

## Joint AAPM/SEFM/AMPR Educational Workshop on Education of Radiotherapy Physicists

### The Spanish Curriculum for the “Hospital Radiation Physicist” and the Projected Impact of Recent European Directives

Montserrat Ribas, Ph.D.

- Chairman of the National Commission of *Radiofísica Hospitalaria*. Spain
- Head of the Department of Radiation Physics and Radiation Protection HSCSP, Barcelona. Spain

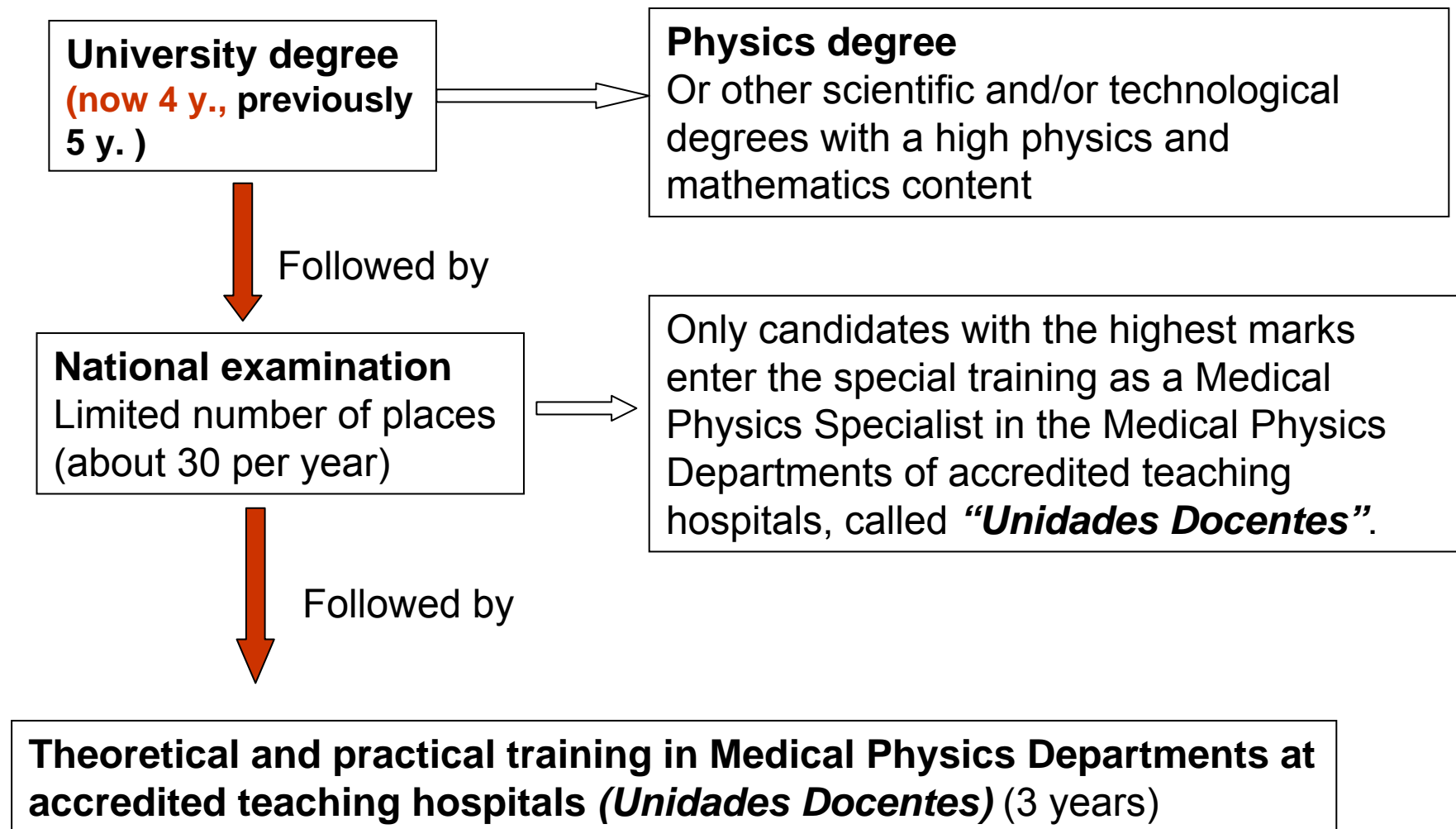
# Specialty of Medical Physics (*Radiofísica Hospitalaria*)

