Research

Research in biomedicine and the health sciences is the principal factor in the progress of the health system: it enables improved prevention and diagnosis of illnesses; it leads to greater security in the application of therapies and increased efficiency in the use and allocation of resources. 2007 has been a key year for the recognition of this principle, as stipulated in the Biomedical Research Act which, among other aspects, established a system for the promotion and coordination of biomedical research in the National Health System and set up a body of regulations which would dispel any legal grey areas that may exist among the applications of this field, and develop a framework of incentives for biomedical research. The Act is centred on four fundamental aspects: the use of human embryonic cells and tissues, invasive procedures, genetic analysis and biological samples and biobanks. In terms of research activities, it should be noted that the Act establishes mechanisms for the promotion, planning, evaluation and coordination of biomedical research which are founded on the principles of quality, efficiency and equal opportunities. The objective is to convert the results of research into effective therapies, or in other words, to base medical practice on scientific evidence. With regard to the organization, the Act establishes a number of associated bodies whose activities will be monitored and evaluated in the near future. The Ethical Research Committees in particular should monitor research which involves operations on human beings or the use of biological samples of human origin. The Guarantee Committee for the Donation and Use of Human Cells and Tissues will evaluate projects which call for the use of tissues, embryonic stem cells or similar material of human origin. Finally, the Act establishes the Biomedical Committee of Spain as the authorising body for consultation on aspects which have ethical or social implications.

As was mentioned previously, the Act gives special emphasis to the application of the results to clinical practice and underlines the function of hospitals as centres for biomedical research through their research centres and networked structure. In accordance with this principle, research activities in the autonomous communities have been developed mainly within their hospitals and universities, where, in most cases, foundations have been set up in order to provide methodological support or administrative support for applications for subsidies and financial backing. In fact, as can be seen in table 50, many autonomous communities do not have centres exclusively dedicated to research, instead setting up groups attached to their different hospital facilities. The research centres that do exist generally adopt the legal status of foundations.

TABLE 50. Research bodies in the Health Sciences, 2007

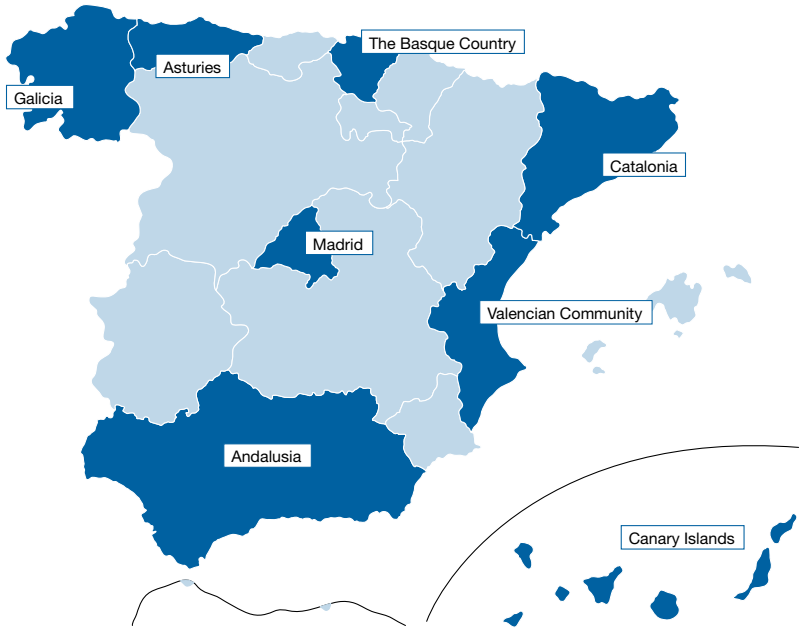
Autonomous community	Research centre	Legal status
Andalusia	Progress and Health Foundation	Foundation
Asturies	Office of Biomedical Research of the Principality of Asturies-Ficyt (OIB)	Non-profit making private foundation
Balearic Islands	Caubet-Cimera Foundation	Public foundation
Canary Islands	Canary Foundation for Research and Health	Non-profit making foundation
Castile-La Mancha	Institute of Health Studies	Foundation
Catalonia	9 centres of biomedical research and 12 institutes of health research	See annex of the section on this autonomous community
Valencian Community	The Prince Felipe Centre for Biomedical Research The Mediterranean Ophthalmologic Foundation (FOM)	Foundation
Madrid	The Laín Entralgo Agency for Health Training, Research and Studies	Public company
The Basque Country	The Basque Institute for Health Research, o+iker	The Basque Foundation for Health Research and Innovation/ B+I+O Eusko fundazioa
La Rioja	CIBIR- La Rioja Health Foundation (FRS)	Public foundation

