The activities of EFOMP in education and training: past, present and future

S Christofides
EFOMP President, Medical Physics Department, Nicosia General Hospital, Nicosia, Cyprus
E-mail: cstelios@cytanet.com.cy

Abstract. One of the main aims of the European Federation of Organisations for Medical Physics is to propose guidelines for education, training and accreditation programmes. This is achieved through the publication of Policy Statements and the organisation of education and training courses, seminars and conferences. It represents a long-term work-programme aimed at harmonising the education and training of the Medical Physicist across Europe. This paper presents an overview of the past, present and future efforts of EFOMP to achieve this aim.

1. Introduction
The European Federation for Organisations of Medical Physics - EFOMP was set up in 1980 in London (www.efomp.org). Among its aims and objectives is the production of guidelines for education, training and accreditation programmes.

EFOMP's first Policy Statement [1] was on “Medical Physics Education and Training: The present European Level and Recommendations for its Future Development”, published in 1984. This policy statement is now obsolete and has been replaced by policy statement No. 12 [2].

An essential component of professionalism is Continuous Professional Development - CPD. EFOMP has been, and continues to be, very active in this area by publishing policy statements for CPD schemes and establishing National Accreditation systems for Medical Physicists.

The exchange of information is a very important component of CPD and for the education and training of any professional. Therefore the support, sponsorship and organisation of educational as well as scientific meetings is another essential component of the work that EFOMP is carrying out to advance the professionalism of the Medical Physicist in Europe.

Presently, EFOMP is an active partner in a number of European and International projects with the aim of producing guideline documents for the education and training of the Medical Physicists and other Healthcare Professionals using ionising radiation.

The purpose of this paper is to give an outline of the EFOMP policy statements its present activities and its future plans.

2. EFOMP Education and Training Activities
2.1. Policy Statements
In total, EFOMP has published 13 policy statements. All of them are related to the professional status, education, training, competence, roles and responsibilities of the Medical Physicist in Europe. A brief description of them is given below:
• Policy Statement 1: “Medical Physics Education and Training: The present European Level and Recommendations for its Future Development” [1].

This policy statement is now considered obsolete and has been replaced by Policy Statement No.12. It remains available on the EFOMP website for reference only.

• Policy Statement 2: “The Roles, Responsibilities and Status of the Clinical Medical Physicist” [3].

This policy statement was also published in 1984 and it concluded that the need for clinical medical physics service in each country depends primarily on the standard and scope of medical care. Generally speaking, it can be said that in the radiological field (X-ray diagnostics, radiotherapy, nuclear medicine and radiation protection), there is an obvious need for a clinical medical physics service. This has proven its development in those countries where the service has been well established. It is also obvious that the introduction of a medical physics service, in general, depends mostly on the appreciation by the medical profession of the ways in which physicists may assist in solving problems of medical diagnosis and treatment.

The number of physicists per million inhabitants in different European countries shows a wide variation. Figures can be used in comparisons between countries only if they have about the same standard of medical care. Countries striving to reach this standard should in their planning take into account the medical physics service required.

The number of physicists needed in diagnostic radiology, radiotherapy, nuclear medicine and radiation protection depends on the number of institutions and the number of facilities, such as radiotherapy units. As a rule, countries at an early stage of development of medical physics develop medical radiation physics first, this still being the largest single aspect of a medical physics service. EFOMP considers this strategy suitable and that it forms the foundation for the further development of other applications of physics to medical care. The number of clinical medical physicists and supporting staff must be adequate to meet the high standards of service required. In making such provision, health authorities are best guided by the recommendations of the national organizations that are affiliated to EFOMP.

• Policy Statement 3: “Radiation Protection of the Patient in Europe: The Training of the Medical Physicist as a Qualified Expert in Radiophysics” [4].

This policy statement was published in 1988 in response to Article 5 of the EEC Directive 84/466/Euratom of 3 September 1984 that state “A Qualified Expert in radiophysics shall be available to sophisticated departments of radiotherapy and nuclear medicine”. In this policy statement, the Qualified Expert in Radiophysics has been defined as “an experienced Medical Physicist working in a hospital, or in a recognised analogous institution, whose knowledge and training in radiation physics are required in services where the quality of the diagnostic image or the precision of treatment is important and the doses delivered to the patients undergoing these medical examinations or treatments must be strictly controlled”.

• Policy Statement 4: “Criteria for the Number of Physicists in a Medical Physics Department” [5].