- 1997. The Spanish Ministry of Health and the Ministry of Education created and regulated the specialty of Medical Physics (*Radiofísica Hospitalaria*).
- 2008. The Spanish Ministry of Health updated legislation. A Royal Decree determined and classified the health sciences specialties and developed certain aspects of specialized health system training

- **Medical Physics is recognized as a health profession and based on the same model as the medical specialties through the resident programme system.**
- **This implies that entrance requirements, training, status and salary are similar to those of medical specialists in the National Health Service.**

# The Education and Training Scheme for Specialists in Medical Physics in Spain

## Bologna declaration since 2011



# The National Examination

- The National Examination consists of 225 multiple choice questions plus 10 backup questions on physics, mathematics and other disciplines related to the use of radiation.
- The Spanish Ministry of Health is in charge of the national examination and assigns the number of places for training each year.
  - **The current ratio is about 30 places per year**
- Successful candidates choose an accredited hospital with a Medical Physics Department on the basis of the score they obtain (i.e. The candidate with the highest score has first choice of centre).

# Residency in Medical Physics

Theoretical and practical training time in Medical Physics Departments is 3 years, distributed in these areas:

- Radiation Therapy: 1 ½ years
- Diagnostic Imaging (Radiology and Nuclear Medicine): 1 year
- Radiation Protection (patients, employees and the public): 0.5 year



**During this 3-year period, the theoretical and practical training takes place simultaneously.**

**The trainee is incorporated gradually into hospital life, increasing his/her level of responsibility in the job, and always under the supervision of the tutor**

