The training of an internal medicine resident (IMR) in nuclear medicine (NM) represents the integration of a recently licensed individual in the health care activities of a NM department, with increasing responsibility and decreasing supervision over time. To do this, tools and resources are necessary to guarantee that this integration is adequately planned and supervised.

The Royal Decree (RD) 183/2008,¹ which determines and classifies the specialties in health sciences, developed determined aspects of the specialized health care education system such as the teaching units, teaching committees, the supervision and responsibility of the IMR and the systems of evaluation and provides the framework for training and evaluating competences, including, among other aspects, the multiprofessional units and a controversial but fundamental topic, the core training.

With this RD all the National Healthcare System found itself before a great opportunity to develop and improve the systems of specialized health care training. However, this did not lead to a parallel development in the systems of training and continuing evaluation in the different autonomous communities.

On the other hand, although the adequacy of the teaching activity corresponds to the autonomous communities, the primary responsibility lays in the teaching unit and the tutor. Thus, each teaching unit of nuclear medicine (TUNM) has had to adapt the program of specialty prevailing since 1996.

With the aim of obtaining the information required concerning the situation of teaching IMR in our specialty in Spain from the perspective of the tutors, a self-administered questionnaire was designed including questions on different administrative aspects related to the TUNM and the tutor responsible as well as on the organization of the training activity of the residents. Finally, the opinion of the tutors was requested about the interest of unifying the training programs of the different centers.

The evaluations were organized in dichotomic variables (yes/no) for most of the questions and continuous numerical questions with values from 1 to 5 were made to study opinions related to a determined aspect.

The questionnaires were sent to the 39 TUNM with IMR positions in 2012.

A descriptive analysis of the results obtained was performed by SPSS program. The differences between the results related to teaching and organizational aspects such as having defined competences, having their own evaluation system, an improvement plan and IMR book were compared with the differentiating characteristics of the tutors such as the level of training or seniority and the date of TUNM accreditation using the Chi-square test ($\chi^2$). A $p$ value <0.05 was considered as significant.

Of the total number of questionnaires sent 39 were returned completed. Of these, 10 corresponded to TUNM with 2 accredited tutors (5 centers), making the total of TUNM from which information was obtained to be 34, constituting a response rate of 87%.

With regard to the number of tutors responsible for the formation of residents, only 5 TUNM had 2 tutors. The mean seniority in the performing of teaching activity of the tutor was of 5.8 years and 69.2% had received specific training courses for the development of their teaching work.

Forty-four percent of the tutors reported participating or having participated in teaching committee in their respective hospital, 82.4% declared having received courses of specific training for performing their teaching work while, in the case of the tutors not participating in teaching committee, 59% had received specific training. Although these results were not statistically significant ($\chi^2 = 2.44; p = 0.12$), it should be recognized that the fact of having participated in the teaching committee may have a facilitating role with respect to accessibility to these courses.

With regard to the self-perception of the tutors concerning their training for their position measured on a scale from 1 to 5, a mean value of 3.2 was assigned. On the other hand, the perception they had of the time at their disposal within their daily activity for dedication to teaching was clearly lower (mean 2.2).

Although the quality of the accreditation of the centers and teaching units is regulated by periodic audits, the tutors and the remaining teaching personnel are not assessed to the same degree.²

On the other hand, the health care pressure and other factors linked to health care organization and management do not facilitate interaction between tutors/physicians and residents. In addition, the necessary resources have not been formulated to ensure adequate dedication of the tutors to their teaching activity, whether during or apart from their working day such as provided for in the RD 183/2008, and neither is their work recognized. On occasions, this climate leads tutors and physicians to forget that they are teachers and that the residents are professionals in formation, although the latter should not forget that they themselves are responsible for their training and are obliged to adopt active positions.³

With regard to the influence of the RD 183/2008 had had on their teaching activity, 15 tutors responded affirmatively and the remaining 9 tutors reported that the RD had not had any influence or did not answer the question.

