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Surgical training in Spain: Results of a national survey

José Maria Miguelena Bobadilla, José Ignacio Landa García, Fernando Docobo Durantez, Jacinto García García, Ignacio Iturbe Belmonte, José M. Jover Navalón, Eduardo Lobo Martínez, Iñigo López de Cenarruzabeitia, Dieter Morales García, and Mercedes Sanz Sánchez*

Sección de Formación Posgraduada y DPC, Asociación Española de Cirujanos, Madrid, Spain

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A B S T R A C T

Introduction: The aim of the study is to try and find out the state of surgical training in Spain and to determine whether it meets the objectives of the Program.

Material and methods: The results of two surveys carried out on Residents and General Surgery Tutors by the Spanish Surgeons Association, based on the conclusions of the XXVII Congreso Nacional de Cirugía. The questions formulated referred to general aspects of the Service and specific ones related to access, teaching activity, surgery, research and personal perspectives.

The responses were defined, adjusted and categorised as quantitative and qualitative variables. The statistics program G Stat 2.0 was used for processing and the descriptive presentation of the results.

Results: The surveys were sent to 626 Residents and 142 Tutors, with a response rate of 19% and 29%, respectively.

First year residents predominated (32%) compared to later years, with an R-5 response index of 7.2%.

A total of 91% knew the speciality Program well, and 76% were satisfied with the training received.

Conclusions: The results obtained as regards surgical activity agree with those established in the Program, both in the number of procedures and in their progression throughout the Residency, although it is not possible to ensure its uniformity.

The functions and accreditation of the Tutors which are one of the main foundations of the training process are pending specific regulations..

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*Corresponding author.
E-mail address: jmmibo@unizar.es (J.M. Miguelena Bobadilla).

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Formacion quirúrgica en España: resultados de una encuesta nacional

Palabras clave:
Formación quirúrgica
Cirugía General
Encuesta formación residentes

RESUMEN

Introducción: El objetivo del estudio intenta realizar una aproximación al estado de la formación quirúrgica en España y analizar su adecuación a los objetivos del programa.
Material y métodos: Se presentan y se analizan los resultados de dos encuestas realizadas por la Asociación Española de Cirujanos a los residentes y a los tutores de Cirugía General basadas en las conclusiones del XXVII Congreso Nacional de Cirugía. Las cuestiones formuladas hacían referencia a aspectos generales del servicio y particulares en relación con el acceso, la actividad docente, la actividad quirúrgica, la actividad investigadora y las perspectivas personales.
Las respuestas fueron definidas, adaptadas y categorizadas como variables cuantitativas y cualitativas. Se utilizó un programa estadístico G Stat 2.0 para el procesamiento y la presentación descriptiva de los resultados.
Resultados: El número de residentes y tutores a quienes se enviaron las encuestas fue de 626 y 142.
Fueron respondidas el 19% de las encuestas de residentes y el 29% de las encuestas de tutores.
Según el año de residencia, predominaron las de residentes de primer año (32%) frente a los de años ulteriores, siendo el índice de respuesta de los R5 del 7,2%.
El 91% conocía bien el programa de la especialidad y el 76% estaba satisfecho con la formación recibida.
Conclusiones: Los resultados obtenidos en cuanto a actividad quirúrgica concuerdan con los previstos en el programa tanto en el número de procedimientos como en su progresión a lo largo de la residencia, aunque no es posible asegurar su uniformidad.
Las funciones y la acreditación de los tutores que constituyen uno de los pilares fundamentales del proceso formativo están pendientes de regulación específica.

Introduction

Since W.S. Halstead, specialised medical formation, and surgical training in particular, has been a complex initiation and teaching process that can transform a medical graduate into a final homogeneous product. The surgeon will acquire standardised knowledge, attitudes, and abilities through an educational programme and monitoring in an accredited teaching hospital, regardless of its size, volume or case mix.

Over two years have passed since the publication on the new general surgery and digestive apparatus programme[1] came out, which modified and updated the objectives and training standards from the previous programme. The *Asociación Española de Cirujanos* (Spanish Society of Surgeons or AEC) which is particularly sensitive and vigilant of the surgical specialty training, performed a first analysis of the new programme,[2] formulating a series of reflections on the subject.

As such, it is pertinent to recall the programme's training objectives, taking into account that some of its primary aspects, such as branches of medicine, final evaluation, length of training, unit accreditation system and systems of access are still unregulated. The programmes and these questions in particular must be structured and regulated by each European Union country in accordance with to EU guidelines.