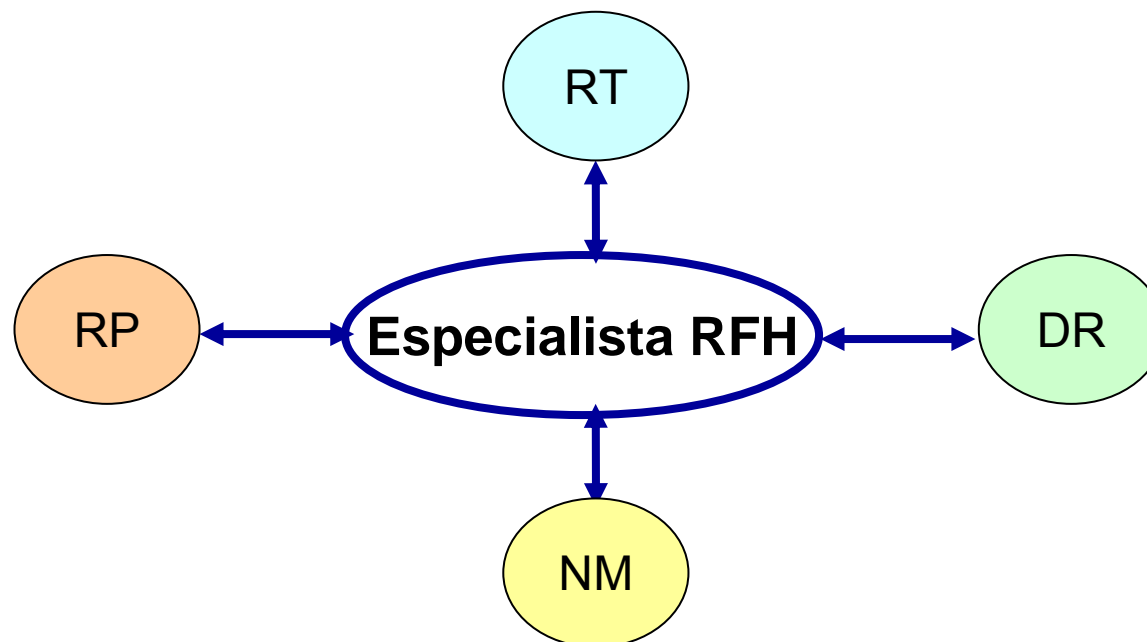
# Theoretical Training

- Since 2004, the SEFM has organized “basic courses” mainly targeted to medical physicists in training. The aim of these courses is to provide the theoretical background to complement the 3 years of practical training carried out in the Hospitals. The “basic courses” are structured as a single course (around 145 hours) called **“Fundamentos de Física Médica”** which is composed by 9 self-contained “modules”.
  - Radiation Measurements
  - Diagnostic Radiology
  - External Radiotherapy (2): Treatment equipment and Clinical dosimetry
  - Brachytherapy
  - Nuclear Medicine
  - Radiobiology and Principles of Oncology
  - Radiation Protection
  - Non-Ionizing Radiation

**These courses are strongly recommended by SEFM and CNRFH, and currently, more than 95% of medical physicists in training have attended them**

## Qualification as “Specialist in Hospital Radiophysics” (*Título de “Especialista en Radiofísica Hospitalaria”*)

At the end of these three years, if the assessment of the training is positive, the trainee applies for the certificate.



This certificate allows the holder to practice as a Medical Physicist in all areas of competence: radiotherapy, diagnostic radiology, nuclear medicine and radiation protection. **This certificate is considered equivalent to the Medical Physics Expert as defined in EU Directive 97/43 EURATOM**

## Professional situation of the MPE in Spain

- Pop. Spain  $\approx$  47 million inhabitants
- 517 MPE working in 119 hospitals (76 public and 43 private)
- $\approx$  300 MPE in RT (58%).