Source: data provided by the autonomous communities. CIBIR, Biomedical Research Centre of La Rioja *(Centro de Investigación Biomédica de La Rioja).*

This model for the distribution of research activities is also found in the evaluation of health technologies: historical data reveals that the number of autonomous communities possessing agencies that carry out this activity has not increased significantly in recent years. Since 2004, only Asturies has joined this group of communities which have technology evaluation centres, in this case they form a specific service within the Department of Health and Health Services. Figure 20 highlights the communities which have agencies –or services attached to their public administration –for the evaluation of medical technology in 2007.

Despite this scant increase in the number of centres for research and evaluation of medical technology, it should be noted that most of the autonomous communities have presented an increase in their scientific output in 2007, measured by the number of scientific publications issued during that year. The number of biomedical research documents published has undergone a constant growth over the last 20 years and now accounts for approximately half of the scientific publications produced in Spain. This

Figure 20. Autonomous communities with centres for the evaluation of health technologies, 2007

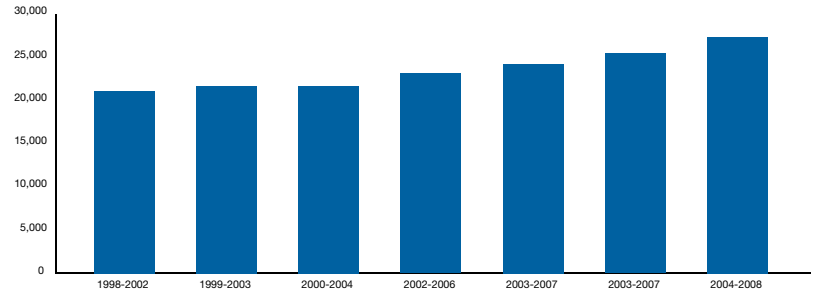


Source: data provided by the autonomous communities.

progression can be seen in figures 21 and 22, which show the number of publications in the areas of clinical medicine and pharmacology/toxicology divided into five year periods.

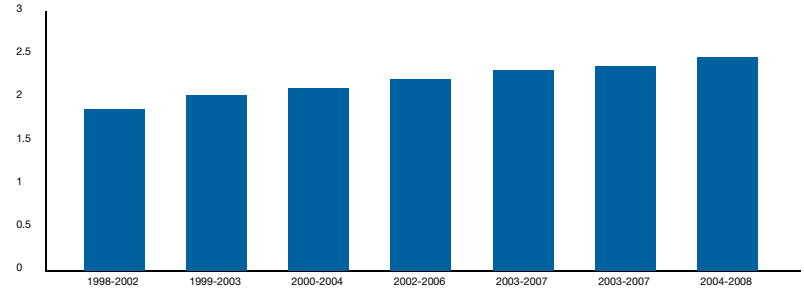
Another indicator of the degree of interest in research activities is the number of projects financed in competitive calls for projects. Table 51 shows the number of R+D projects and subsidies awarded by the Health Research Fund (FIS, *Fondo de Investigación Sanitaria*), by autonomous community in 2007. First of all, the total amount of the subsidies awarded in this area came to over 5.5 million euros, distributed among 551 projects. These values imply that 41% of the projects presented were accepted, and that 42% of the subsidies requested were granted. The autonomous communities received the support of the Health Research Fund (FIS) in different formats, although a few regions have traditionally been the focus of research activities.