Considering this frame of reference and these important and controversial questions on the adequacy and homogeneity in the type of surgeons being trained in our country, we need to know the current situation in this regard.

An analysis of these characteristics can *a priori* be difficult, complex and controversial. This may slow down any type of initiative, as can be seen in the scarcity of references on this subject.

Being conscious of the interest and pertinence of these questions, as well as their intrinsic difficulty, the post-graduate training programme of the AEC assumed this challenge with the objective of approaching the current main subjects regarding structure and competency that, in their judgement, are the underlying pillars of our specialty. To this end, they designed a non-exhaustive, structured, simple survey aimed at the residents in the General Surgery and Digestive Apparatus department that included a series of fundamental questions. In order to complete the study, they also designed a survey with similar characteristics aimed at the teaching staff at the teaching hospitals.

Material and method

The training department of the AEC developed two surveys, one for residents and another for teachers. They had 40

AEC TRAINING DEPARTMENT, NATIONAL RESIDENTS SURVEY, 2009

Community			Hospital		
No. hospital beds			No. surgical department beds		
Year of residency		Sex		No. of internal medicine residency access	
No. of departmental surgeons			No. of residents in the specialty		
No. of duty shifts per month			No. of monthly clinical sessions		
Is the surgical department divided into functional units? (Y/N)					
Do you believe that the National Residents Conference is pertinent? (Y/N)					
Are you aware of the electronic Residency Book by the AEC? (Y/N)					
Do you use the electronic Residency Book by the AEC? (Y/N)					
How many AEC accredited courses have you taken?					
Have you performed a rotation outside of your hospital?				No. of months	
No. of emergency laparoscopic surgical procedures performed per month in the department					
No. of programmed laparoscopic surgical procedures performed per month in the department					
Are advanced laparoscopic surgical procedures commonly performed in your department?					
No. of surgeons that commonly perform advanced laparoscopic surgical techniques					
Do you have a specific MOS program in your hospital/ department?					
Have you taken a specific training course in laparoscopic surgery?					
Have you taken a course or specialised training for experimental surgery?					
No. of minutes of practice on a pelvitrainer (total)					
Does your department have a surgical simulator?					
No. of minutes practice on a simulator (total)					
No. of procedures performed in laparoscopic surgery as an assistant					
No. of procedures performed in laparoscopic surgery as surgeon					
No. of surgical procedures for inguinal hernia performed as surgeon					
No. of emergency surgical procedures performed as surgeon					
Have you read and consulted the Specialty Program at some point?					
Are you aware of/have you read the Resident Training Decree?					
Does the training period length of time seem adequate to you (5 years)?					
Do you consider a final evaluation test to be necessary at the end of R5?					
Do you consider your current training to be adequate?					
How many published articles in journals in your specialty have you participated on?					
Would you conclude studies for a doctorate during your residency+1 year?					
COMMENTS					

AEC TRAINING DEPARTMENT, NATIONAL TEACHERS SURVEY, 2009

Community			Hospital		
No. of hospital beds			No. of beds in the Surgical Department		
No. of surgeons in the department			No. and sexes of residents		
How many surgical residents come from other communities?					
How many weekly hours do you dedicate to teaching?					
Is the Surgical Department divided into functional units?					
Length of teaching experience			No. of teachers in the department		
Have you taken any specialised and/or accredited teacher training courses?					
Are you aware of the teachers training course in the Training Department?					
Do you believe that the National Teachers Conference is pertinent?					
Are you a member of the Post-Graduate Training Department?					
Are you aware of the AEC Resident's electronic book?					
Do you use the AEC Resident's electronic book in your department?					
How many residents have you evaluated this year with a grade of under 3?					
No. of monthly clinical sessions in your department					
No. of monthly programmed laparoscopic surgical procedures performed in your department					
No. of monthly emergency laparoscopic surgical procedures performed in your department					
Are advanced laparoscopic surgical techniques commonly used in your department?					
No. of surgeons that habitually use advanced laparoscopic surgical techniques					
Does your department/hospital have a specific MOS program?					
How many duty shifts per month do your residents perform?					
Do you believe that a final examination is necessary for finishing R5?					
Would you add another training year to the specialty program?					
Do you believe the current training program to be adequate?					
COMMENTS					

Figure 1 – Survey formats. AEC indicates Asociación Española de Cirujanos (Spanish Society of Surgeons); MOS, Major Outpatient Surgery; N, no; Y, yes.

and 29 questions respectively (Figure 1) that were derived from the conclusions made from the papers presented and debated upon during the XXVII *Congreso Nacional de Cirugía* (National Surgery Conference) in November 2008.