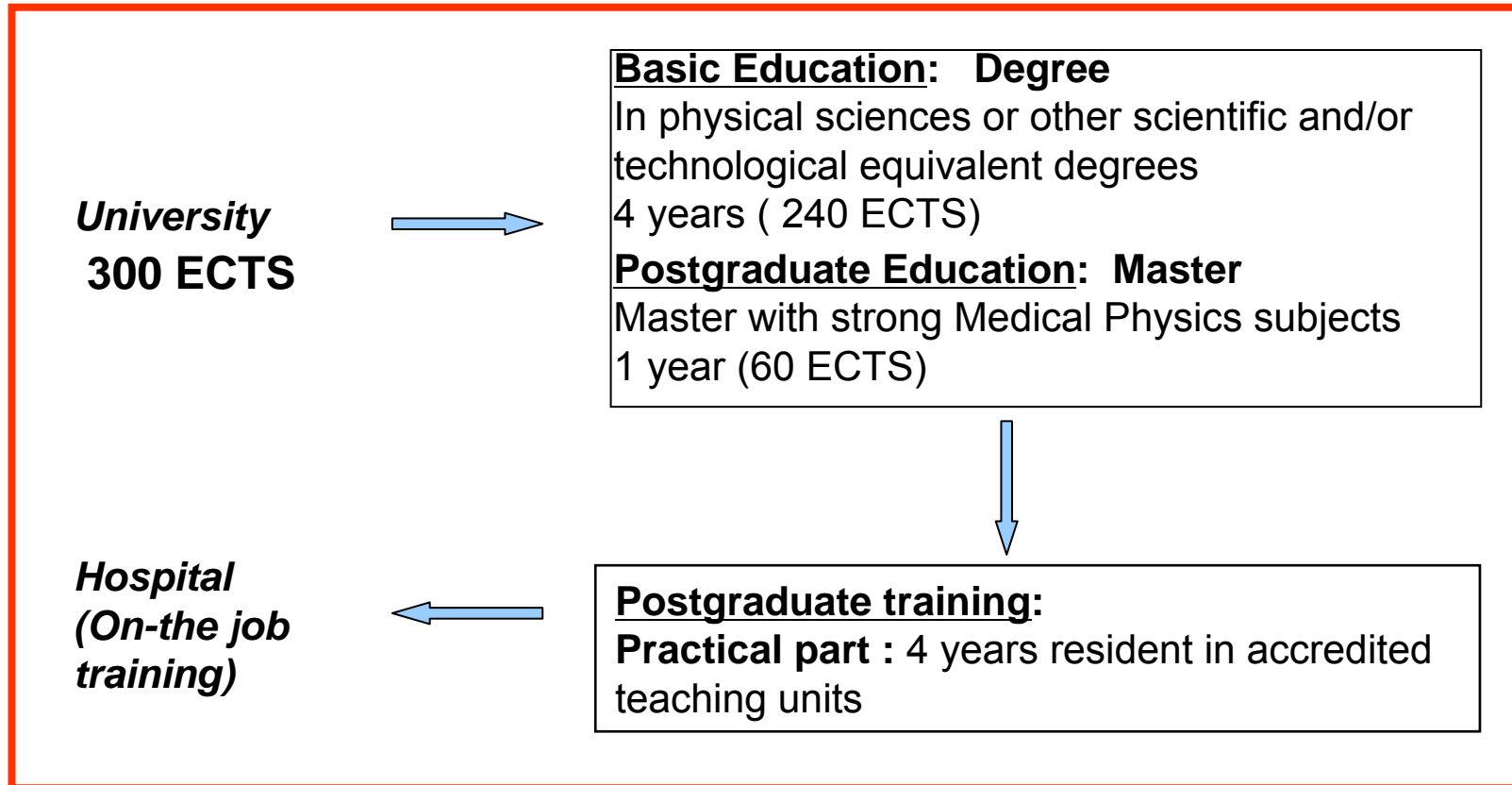
| <b>nr MPE</b>       | <b>0-1</b> | <b>2</b>  | <b>3</b>  | <b>4</b>  | <b>5</b>  | <b>6</b>  | <b>7</b> | <b>8</b> | <b>9</b> | <b>10</b> |
|---------------------|------------|-----------|-----------|-----------|-----------|-----------|----------|----------|----------|-----------|
| <b>nr hospitals</b> | <b>26</b>  | <b>18</b> | <b>10</b> | <b>21</b> | <b>14</b> | <b>10</b> | <b>9</b> | <b>6</b> | <b>2</b> | <b>3</b>  |

No single model of organisation:

- Some MPEs work in a Medical Physics Departments that covers all four areas (RT, DR, NM, RP)
- Some work in Medical Physics departments covering some of the disciplines
- Some work in Medical Departments: RT, NM



## CNRFH (Spain): Recommendations on Education and Training of Medical Physicists



The National Commission of *Radiofísica Hospitalaria* (CNRFH) is a consultative body depending on both the Spanish Ministry of Health and the Ministry of Education.

## Postgraduate training

Currently, the CNRFH and the Spanish Ministry of Health are working on extending postgraduate hospital training to 4 years in order to include new technologies and non-ionizing physical agents (MR, US, laser).