Training based on competences is centered on learning and not teaching as well as on the achieving of specific objectives, that is, learning results.⁴ The implementation of the RD 183/2008 defines the need to define the objectives and competences of each rotation by the tutor. However, these competences should be stated in official programs including minimum criteria.⁵
The present training program prevailing in NM since 1996 is obsolete since it has not been adapted to the changes undergone by the specialty in the last years, among these, the disappearance of radium laboratories and immunonolation and the implementation and development of multimodality imaging in practically all the Spanish departments of NM. In short, with the introduction of multimodality imaging techniques training which integrates the functional orientation of NM with the anatomical orientation of radiology is necessary.5–7

On the other hand, the problem of core training has not been solved since the preliminary agreements between the European Societies of Nuclear Medicine and Radiology have not led to an interdisciplinary training program or common certification.8 In addition, while the European and American Societies of Nuclear Medicine have explained how the overlapping of the training programs would be, the European Society of Nuclear Medicine has published the European Training Charter for Clinical Radiology, in which molecular imaging and other NM techniques have been integrated within the radiology training program as well as providing an option for subspecialization in molecular imaging during the last 2 of the 5 years of training.9

Concerning the results of the questionnaire, 91 and 94% of the TUNM have guidelines and a teaching program, respectively. The external rotation is an aspect reflected as optional in our current training program. However, in practical terms they are considered obligatory and fundamental for all the TUNM since in all the centers the IMR carry out rotations outside their department, although only 50% do so in foreign reference centers.

These rotations should be of a mandatory nature and with concrete objectives in reference to complementary training which requires the interpretation of hybrid imaging, similar to what is reflected in the current radiodiagnostic training program. It would even be convenient to determine some specific objectives of this training as is provided in the present training program of the European Society of Nuclear Medicine.7

In the section of the questionnaire corresponding to competences, these are defined in 31/34 TUNM, in 29 they are structured in skills, knowledge and attitudes and 27 TUNM have objectives defined in the areas of teaching and investigation.

Evaluation of the acquisition of knowledge and competences is a subject of continuous debate but it is important to consider as yet another method of formation which also increases objectivity in the evaluation of learning. Thus, a training evaluation plan is required with follow up through formally established meetings with the resident at least once per rotation and at the end of the same as stated in the RD 183/2008.

The results of the questionnaire determined that 70.6% of the TUNM carried out training assessments, although 82.3% did not dispose of their own evaluation systems. Nonetheless, 59% of the tutors recognized that the current evaluation system is adapted to their necessities. Twenty-three centers perform previously agreed upon and registered interviews between tutor/IMR.

The perception that the residents have of the management of their learning is important. According to the data of the tutors, in 47.1% of the TUNM the residents do not counterevaluate the training they receive.

Formative and continued evaluation along the training period will allow the observation of progress and deficiencies to establish corrective measures which are the mechanisms that allow the modification of the practical application of the training program based on the results of the assessment with a view of correcting possible deficiencies. To this respect only 41% of the TUNM have these corrective measures.

Although the RD 183/2008 states that the tutor is responsible for the training evaluation it is fundamental for all the teaching team to carry out this assessment. Moreover, contrast of opinion favors rigor.

With regard to who performs the IMR evaluation, only 41% reported the involvement of all the teaching team followed in order of frequency by the attending physician responsible for the rotation (21%) and the tutor (18%).

Comparison of the results of the different teaching and organizational aspects and the characteristics of the tutors and the TUNM defined a nearly statistically significant relationship between the position seniority of the tutor and the implementation of an evaluation system (p = 0.08) since all except one of the tutors with their own evaluation system had been in their position for at least 5 years.

In relation to corrective measures, a statistically significant relationship was found when the seniority of the TUNM was taken into account, with 3 of the 16 TUNM having accreditation before 1986 having such a plan versus 11/18 of the remaining centers with posterior accreditation (χ² = 5.37, p = 0.02, with Yates correction). With regard to the remaining variables, no statistically significant relationships were observed.

It is essential to note that to generate any change it is very important for all the professionals integrating the TUNM to work with the same approach and language. This defines the relevance of having common, uniform tools which cover from the objectives of training and competences and the teaching program to the systems of evaluation and certification. In this respect most of the questionnaire responders reported being in favor of having these common tools (mean 4/5 points).

In short, the training of specialists in NM in Spain seems to have the necessary teaching resources with interest being demonstrated in the unification of the documentation related to teaching. The evaluation systems and greater involvement of all the teaching team are aspects pending improvement.

Conflict of interest

The authors have no conflicts of interest to declare.

References

1. RD 183/2008, de 8 de febrero, por el que se determinan y clasifican las especialidades en Ciencias de la Salud y se desarrollan determinados aspectos del sistema de formación sanitaria especializada. BOE n 45.