The questions of the survey included, firstly, general aspects of the relevant hospital and teaching department/unit, and secondly, specific aspects related to the access to the specialty, teaching activities, surgical activity and the research, as well as the personal perspectives and opinions.

The surveys were edited both in electronic and printed formats and then sent by email from the AEC secretary, along with a letter explaining and justifying the research, to all residents and teachers identified as such by the AEC database on two successive occasions between January 15 2009 and April 15 2009. A total of 626 residents and 142 teachers received the surveys.

Finally, the surveys were printed and again presented and distributed at the IV *Reunión Nacional de Tutores* (National Teacher's Conference) and the XII *Reunión Nacional de Residentes* (National Resident's Conference) that took place in Madrid on the 23 and 24 of April 2009.

The responses to both surveys were defined, adapted and categorised as quantitative and qualitative variables before being included into a database. We used G Stat 2.0 statistical software (GSK Barcelona 2007) for the processing and descriptive presentation of the results. Given the sample size and the nature of the study design, we have not attempted any type of intervariable analyses.

Results

Nineteen percent of the resident surveys (126) and 29% of the teacher surveys (42) were filled out.

By Spanish autonomous community, 24% of the resident surveys came from Andalusia, 16.8% from Madrid, and 12% from Valencia, whereas 21.4% of the teacher surveys came from Madrid, 11.8% from Catalunya, and 9.5% from Andalusia (Table 1).

With regard to the residency year, 32% of student surveys came from first year residents, whereas fifth year residents made up only 7.2% (Figure 2).

Resident profile. Only 36% of the residents were carrying out their residency in areas other than their community of origin. 57.6% were women (72) and 42.4% were men (53). As regards the internal residency test, this specialty mean number was 1.759, with extreme values of 3-3,560.

The residents are on duty six times a month, as well as perform an average of four structured clinical sessions per month. 28.9% had performed rotations outside of the hospital: 5% of R1, 16% of R2, 52% of R3, 47% of R4, and 88% of R5.

Forty one percent of residents had taken some type of special course for laparoscopic surgery training, and 27% had received specialised training for experimental surgery.

Ninety-one percent had read and consulted the specialty programme, and 62% had read or knew of the Spanish royal decree that regulates the working relationship of residents in the Health Sciences.[3] Seventy-six percent were in agreement with the length of training (5 years) and 72.8% did not consider a final exam necessary.

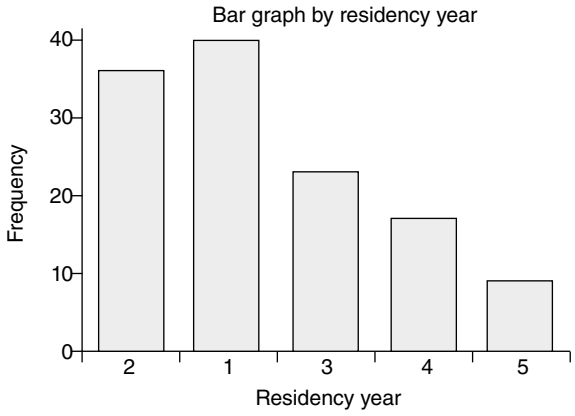

Figure 2 – Level of response according to residency year.

Table 1 – Survey responses

Community	Resident surveys		Teacher surveys	
	n	%	*n*	%
Andalusia	30	24	4	9.5
Aragon	11	8.8	3	7.1
Balearics	1	0.8	–	–
Canary Islands	2	1.6	2	4.7
Cantabria	3	2.4	1	2.3
Castile-La Mancha	4	3.2	2	4.7
Castile-Leon	9	7.2	3	7.1
Catalonia	14	11.2	5	11.8
Euskadi	5	4	3	7.1
Extremadura	3	2.4	1	2.3
Galicia	2	1.6	3	7.1
Madrid	21	16.8	9	21.4
Murcia	3	2.4	1	2.3
Navarra	2	1.6	1	2.3
Valencia	15	12	3	7.1

Fifty-one percent of residents had participated in some type of scientific article, with an average of 2 articles per person in this group.