The new time distribution will be:

- Radiation Therapy: 2 years
- Medical Imaging (Radiology and Nuclear Medicine): 1.5 years
- Radiation Protection (patients, employees and the public): 0.5 year

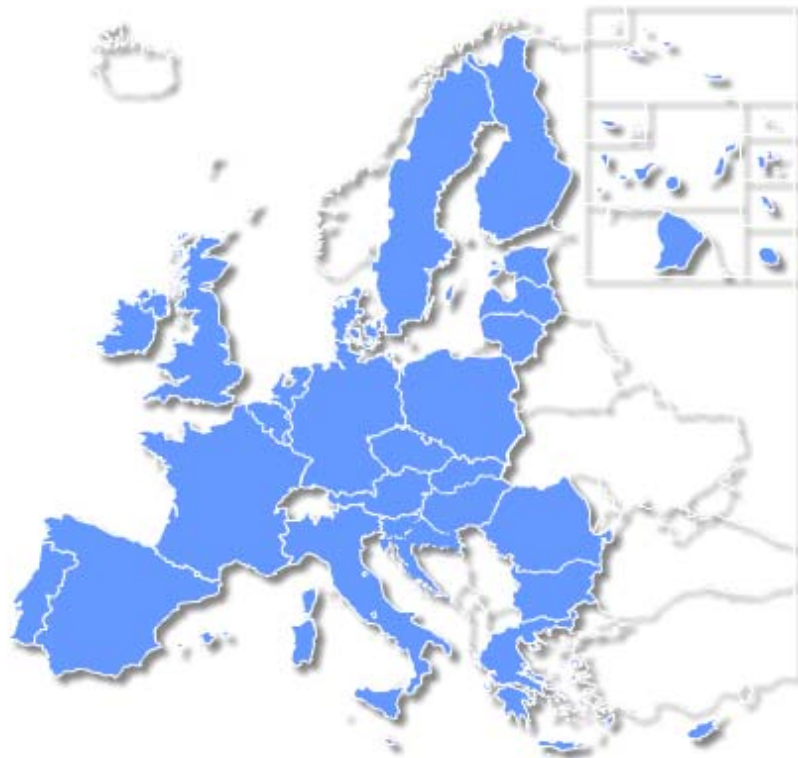
# European Union. Directive 2013/59/Euratom. 2013



**Official Journal of the European Union. L13, volume 57.**

17 January 2014

Council Directive 2013/59/Euratom of 5 December 2013 laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation, and repealing Directives 89/618/Euratom, 90/641/Euratom, 96/29/Euratom, 97/43/Euratom and 2003/122/Euratom .....



- To adapt European standards for radiation protection to basic recommendations of ICRP-103
- To achieve more harmonization between the European and the International Basic Safety Standards, cosponsored by EC/Euratom, FAO, IAEA, ILO, OECD/NEA, PAHO, UNEP and WHO.
- To strengthen European legislation on radiation protection by joining the five previous directives into one directive

# Medical Physics Expert (Directive 2013/59)

## *Chapter II. Definitions. Article 4*

- (49) “**medical physics expert**” means an individual or, if provided for in national legislation, a group of individuals, having the knowledge, training and experience to act or give advice on matters relating to radiation physics applied to medical exposure, whose competence in this respect is recognised by the competent authority.

## *Chapter IV. Requirements for radiation protection education, training, and information. Article 14.2*

- Member States shall ensure that arrangements are made for the establishment of education, training and retraining to allow the recognition of radiation protection experts and **medical physics experts**....

Authors' note: By 'group of individuals' is meant a group of Medical Physics Professionals with at least one who has reached the status of MPE in each specialised area of radiation physics applied to medical exposure e.g., Diagnostic and Interventional Radiology or Radiation Oncology or Nuclear Medicine or a sub-speciality of these e.g., Brachytherapy, Nuclear Medicine therapy, Interventional Imaging in Cardiology as owing to the rapid expansion in medical technology it is becoming increasingly difficult for any single individual to be able to act or give advice in all areas of radiation physics applied to medical exposure.