Figure 21. Number of clinical medicine publications in Spain (total), divided into five year periods



Source: ISI Web of Science.

Figure 22. Number of pharmacology/toxicology publications in Spain (total), divided into five year periods



Source: ISI Web of Science.

Catalonia (20,024), Madrid (13,339) and Andalusia (6,207) stand out as the communities that received the highest level of funding, expressed in thousands of euros, far above the national average (3,259). In contrast, La Rioja (19), Castile-La Mancha (486) and Asturies (579) are the three autonomous communities which received the lowest amounts for R+D projects.

Table 52 contains a comparison of the quantities assigned to R+D projects in 2006 and 2007, along with the variation over this period and the percentage variation in the quota of subsidies received.

TABLE 51. R+D Projects financed by the Health Research Fund (FIS), 2007

Autonomous community	Research projects financed by FIS	Subsidy (thousands of euros)
Andalusia	66	6,207
Aragon	8	809
Asturies	10	579
Balearic Islands	11	819
Canary Islands	9	979
Cantabria	8	985
Castile and Leon	16	1195
Castile-La Mancha	9	486
Catalonia	188	20,024
Valencian Community	30	3,253
Extremadura	7	740
Galicia	17	1,686
Madrid	128	13,339
Murcia	7	670
Navarre	17	2,014
The Basque Country	19	1,591
La Rioja	1	19

Source: Subdirectorate General for Research Assessment and Promotion, Carlos III Health Institute.
FIS, Health Research Fund.

The data presented in table 52 allows us to make an initial assessment of the changes in the ability to raise research funds in each autonomous community. Navarre has seen an increase of over 65% in its quota of funding, rising from 2.21% in 2006 to 3.64% in 2007. Only Extremadura has risen further, going from 0.77% in 2006 to 1.34% in 2007. Catalonia and Madrid, which are among the three regions receiving the greatest amount in the two years studied, have maintained a relative stability, with the community of Madrid losing an percentage of the quote roughly equivalent to that gained by Catalonia. In contrast, two of the communities which received the lowest

level of subsidies in 2007, Castile and Leon and La Rioja, have lost 49.77% (from 4.29 to 2.16%) and 69.10% (from 0.11 to 0.03%) respectively in this period. In general, this data is insufficient for drawing definite conclusions on the changing pattern in the distribution of resources as regards the convergence or lack of it among the autonomous communities. However, the large variations observed in the distribution of the quota in this period is remarkable.

TABLE 52. R+D Projects financed by the Health Research Fund (FIS): variations with reference to 2007

Autonomous community	2006 Subsidy (thousands of euros)	2006 Quota (%)	2007 Subsidy (thousands of euros)	2007 Quota (%)	Variation in subsidies	Variation in the quota (%)
Andalusia	4,517	8.64	6,207	11.20	1,690	29.62
Aragon	1,381	2.64	809	1.46	- 572	- 44.74
Asturies	1,018	1.95	579	1.05	- 439	- 46.35
Balearic Islands	922	1.76	819	1.48	- 103	- 16.21
Canary Islands	935	1.79	979	1.77	44	- 1.23
Cantabria	530	1.01	985	1.78	455	75.31
Castile and Leon	2,244	4.29	1195	2.16	- 1,049	- 49.77
Castile-La Mancha	342	0.65	486	0.88	144	34.05
Catalonia	16,084	30.78	20,024	36.15	3,940	17.43
Valencian Community	3,509	6.72	3,253	5.87	- 256	- 12.55
Extremadura	404	0.77	740	1.34	336	72.78
Galicia	2,097	4.01	1,686	3.04	- 411	- 24.16
Madrid	15,236	29.16	13,339	24.08	- 1,897	- 17.42
Murcia	531	1.02	670	1.21	139	19.02
Navarre	1,155	2.21	2,014	3.64	859	64.48
The Basque Country	1,290	2.47	1,591	2.87	301	16.34
La Rioja	58	0.11	19	0.03	- 39	-69.10
Total	52,253		55,395		3,142	

Source: Subdirectorate General for Research Assessment and Promotion, Carlos III Health Institute.