Eighty percent knew the *AEC* medical resident's electronic handbook, and 47% actually used it. 77% had been systematically and consistently taking the training courses promoted and accredited by the *AEC*, with a mean of 2 courses per year.

Surgical department profile (Table 2). The departments had a mean of 60 beds and 23 surgeons on staff. 83.2% of the departments are organised into functional units (74% according to the teachers) and perform a mean of 15 emergency and 34 programmed laparoscopic procedures per month. 87% of departments usually performed advanced laparoscopic techniques (85% according to the teachers). 29.6% used simulators.

Seventy percent of departments (72% in the resident surveys, 78% in the teacher surveys) provided a structured programme for Major Outpatient Surgery (MOS).

Surgical activity of the residents. Table 3 summarises the surgical activity specified as the number of procedures performed in hernia, emergency surgery, and laparoscopic surgery (as surgeon and assistant), with a global mean in the R4+R5 group of 81, 141, and 188, respectively. The results obtained in laparoscopic surgery as surgeon and assistant in the first and second years of residency were interesting, with a mean number of procedures performed in each role of 1.4 and 26.5 for R1 and 11 and 52 for R2.

Teacher profile. The teachers surveyed dedicate 2.7 hours per week to teaching, have a mean teaching experience of 7 years, and each department has a mean of 2 teachers. 74% have taken some type of specific and/or accredited teacher training course.

Sixty-six percent of teachers had never scored a resident with less than 3 points and none had evaluated a resident under 1 point.

Sixty percent considered a final evaluation exam at the conclusion of R5 period to be necessary, and although 64% considered the current length of residency time to be adequate, 70% would add another year to the specialty teaching period.

Hundred per cent of teachers were familiar with the teacher's course by the Training Department of the *AEC*, and they believed the national teacher's conference to be pertinent and necessary. 68% are members of the Post-Graduate Training Department. 92% were familiar with the *AEC* medical resident's electronic handbook and it was used in 62% of the surgical departments.

Discussion

Rates of response of 19% in residents and 29% of teachers confirmed our most pessimistic predictions, and are in line with other studies of these characteristics.[4] The general tendencies that stand out from these results probably being more important than the absolute values obtained. However, a recent publication[5] from a study in a more restricted environment obtained a much higher participation rate.

Although the causes of the disaffection and lack of participation in the survey could be attributable to an unattractive, excessively complex or excessively long survey design, or to a deficient diffusion or justification of the survey by its promoters, the level of disinterest provoked in the potential survey takers was surprising, especially in the main study group: the medical residents. Only through

Table 2 – Characteristics of the teaching units/departments

Item	Mean	Item	Mean	Item	%
Beds, n	60	SP/month-emergency laparoscopic surgery, n	15.2	Organisation into functional units	83.2
Surgeons, n	23	SP/month-programmed laparoscopic surgery, n	34	Structured MOS programme	72
Residents, n	8	Surgeons performing advanced laparoscopic surgery, n (%)	6 (26)	Advanced laparoscopic procedure performed	87
Teachers, n	2	Clinical sessions/month, n	4	Simulator	29

MOS indicates major outpatient surgery; SP, surgical procedure.

Table 3 – Surgical activity

Mean SP	Overall	R1	R2	R3	R4	R5	R4+R5
Laparoscopic surgery as assistant surgeon	59.5	26.5	52	52	108	173	133
Laparoscopic surgery as surgeon	18	1.4	11	18	48	65	55
Hernia	38	7.3	41	40	78	85	81
Emergency	67	19	53	97	116	184	141

R1 indicates first year residents; R2, second year residents; R3, third year residents; R4, fourth year residents; R5, fifth year residents; SP, surgical procedure.

a statistical analysis of these characteristics a diagnosis can be established on the current state of surgical training in Spain and if it meets the specifications and objectives of the training programme in terms of knowledge, debate and development of possible strategies.

In any case, we believe that the description of the results obtained could provide a very good approximation for the current state of the issue, although intervariable analyses were not possible.

A first analysis of the results allows us to deduce that the teaching hospital units are fairly homogeneous: a mean of 60 beds and 23 surgeons organised into functional units (83.2% according to the residents and 74% according to the teachers), with a specific MOS programme (72% according to the residents and 78% according to the teachers) and in which advanced laparoscopic techniques are used (87% according to the residents and 85% according to the teachers), although by only a small number of the staff.