# Medical Physics Expert

(Directive 2013/59. Article 83)

- Takes responsibility for dosimetry, including physical measurements for evaluation of the dose delivered to the patient and other individuals subject to medical exposure.
- Optimization of the RP of patients and other individuals subject to medical exposure, including the application and use of diagnostic reference levels.
- The definition and performance of QA of the medical radiological equipment
- Acceptance testing of medical radiological equipment
- The preparation of technical specifications for medical radiological equipment and installation design
- The surveillance of the medical radiological installations
- The analysis of events involving, or potentially involving, accidental or unintended medical exposures
- The selection of equipment required to perform radiation protection measurements
- The training of practitioners and other staff in relevant aspects of radiation protection

# Medical Physics Expert

(Directive 2013/59. Articles 57 and 58)

| <b>Responsibilities/Procedures</b>  | <b>Directive 97/43*</b>                            | <b>Directive 2013/59</b>                           |
|-------------------------------------|--|--|
| <b>Radiotherapy</b>                 | <b>closely involved</b>                            | <b>closely involved</b>                            |
| <b>Nuclear Medicine</b>             | <b>available</b>                                   | <b>involved</b>                                    |
| <b>Diagnostic Radiology</b>         | <b>available</b>                                   | <b>involved</b>                                    |
| <b>Interventional Radiology</b>     |  | <b>involved</b>                                    |
| <b>Computed Tomography</b>          |  | <b>involved</b>                                    |
| <b>Other radiological practices</b> | <b>available, as appropriate, for consultation</b> | <b>available, as appropriate, for consultation</b> |

\* Council Directive 97/43/Euratom of 30 June 1997 on health protection of individuals against the dangers of ionising radiation in relation to medical exposure,

# Medical Physics in Europe



- Unfortunately, Medical Physics is not yet regulated in some European countries.
- Education and Training of Medical Physics in Europe is not harmonized.
- The total length (basic university + post-graduate training ) ranges from 2½ years to 9 years.
- EFOMP (European Federation for Medical Physics) has been promoting recommendations to harmonize this education and training.

*EFOMP, Policy Statement n° 12: The present status of Medical Physics Education and Training in Europe: New perspectives and EFOMP recommendations.*

T. Eudaldo, Chairperson of the Education, Training and Professional matters (ETP) Committee of EFOMP<sup>a</sup>, K. Olsen, Chairperson of the Standing Committee of Registration of EFOMP<sup>b</sup>

