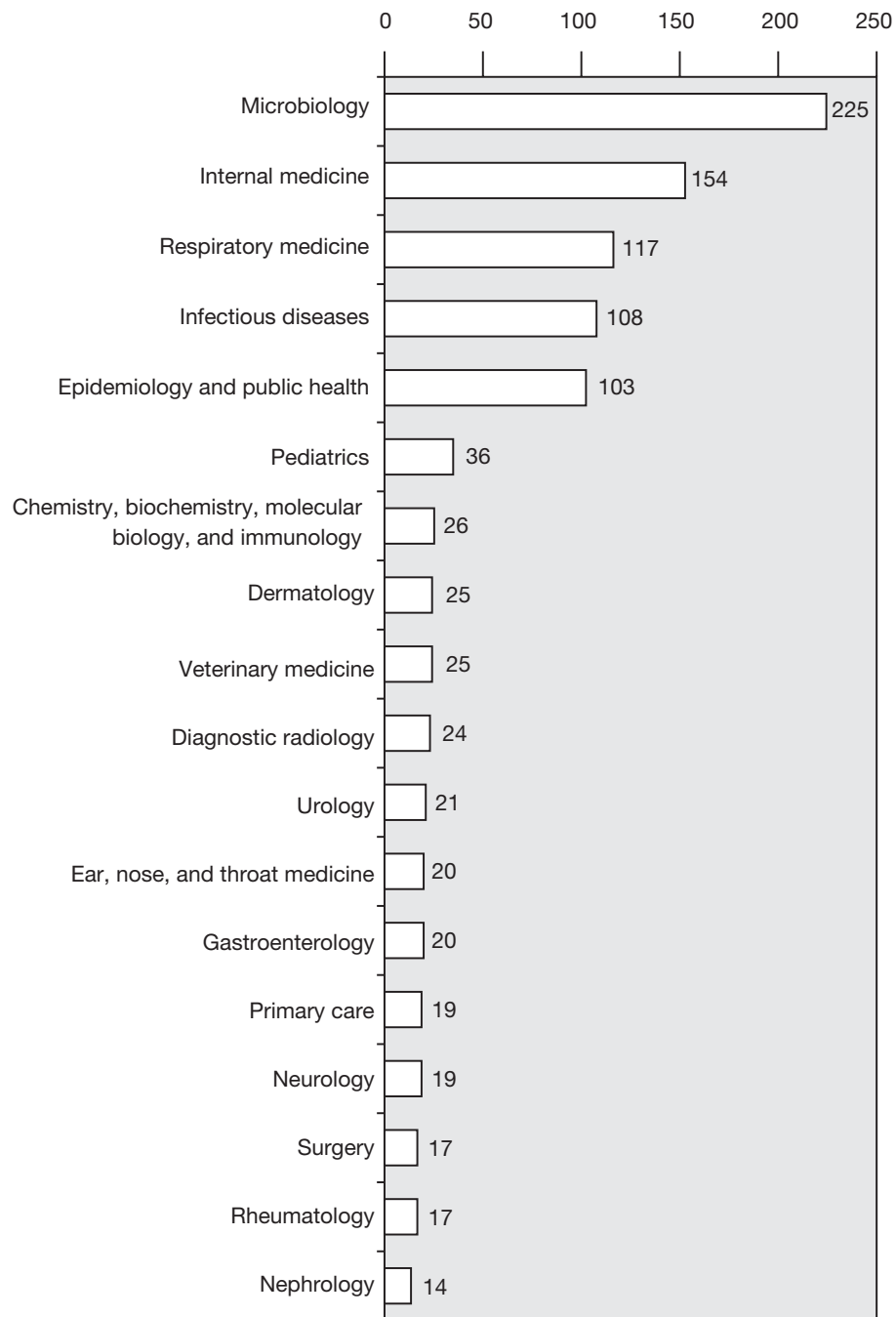


Figure 2. Papers on tuberculosis by Spanish authors published in the years 1997 through 2006, distributed by first author's specialty.