The number of surgical beds is above the accreditation standards that used to be required for accreditation of teaching hospitals. At present, this should not be an acceptable criterion for evaluating a teaching hospital above the surgical quality indicators that are required for clinical care.

The high percentage of organisation of the departments into functional units stands out, with both teachers and residents coinciding on this point, which points to a current restructuring of these departments, improving the care of patients in areas of specialisation. Furthermore, the MOS programmes that improve the management of these clinical departments present high implantation percentages (72%/78%), which is in agreement with the current substitution rates (63.3%) in Spain.[6]

A point that is impossible to overlook is that of the mean 23 surgeons per teaching department or unit, which stands out and complies with the available data on public health in Spain for 2007: 3,429 general and digestive surgeons, 7.47% per thousand inhabitants higher than the advisable standards and higher than other developed countries, such as Holland, England, Belgium, Switzerland, Canada, Germany, USA and Japan.[7]

Regarding the profile of the residents surveyed, the majority were female (57.6%) and had picked their specialty with a mean internal medicine residency access number of 1,759 (3-3,560). 64% performed their specialty training within their community. During the internal medicine residency application phase of 2009, General Surgery and Digestive Apparatus was picked first at a rate of 91 and last at a rate of 3.781, with a 63% rate of feminisation.

If all of the teaching hospitals guarantee compliance with the programme[1] requested by the *Comisión de Recursos Humanos del Sistema Nacional de Salud* (Human Resources Commission of the National Health Sciences System) without adequately evaluating the need for specialists and which is in disagreement with the *Comisión Nacional de la Especialidad* (National Medical Specialty Commission), the 194 accredited teaching vacancies offered in Spain could bring sub-employment in the near future and/or unemployment. This may create surgeons with training deficits according to the current demands of our society.

The ever-higher level of access and preferential choice of working in the community of origin put the vocation of some of our future surgeons in doubt, although in the year 2007, only 5.4% left the specialty training before finishing.

The tendencies towards feminisation, the modification of vocational priorities, and the localism or endogamy intuited in previous articles[8,9] appear to increase in light of the results and the tendency to prioritise the cost-effectiveness of the lack of "training, and ultimately labour, emigration" once the residency has come to an end.

In 2003, the *AEC*, through their *Sección de Cirugía Endoscópica* (Endoscopic Surgery Department), published the results of a national survey on the level of implantation in laparoscopic surgery programmes in Spain.[10] In another survey performed in residents by the *Sociedad Española de Cirugía Laparoscópica* (Spanish Society of Laparoscopic Surgery) in 2006,[11] 64% never or rarely performed emergency laparoscopy, 80% never or rarely performed advanced laparoscopic surgery, 50% considered the specialists around them to be incapable of teaching advanced laparoscopic surgical techniques, 92% considered their laparoscopic surgery training to be insufficient, and 96% considered courses with simulators or experimental animals to be of crucial importance. In a recent survey taken from the residents of the Valencian Community,[5] the results also reflect a training deficit in this field.

Surprisingly, results obtained from the past 3 and 6 years, respectively, have not suffered any major modifications according to the point of view of the residents. The data obtained such as mean number of both laparoscopic and elective surgical operations performed per month in the departments surveyed (Table 3) attest to this, with only a small number of surgeons in the teaching units capable of working with advanced laparoscopic surgical techniques.

However, throughout the residency period, the training standards proposed in the programme appear to be minimally complied with in relation to the activity of both resident and teacher in basic laparoscopic surgical procedures and enrolment special practical courses in laparoscopic surgery (41% had taken some type of specialised training course in laparoscopy and 27% had received specific training in experimental surgery). However, few teaching hospitals have simulators or pelvitrainers (29.6%) with little time devoted to their use by residents, which in the view of the authors presents one of the main shortcomings of the training process. On this subject, the *Sección de Cirugía Endoscópica* of the *AEC* has promoted an attractive and ambitious training process.