It can be seen that the distribution of the subsidies approved for each autonomous community reflects the same characteristics as the number of projects applied for or awarded, which in turn reflects the intensity of research

activity in the different communities, and not an arbitrary distribution of resources.

Table 53 shows data relative to research projects on the evaluation of medical technology financed by the Health Research Fund (FIS).

Participation in tenders financed by European funds continues to be relatively rare, and the few projects obtained this way are insufficient to demonstrate any geographical concentration in these cases. Some autonomous communities report receiving funding from the European Union for research projects in this year: Andalusia (8), the Balearic Islands (2), the Canary Islands (2), Cantabria (1), Galicia (1) and La Rioja (1).

TABLE 53. Research projects on the evaluation of medical technology and health systems financed by FIS

Autonomous community	Research projects financed by FIS	Subsidy (thousands of euros)
Andalusia	20	996
Aragon	8	267
Asturies (Principality of)	5	101
Balearic Islands	4	148
Canary Islands	1	41
Cantabria	2	111
Castile and Leon	2	136
Castile-La Mancha	2	126
Catalonia	45	2,146
Valencian Community	10	440
Extremadura	1	28
Galicia	7	428
Madrid	47	2,414
Murcia	2	101
Navarre	1	9
The Basque Country	5	208

Source: Subdirectorate General for Research Assessment and Promotion, Carlos III Health Institute. FIS, Health Research Fund.

All of the governments of the autonomous communities have established competitions with finalists for research projects with the aim of both financing projects and awarding grants and prizes to individuals. As regards

these competitions, a general increase in the level of investment by the communities in this area can also be observed.

This is particularly noticeable in the expansion of "research awards" which both acknowledge and stimulate the results of the personnel engaged in this activity in terms of their scientific production. Among these, the following competitions should be noted; the prize Aragon Investiga, in Aragon; the prizes for research work awarded by the Central University Hospital of Asturies and the Gijón health authority in the Principality of Asturies; the National Prize for Nursing Research of the University Hospital Marqués de Valdecilla, in Cantabria; the FISCAM (*Fundación para la Investigación Sanitaria en Castilla-La Mancha,* Foundation for Health Research in Castile-La Mancha) Awards for the best articles and theses by medical professionals in Castile-La Mancha; the prizes awarded by the Galician School of Health Administration for published articles and doctoral theses in the field of healthcare in Galicia; and the research awards of the Community of Madrid for outstanding researchers.

These initiatives, besides providing financial incentives for research personnel, help to raise the profile of science and encourage the appreciation of research activities among the general public. From this fact –and the insignificant increase in the number of research centres mentioned above– we can deduce a tendency where the encouragement of research is controlled through groups or individuals, especially health personnel who dedicate a part of their time to this activity.

One positive aspect of the structure of the research system which should be borne in mind is the development of specialised networks for corporate research (Retics) and biomedical research on line (Ciber). These networks encourage stable translational research, reinforce the cohesion of the National Health System and represent a significant improvement in terms of efficiency.

2007 saw the approval of two new Ciber –the Ciber dealing with diabetes and associated metabolic disorders (Ciberdem) and the Ciber for mental health (Cibersam)– and the addition of 88 new research groups to the existing 7 Cibers. In December 2007, the total number of researchers employed in biomedical research centres amounted to 3,290. Between 2006 and 2007, funding has risen from 32 to 52 million euros in one year and has included over 250 groups among the different centres. Table 54 shows the contribution of each community to the different Cibers, and in particular, it shows the number of research groups in each Ciber from each of the autonomous communities.