Table 3
International and Spanish National Journals Publishing More Than 5 Articles, 1997–2006

Spanish National Journals	No. of Articles	%	International Journals	No. of Articles	%
Med Clin (Barc)	78	6.5	Int J Tuberc Lung Dis	60	5.0
Enferm Infecc Microbiol Clin	78	6.5	J Clin Microbiol	41	3.4
An Med Interna	72	6.0	Eur J Clin Microbiol Infect Dis	25	2.1
Rev Clin Esp	64	5.4	Clin Infect Dis	25	2.1
Arch Bronconeumol	63	5.3	Clin Microbiol Infect	16	1.3
An Esp Pediatr	19	1.6	Chest	13	1.1
Rev Esp Salud Publica	16	1.3	Scand J Infect Dis	11	0.9
An Sist Sanit Navar	16	1.3	Eur Respir J	10	0.8
Aten Primaria	15	1.3	Respiration	9	0.8
Arch Esp Urol	14	1.2	Int J Antimicrob Agents	8	0.7
Acta Otorrinolaringol Esp	13	1.1	AIDS	8	0.7

(Table follows next page)

Table 3 (Continuation)

Spanish National Journals	No. of Articles	%	International Journals	No. of Articles	%
Gac Sanit	13	1.1	Respir Med	7	0.6
An Pediatr (Barc)	13	1.1	Vet Microbiol	7	0.6
Rev Esp Quimioter	11	0.9	J Infect	6	0.5
Gastroenterol Hepatol	9	0.8	Arch Intern Med	6	0.5
An Otorrinolaringol Ibero Am	9	0.8	Diagn Microbiol Infect Dis	6	0.5
Rev Neurol	9	0.8	Arthritis Rheum	6	0.5
Actas Urol Esp	8	0.7	Pediatr Infect Dis J	6	0.5
Nefrologia	8	0.7	Antimicrob Agents Chemother	6	0.5
Arch Soc Esp Oftalmol	7	0.6	Scand J Immunol	5	0.4
Actas Dermosifiliogr	7	0.6	Infection	5	0.4
Rev Esp Med Nucl	6	0.5	Transplantation	5	0.4
Rev Esp Enferm Dig	6	0.5	Clin Exp Rheumatol	5	0.4
Rev Esp Cardiol	5	0.4	Microb Drug Resist	5	0.4
			Eur J Intern Med	5	0.4
			Arch Orthop Trauma Surg	5	0.4

Table 4
Geographic Origin of Published Papers on Tuberculosis, 1997-2006

Province	No. of Articles	%	Spanish Autonomous Community	No. of Articles	%
Madrid	272	22.8	Catalonia	281	23.6
Barcelona	256	21.5	Madrid	272	22.8
A Coruña	64	5.4	Andalusia	145	12.2
Alicante	49	4.1	Community of Valencia	106	8.9
Seville	49	4.1	Galicia	97	8.1
Valencia	49	4.1	Castile and Leon	47	3.9
Cordoba	32	2.7	Basque Country	44	3.7
Saragossa	30	2.5	Aragon	31	2.6
Navarre	29	2.4	Castile-La Mancha	29	2.4
Vizcaya	27	2.3	Navarre	29	2.4
Pontevedra	24	2.0	Canary Islands	25	2.1
Asturias	23	1.9	Asturias	23	1.9
Malaga	21	1.8	Murcia	18	1.5
Las Palmas	20	1.7	Extremadura	12	1.0
Murcia	18	1.5	Cantabria	11	0.9
Lleida	18	1.5	Balearic Islands	4	0.3
Cadiz	18	1.5	La Rioja	3	0.3
Granada	17	1.4	Ceuta	1	0.1
Leon	14	1.2	No affiliation given	13	1.1
Salamanca	12	1.0			
Valladolid	12	1.0			
Guipuzcoa	12	1.0			
Cantabria	11	0.9			
Albacete	10	0.8			
Castellón	8	0.7			
Toledo	7	0.6			
Lugo	7	0.6			
Badajoz	6	0.5			
Caceres	6	0.5			
Ciudad Real	6	0.5			
Alava	5	0.4			
Tenerife	5	0.4			
5 provinces with 4 articles each ^a	20	1.5			
2 provinces with 3 articles each ^b	6	0.6			
5 provinces with 2 articles each ^c	10	1.0			
5 provinces with 1 article each ^d	5	0.5			
No affiliation given	13	1.1			
Total	1191	100.0	Total	1191	100.0

^a Balearic Islands, Burgos, Guadalajara, Huelva, and Tarragona.^b Girona and La Rioja.^c Almería, Cuenca, Jaén, Ourense, and Segovia.^d Ávila, Ceuta, Palencia, Soria, and Teruel.