This policy statement has been revised and has been replaced by Policy Statement number 7. It remains available on the EFOMP website for reference only.

• Policy Statement 5: “Departments of Medical Physics - Advantages, Organisation and Management” [6].

The recommendations of this policy statement are as follows:

- The role of Medical Physics Departments is to support the established broad range of applications of physics and engineering in medicine and to be actively involved in the development, implementation and exploitation of new medical technologies and procedures.

- A main objective of a Medical Physics Department must be to provide a competent and cost-effective medical physics service to all parts of the national health services that need it. This service includes: safety of patients and hospital staff, maintenance of medical equipment and scientific support.
Medical Physics services must be the responsibility of an integrated Department of Medical Physics providing an agreed core of work activities representative of the diverse character of the specialty.

These services must be organized or coordinated at the highest practicable level, which can be through a regional or sub-regional structure.

The Head of the Department must be a physical scientist in medical physics to whom all physical scientists employed on hospital physicists' grades and technical staff must be professionally and officially responsible.

The Head of the Department should be responsible for the departmental budget.

University Departments of Medical Physics have the further tasks of teaching, research and training in this field.

- **Policy Statement 6:** “Recommended guidelines of National Registration Schemes for Medical Physicists” [7].

When EFOMP was inaugurated in May 1980, its principal objective was to harmonise and promote the best practice of medical physics in Europe. In pursuing this objective, one of the long-term aims of EFOMP is to achieve uniformly high standards of training and performance of medical physicists in the countries of all member organisations. Furthermore EFOMP wishes to see some form of recognition when these standards are achieved.

This has three advantages. First, it demonstrates that patients are receiving the same level of medical physics support, no matter where they are being treated. Second, it greatly facilitates the movement of physicists from one country to another. Finally, EFOMP would be seen as the body competent to decide how the by then recently established qualification of European Physicist (Boswell, 1994) would be applied in the context of medical physics.

Within the European Community, the direct application of the Council Directive on "Mutual Recognition of Higher Education Diplomas" 89/48/EEC [8] has not proved a very successful mechanism for ensuring the freedom of movement and the maintenance of appropriate standards for medical physicists. A major reason for this is that the current level of legalised regulation of the profession in Europe is low. However, the European Commission is clearly sympathetic to self-regulation by the professions and in response to an enquiry from FEANI (Fédération Européenne d'Associations Nationales d'Ingénieurs) on the Eur Ing qualification received the reply "The Commission considers that the FEANI scheme is an excellent example of self-regulation by a profession at the European level".

In response to the above, EFOMP provides in this policy statement the necessary guidelines for it to take the lead in establishing a mechanism for the proper recognition of medical physics by means of approved National Registration Schemes.

- **Policy Statement 7:** “Criteria for the Staffing Levels in a Medical Physics Department” [9].

This policy statement is a revision of Policy Statement number 4 (EFOMP, 1991) and it contains more details as to how many Medical Physicists are required for a Medical Physics Department in relation to the equipment available in the hospital.

Policy statement 7 is now also considered obsolete due to the rapid advancement of the medical technology and it is currently being revised.

- **Policy Statement 8:** “Continuing Professional Development for the Medical Physicist” [10].

This policy statement was revised in 2000 and it is replaced by Policy Statement number 10.

- **Policy Statement 9:** “Radiation Protection of the Patient in Europe: The Training of the Medical Physics Expert in Radiation Physics or Radiation Technology” [11].

In order to reach harmonisation throughout Europe when implementing EC-Directive 97/43/Euratom [12] into national legislation, EFOMP recommends the following guidelines with respect to the definition and role of the Medical Physics Expert - MPE:

- At the minimum, the MPE must have been recognised as a qualified medical physicist and preferably also have further experience.
The Education and Training Scheme in Medical Physics aiming at the level of a MPE has to follow the EFOMP guidelines [3]. A system for a recognised Continuing Professional Development is recommended. According to the duties defined by the new Directive, the MPE has to be involved in radiological practices in all university and specialised hospitals using ionising radiation on patients i.e. radiotherapy, nuclear medicine and diagnostic radiology. Involvement of the MPE in radiological practices, as demanded in Article 6(3) of the Directive, is recommended by EFOMP in the following way:

**EC Directive:** In radiotherapy, the MPE shall be closely involved.  
**EFOMP:** Daily relationship between MPE and patient environment is mandatory. To be deeply involved in dosimetry, Quality Assurance and elaboration of techniques used in the radiotherapy department.