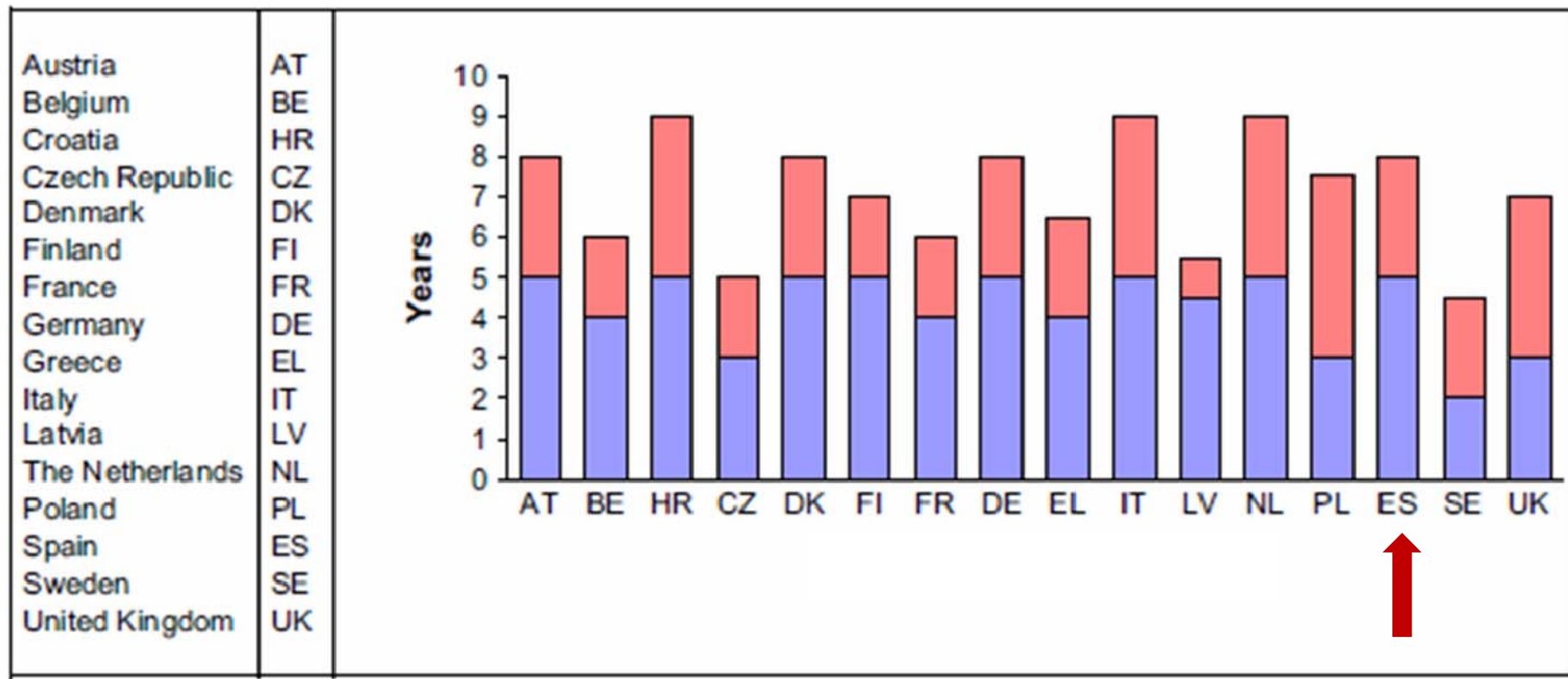
Physica Medica (2010) 26, 1-5



# Total Medical Physics Training

Education (Degree + Master)

Postgraduate (including clinical residency)



The present status of Medical Physics Education and Training in Europe: An EFOMP Survey  
 T.Eudaldo and K.Olsen. *Physica Medica* (2008) 24, 3-20.



# Recognition in Spain of Medical Physicists from other EU Member States

*Royal Decree 1837/2008 incorporates into Spanish law Directive 2005/36/EC of the European Parliament and the Council of 7 September 2005, and Directive 2006/100/EC of the Council of November 20, 2006, regarding the recognition of professional qualifications*

The qualification of Medical Physicist from other EU member states is not automatically recognized by the Spanish Government.

**1. Documentation necessary for recognition, to be presented to the Ministry of Health** (official translation into Spanish and certified copies)  
<http://www.msssi.gob.es/profesionales/formacion/docs/documentacionNecesaria3.pdf>