It can be seen that Catalonia and the Community of Madrid contribute the greatest number of research groups to the Cibers: together they provide 141, which represents more than 50% of all the research groups included

in the centres. These two communities are also the only ones to participate with research groups in all of the Cibers. The only autonomous communities whose research groups do not participate in any of the Cibers are La Rioja and Ceuta and Melilla.

It should be noted that the Ciber which brings together the most research groups in Spain (41) is that of epidemiology and public health.

As regards the specialised networks, there were four new incorporations worth noting in 2007: The Spanish Multiple Sclerosis Network; Ocular Pathology of Aging, Visual Quality and Quality of Life; Research Network for Adverse Reactions to Allergens and Pharmaceuticals, and the Cooperative Research on Computational Biomedicine Network. The total number of networks set up and financed in 2007 rose to 18, and they were made up of about 500 groups.

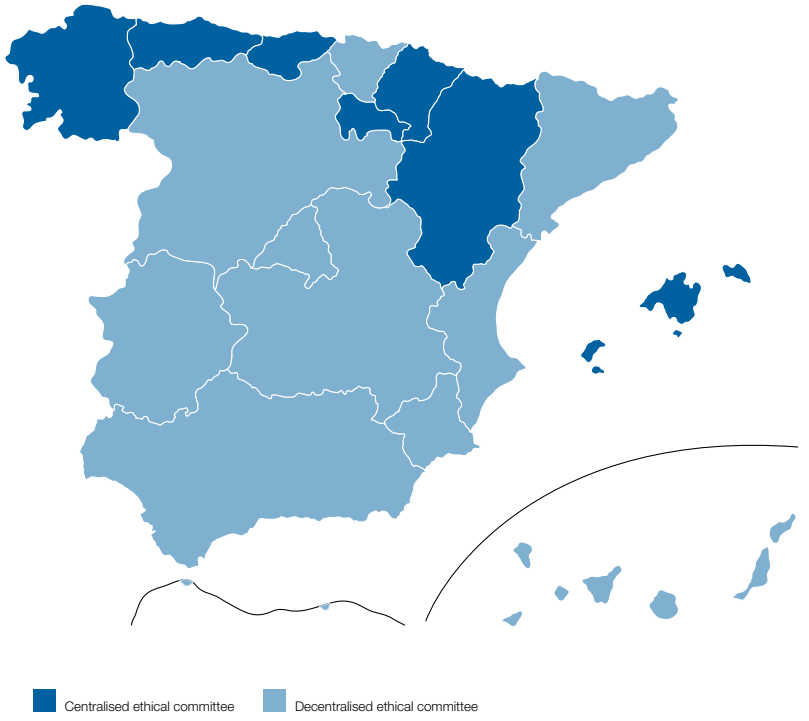
Tabla 54. Research groups included in the Cibers, by autonomous community, 2007

	Ciber01	Ciber02	Ciber03	Ciber04	Ciber05	Ciber06	Ciber07	Ciber08	Ciber09	Total
Andalusia	2	6	4	6	4		3	2	2	29
Aragon	1		1	1		1	2		1	7
Asturies		1							1	2
Balearic Islands			2			1				3
Canary Islands		1			1	1	1			4
Cantabria					1				2	3
Castile and Leon	1			2		1				4
Castile-La Mancha	1				1					2
Catalonia	12	18	8	7	8	8	11	9	6	87
Valencian Community	4	4	3	4	4	1	5		2	27
Extremadura	1				1	1		3		6
Galicia	2	1	2		1		1			7
Madrid	8	7	2	6	9	7	11	2	2	54
Murcia		1		1	1		1			4
Navarre		1	1	2	1					5
The Basque Country	3	1		2	2	1	1	1	2	13
La Rioja										0
Total Ciber	35	41	23	31	34	22	36	17	18	257

Ciber01: bioengineering, biomaterials and nanomedicine; **Ciber02:** epidemiology and public health; **Ciber03:** physiopathology of obesity and nutrition; **Ciber04:** liver disease and digestive disorders; **Ciber05:** neurodegenerative diseases; **Ciber06:** respiratory diseases; **Ciber07:** rare diseases; **Ciber08:** diabetes and metabolic disorders; **Ciber09:** mental health.
Source: Subdirectorate General for Research Assessment and Promotion, Carlos III Health Institute.