Independently of the restrictions proposed by the European Work Time Directive, the era of specialised surgical training through a purely clinical learning system is over; especially if we take into account the laboratories for surgical training. It appears probable (and this really is our own point of view) that the doctors currently undergoing training will have to acquire their basic surgical abilities in laboratories using physical and virtual reality simulators before being allowed to participate in supervised surgical procedures.[12]

If minimally invasive surgery is to constitute one of the fundamental pillars of modern surgery, we must conclude

Table 4 – Teaching and research activity

Item	%	Mean	Item	%	Item	%
Accredited courses taken	77.5	≥ 2/year	Aware of the programme	91	Satisfaction with training	76
Laparoscopic surgery courses taken	41.6	1	Aware of the royal decree	61.6	Increase in training period length	No: 76
External rotations performed	28.8	2 months	Aware of electronic book	80	Need for final evaluation	No: 72
Publications	51	2	Use of electronic book	47.2	Would you finish a thesis?	74

that at the present time, the first generations of specialists in General Surgery and the Digestive Apparatus with a surgical training based primarily on laparoscopic surgery are still yet to arrive.

The results obtained regarding general surgical activity (Table 3), basic laparoscopic surgery, emergency surgery, and hernia surgery are all in accordance with those predicted for the programme, both in the number of procedures and their progression throughout the medical residency. We cannot assure that this trend is uniform throughout the different diplomatic communities, and reasonable doubts exist on the laparoscopic training given at some accredited teaching centres.

A surprising result is that although 80% of residents were aware of the electronic residency book by the AEC, only 47.2% used it, failing to take advantage of an easily accessible and usable tool that could serve as a logbook, activity registry, dynamic curriculum vitae for the resident, and with a double use as an external (annual, audits, and end of residency) and internal (auto-evaluation) evaluation mechanism, and although the teachers are aware of this tool (92%), only 62% of teachers actually use it.

In light of the results, the dynamic nature of performing the proposed specialised courses in a specialty programme appears reasonable, and is also contemplated and accredited as a teaching method by the AEC, which favours and supports the access, enrolment, and content of these courses.

However, we believe that the percentage of residents that perform rotations in other hospitals (28.9%) and the length of time of these rotations are scarce and insufficient. This constitutes a challenge and an achievable goal, as is pointed out by other authors.[5] The intensification and enhancement of external inter-hospital rotations inside or better yet outside the resident's community of origin favours an inter-hospital flow that includes hospitals with fewer beds and general surgical departments in some cases, and in others, reference hospitals and functional units.

Our residents perform a mean of six shifts (in the programme, 4-6 per month are advised) per month, and attend an average of four clinical sessions. 52% of residents have not participated in any type of scientific article, which varies from 0.42% of R1 students to 7.3% in R5. This is all far removed from the objective of the new training programme, creating serious doubts in their research formation.

91% of residents affirm that they are aware of and periodically consult the specialty programme, and 62% are aware of the resident training decree, which speaks to a positive concern on their part. 76% of residents and 64.5% of teachers are in agreement with the length of five years in the specialty training, although the teachers in general would like to add another year to the formative period (70%). This apparent contradiction could be related to the European Work Time Directive, which would imply a theoretical 30% reduction in time dedicated to training and a real focus on surgical specialty branching with the incoming cohort of residents. In either case, the increase in number of years of training does not appear to be feasible by comparison with our environment (Table 4).

Lastly, another point of discord in the results from both surveys is the rejection of the proposition of a final evaluation of the residents (72.8%), as compared to a majority of teachers in favour of the proposition (60%), this being more aligned with the regulations outlined by the Health Professions Regulatory Law and training decree.[3,13] However, the voluntary evaluation of those who could obtain a favourable final score from the National Specialty Commission could provide them with the opportunity, through accreditation by means of a diploma, to stand out with honours and high honours. However, this provides little compensation to those who put in the most effort, since 66% of teachers have never evaluated a resident below three points and none have ever done so below one point.

Despite the lack of motivation and institutional recognition, the teachers had a mean 7 years of experience and a mean time of 2.7 hours per week devoted to teaching. 74% have received some sort of specialised training course, 68% are members of the *Sección de Formación* (Training Department) of the AEC, 100% are aware of the teacher training courses offered by the AEC and approve of an annual national departmental conference. Together with the programme in the accredited teaching institution, the teachers constitute one of the fundamental pillars of the training process, and their functions and recognition are under specific guidelines, mainly determined by the autonomous communities.

The Training Department of the AEC, which previously performed a preliminary analysis of the new programme[2] and presented their results from a national survey, unrepeated during this century, has also elaborated a new manuscript including a critical analysis of the training given in our specialty, proposing new alternatives.

Conflict of interest

The authors affirm that they have no conflicts of interest

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