OK



**2. National Commission of Hospital Radiation Physics (consultative body of the Ministry of Health)**

To evaluate



- Ask for supplementary information
- Compensatory measures

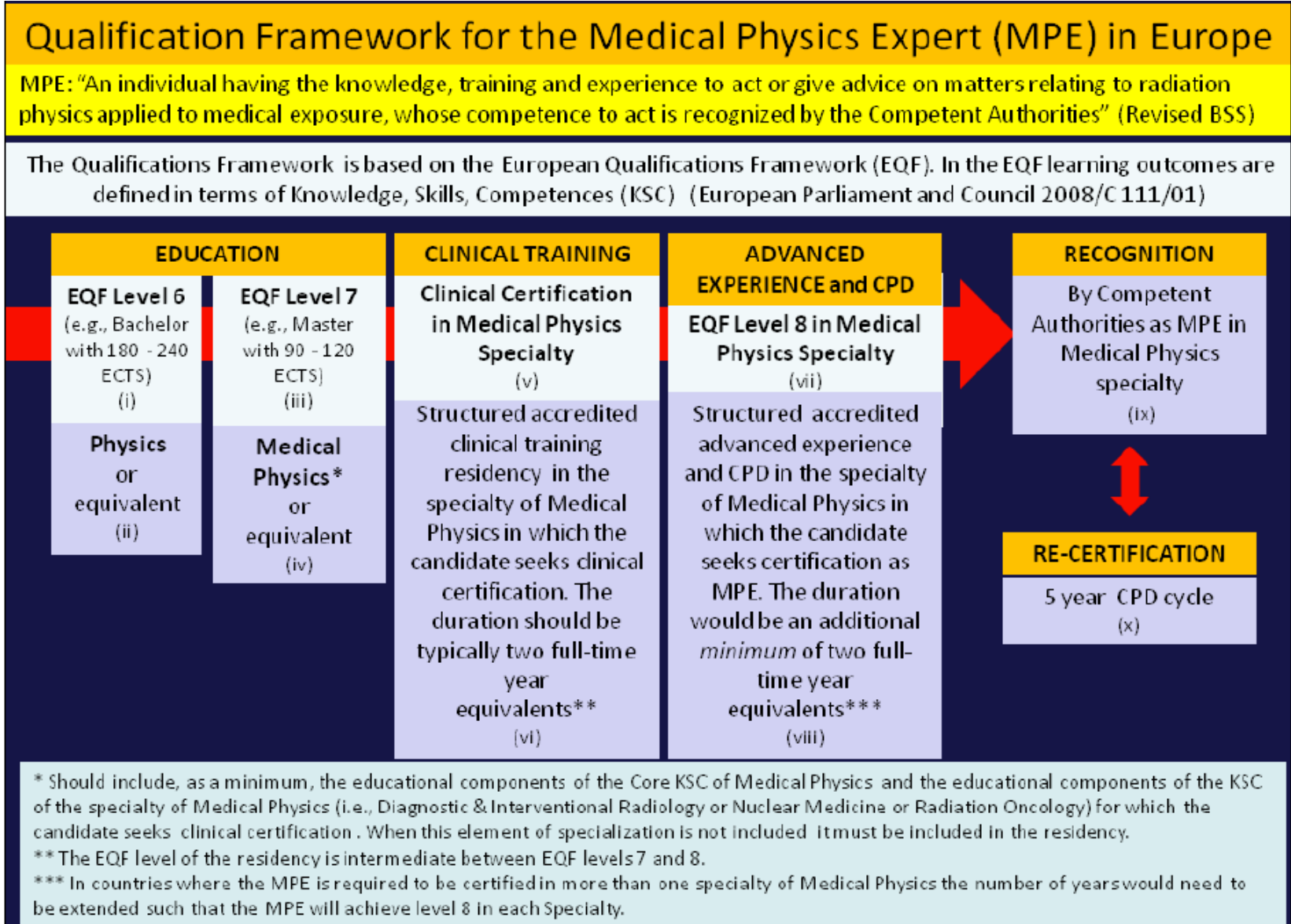
# European Guidelines on MPE. Radiation Protection n° 174. EC 2014

## Purpose and scope

- To improve implementation of the Medical Exposure Directive and revised BSS provisions related to the MPE.
- To harmonize the education and training of medical physicists to MPE level among the EU Member States aiming to improve cross-border mobility.
- To make recommendations for the most appropriate education and training structure, based on *the European Higher Education Area and on the European Qualifications Framework for Lifelong Learning (European Parliament and Council of the EU,2008)*.

*These European Guidelines on MPE have been developed by a team in which EFOMP played a key role and have been prepared in the context of the EC project “Guidelines on Medical Physics Expert”, financed by the EC (contract TREN/09/NUCL/SI2.549828)*

# European Guidelines on MPE. Radiation Protection n° 174. EC, 2014



# Conclusions

- In Spain the specialty of Medical Physics is regulated and recognized as a health profession.
- The European Directive 2013/59/Euratom increases the role of the medical physicist in the field of medical imaging.
- In Europe:
  - The Specialty of Medical Physics is not yet regulated in all European countries.
  - Education and Training of Medical Physics is not harmonized.
  - European Guidelines on MPE can help to harmonize the education and training of among the EU Member States.