Another fundamental activity for the evolution of the health system is the performance of clinical trials. Although clinical trials are carried out in nearly all of the autonomous communities, there was a concentration of this activity in a few communities in 2007, namely Catalonia, Valencia and Andalusia. In keeping with its historical pattern –and the commercial value of the application of new health technologies– nearly 85% of all the clinical trials carried out in Spain have been sponsored by the pharmaceutical industry. With regard to this subject, the importance of the development of ethical committees for clinical trials has been notable, with the implementation of different models, both centralized and decentralized, depending on the community, as shown in figure 23.

Figure 23. Autonomous communities with a centralised ethical committee and with a system of decentralised ethical committees, 2007



Source: data provided by the autonomous communities.

As regards the R+D projects requested and subsidised by the FIS, table 55 shows the distribution of these by autonomous communities.

The variations show that there are different ways of ensuring the fulfilment of the ethical requirements called for in clinical trials and also exposes the need to analyse the relative efficiency of the different models so that the autonomous governments can adopt the most appropriate measures. As regards independent clinical trials, table 55 provides information on the number of projects requested and subsidised by the FIS. Most of the trial projects and most of the subsidies are concentrated in Catalonia and the Community of Madrid. In general, this data confirms the tendencies observed in the distribution of funds and makes patent the need for a better distribution of research activities among the communities to be encouraged and promoted. It may be that this factor, together with the social and economic circumstances of each community, could be the cause of regional inequalities in health in the future.

TABLE 55. R+D Projects (independent clinical trials) by autonomous community, 2007

	Requested	Approved	Subsidy (thousands of euros)
Andalusia	62	17	470
Aragon	8	3	92
Asturies	6	2	114
Balearic Islands	10	1	65
Canary Islands	9	2	131
Cantabria	3	1	10
Castile-La Mancha	10	3	329
Castile and Leon	11	3	256
Catalonia	203	71	7,593
Valencian Community	41	12	433
Extremadura	3	1	77
Galicia	19	4	232
Madrid	129	55	8,587
Murcia	6	3	349
Navarre	10	4	296
The Basque Country	18	6	151
La Rioja	1	0	0
Total	549	188	19,185

Source: Subdirectorate General for Research Assessment and Promotion, Carlos III Health Institute.

The issues of equality in general and in terms of gender in particular, have become increasingly significant in political and social spheres. The actions promoted by the Observatory on Women's Health in the area of health research and support for groups carrying out research into health and gender within the framework of the National Plan for R+DI 2004-2007 are worth noting. There has also been the offer of funding as part of the programme for the promotion of biomedical research and in the health sciences for carrying out research studies on the evaluation of medical technology and research in the health services in 2007. Also, among the actions undertaken as part of the Quality Plan of the National Health System (Strategy 4),we can note the following[57]: Study of the situation of cardiovascular illness among women in Spain (with the collaboration of the Spanish Cardiology Society); 5th monograph, *Research into Gender and Health* (in collaboration with the Spanish Epidemiological Society); the review report on guides for incorporating gender perspective in health research policies (with the Andalusian School of Public Health); a guide to health statistics with a gender focus (including the review of the questionnaires of the National Health Survey and the Health Barometer, among others); recommendations for employing the gender perspective in health programmes, etc.

Also, within the sphere of the autonomies, the initiative of the Directorate General of Public Health of Cantabria should be noted, which has promoted specific projects on access to health and gender services, rheumatoid arthritis and migraine, and the Catalan initiative for anonymity in projects, which while it does not actively promote the participation of women in research, does guarantee the elimination of gender bias –as well as bias towards status or institutions– in the provision of financing.