A limitation of this study is its reliance on information retrieved from MEDLINE. That database indexes journals with and without impact factors and, therefore, with differing levels of international repercussion. In addition, as MEDLINE only includes the institutional affiliation of the first author, some papers by Spanish authors produced in collaboration with institutions outside Spain could not be retrieved.¹⁰ Nor could we study collaboration between departments

within a center or between centers (national and international institutions, or public and private ones).^{11,17}

These results should encourage Spanish specialists working on tuberculosis to continue active research and attempt to achieve greater impact for their publications. Funding bodies should also be encouraged to continue to support research and to broaden the projects of Spanish researchers in this field.

Table 5

Research Output in Articles, by Research Center Type, and List of Specific Centers Producing More Than 10 Papers on Tuberculosis Published by International versus Spanish National Journals

	Total (n = 1191)		International Journals (n = 610)		Spanish Journals (n = 581)	
	No. of Articles	%	No. of Articles	%	No. of Articles	%
Research center type						
Hospital	900	75.6	435	71.3	465	80
University	132	11.1	112	18.4	20	3.4
Other public facility	94	7.9	29	4.7	65	11.2
Primary care center	20	1.7	4	0.7	16	2.8
CSIC	14	1.2	3	2.1	1	0.2
Other	13	1.2	8	1.4	5	0.9
Institution						
Hospital Universitari Germans Trias i Pujol, Badalona ^a	54	4.6	41	5.8	13	2.2
Hospital Universitario Ramón y Cajal, Madrid	49	4.1	33	5.4	16	2.9
Complejo Hospitalario Universitario de Santiago	42	3.5	18	3.0	24	4.1
Hospital Universitari Vall d'Hebron, Barcelona	39	3.3	27	4.4	12	2.1
Hospital Universitario Gregorio Marañón, Madrid	33	2.8	28	4.6	5	0.9
Hospital Clínic, Barcelona	27	2.3	22	3.6	5	0.9
Hospital Universitario 12 de Octubre, Madrid	26	2.2	14	2.3	12	2.1
Hospital General Universitario de Elche, Alicante	24	2.0	17	2.8	7	1.2
Public Health Agency, Barcelona ^b	22	1.8	10	1.6	12	2.1
Hospital Universitario Virgen del Rocío, Sevilla	22	1.8	10	1.6	12	2.1
Fundación Jiménez Díaz, Madrid	20	1.7	16	2.6	4	0.7
Hospital de la Santa Creu i Sant Pau, Barcelona	19	1.6	12	2.0	7	1.2
Hospital Universitario La Paz, Madrid	19	1.6	8	1.3	11	1.9
Hospital Clínico Universitario de San Carlos, Madrid	16	1.3	5	0.8	11	1.9
Hospital Universitario La Fe, Valencia	15	1.3	6	1.0	9	1.5
Faculty of Medicine, Universidad de Zaragoza	15	1.3	13	2.1	2	0.3
Tuberculosis Research Unit, ISCIII, Madrid	14	1.2	7	1.1	7	1.2
Hospital de Galdakao, Vizcaya	13	1.1	11	1.8	2	0.3
Faculty of Veterinary Medicine, UCM	13	1.1	13	2.1	0	—
Hospital de Gran Canaria Dr. Negrín, Las Palmas	13	1.1	8	1.3	5	0.9
Faculty of Sciences, UAB	13	1.1	11	1.8	2	0.2
Hospital Juan Canalejo, A Coruña	12	1.0	9	1.5	3	0.5
Hospital Universitario Reina Sofía, Córdoba	12	1.0	8	1.3	4	0.7
Hospital Donosita, Guipúzcoa	11	0.9	7	1.1	4	0.7
Complejo Hospitalario Universitario de Vigo, Pontevedra	11	0.9	3	0.5	8	1.2
Hospital Universitari Arnau de Vilanova, Lleida	11	0.9	8	1.3	11	1.9
Faculty of Medicine, Universidad de Córdoba	11	0.9	9	1.5	2	0.3
Hospital Universitario Carlos Haya, Málaga	10	0.8	4	0.7	6	1.0
Hospital Universitario de Cruces, Bilbao	10	0.8	3	0.5	7	1.2
Hospital Universitari de Bellvitge, Barcelona	10	0.8	8	1.3	2	0.3

Abbreviations: CSIC, Spanish National Research Council; ISCIII, Carlos III Health Institute; UAB, Universitat Autònoma de Barcelona; UCM, Universidad Complutense de Madrid.

^aIncludes the Germans Trias i Pujol Health Sciences Research Institute.^bIncludes the Municipal Institute of Public Health, Barcelona.

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