One relevant piece of data on the participation of women in research can be obtained from the breakdown by sex of the participants in R+D projects financed by the Health Research Fund. Table 56 shows the participation data for men and women in research projects. As can be seen, the participation of women nationally is limited to 32% out of the total number of researchers, despite the massive presence of women in university health-related degrees[58]. The competition for support from the Health Research Fund gives a view of the inequality in the distribution of this support due to gender, because one person must be mentioned as the "principal researcher" or IP (figures 24 and 25).

57 Available at: www.msc.es/organizacion/sns/planCalidadSNS/e02_t01.htm

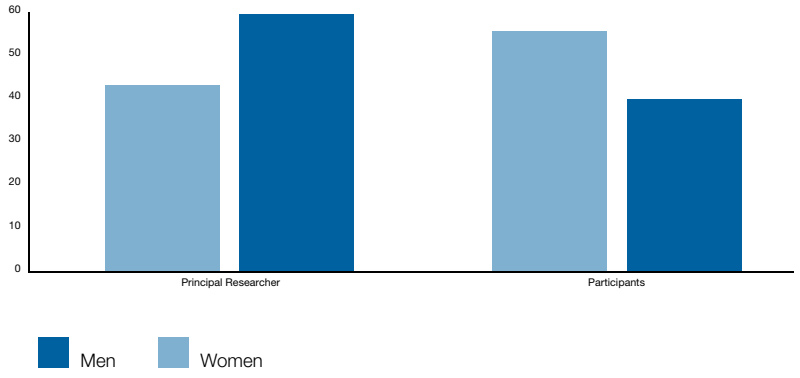
58 See chapter 6. Women in medical careers. Health and Gender 2006 Report. Available at: www.msc.es/ciudadanos/proteccionSalud/mujeres/docs/informeSaludGenero2006.pdf

TABLE 56. Participation of men and women in R+D projects, 2007

	Women	Men	%
Andalusia	14	52	0.21
Aragon	4	4	0.50
Asturies	1	9	0.10
Balearic Islands	4	7	0.36
Canary Islands	0	9	0.00
Cantabria	1	7	0.13
Castile-La Mancha	4	5	0.44
Castile and Leon	5	11	0.31
Catalonia	72	116	0.38
Valencian Community	9	21	0.30
Extremadura	2	5	0.29
Galicia	1	16	0.06
Madrid	46	82	0.36
Murcia	3	4	0.43
Navarre	4	13	0.24
The Basque Country	6	13	0.32
La Rioja	1	0	1.00
Total	177	374	0.32

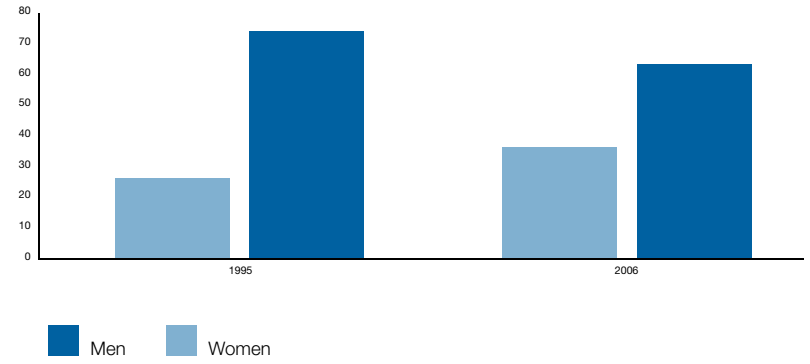
Source: Subdirectorate General for Research Assessment and Promotion, Carlos III Health Institute.

Figure 24. Personnel associated with projects financed by category, 2005



Source: Carlos III Health Institute, 2006.

Figure 25. Assignation by the FIS by principal researcher, 1995-2006



Source: Carlos III Health Institute, 2006. FIS, Health research Fund.