**EC Directive:** In nuclear medicine, the MPE shall be available.  
**EFOMP:** The MPE shall be able to make a meaningful intervention. Daily relationship between the MPE and the patient environment is most appropriate.

**EC Directive:** In diagnostic radiology, the MPE shall be involved as appropriate.  
**EFOMP:** Depending on the spectrum of techniques used, there must be access to medical physics service, for instance, local or regional networks could be established to provide practitioners and smaller hospitals with up to date medical physics service. When special practices are used, as defined in Article 9 of the Directive, a daily relationship of the MPE and the patient environment shall be standard.

- **Policy Statement 10:** “Recommended Guidelines on National Schemes for Continuing Professional Development of Medical Physicists” [13].  
  This is a revision of Policy Statement number 8 that further develops the recommendations for the establishment of CPD Schemes at the National Level.

- **Policy Statement 11:** “Guidelines on Professional Conduct and Procedures to be implemented in the Event of Alleged Misconduct” [14].  
  The role of the medical physicist in health care is diverse. In many areas, the medical physicist will take decisions and give advice that have a direct influence on the management of patients and in all of them medical physicists will interact with individuals from a wide range of professional groups. This policy statement gives guidelines on professional conduct that have been drawn up to enable the National Member Organisations of EFOMP to establish a code of practice that will ensure that medical physicists across Europe conduct themselves at all times in a manner that is appropriate to the profession.

- **Policy Statement 12:** “The present Status of Medical Physics Education and Training in Europe: New Perspectives and EFOMP Recommendations” [2].  
  It replaces Policy Statement number 1. The organisation of the Medical Physics Education and Training in many countries has changed since the publication of Policy Statement 1, and this more recent EFOMP policy statement have been issued to introduce new concepts and new recommendations that the current developments in the European Higher Education Area arising from “The Bologna Declaration”, and with a view to facilitate the free movement of professionals within Europe, according to the new Directive [15].  
  This policy statement provides an updated view of the present level of education and training of Medical Physics in Europe and makes recommendations in view of these new European challenges [16].

- **Policy Statement 13:** “Recommended Guidelines for the Development of Quality Management Systems for Medical Physics Departments” [17].  
  This policy statement outlines the way in which a Quality Management System can be developed for Medical Physics Departments that will be instrumental in eliminating or at least minimizing the contribution of the Medical Physicist to accidents or incidents involving patients. It also describes
what mechanisms need to be in place to ensure the effective and efficient use of new highly complicated and sophisticated technologies and procedures.

2.2. Education and Training Activities

- Support for Meetings, Congresses and Courses: The sponsorship of meetings and congresses is instrumental in disseminating and encouraging the adaptation of the policy statements. EFOMP organise, co-organise, support and recognise meetings, congresses and courses with its NMOs. Guidelines that explain the above terms and the requirements for interested NMOs to collaborate in such events can be found on EFOMP’s website (www.efomp.org). The purpose of these Guidelines is to help NMOs to obtain EFOMP sponsorship for their events by setting out the steps that they need to take and the conditions that must be fulfilled. The biggest event is the annual European Conference on Medical Physics. Note that there are detailed guidelines on the requirements for this event.

- Awards and bursaries: The encouragement of young scientists to pursue the profession of Medical Physics is of enormous importance to EFOMP. For this reason EFOMP gives awards to young scientist at the EFOMP Conference and provides bursaries to young scientist to attend the European School of Medical Physics – ESMP.

- European School of Medical Physics: This is an annual event in collaboration with the European Scientific Institute - ESI and takes place in Archamps, France. It consists of six weeks of intensive training in Medical Physics. One week is spend on covering each of Medical Imaging with Non-ionising Radiation, Medical Imaging with Ionising Radiation, Medical Computing, Physics of Modern Radiotherapy, Brachytherapy, and Radiation Protection.

- European Network of Medical Physics Training Schools: This is a new initiative that is currently under development. Moving a step further from just publishing policy statements, the EFOMP Officer’s have recently discussed with interested parties on the establishment of a process for coordinating across Europe Continuous Professional Development Courses for Medical Physicists. This would ensure that these are harmonised and offer the same level of education irrespective of the institution delivering them.

The above activities are mainly organised by the Education & Training (ET), the Professional Relations (PR) and the Scientific (SC) Committees of EFOMP.

2.3. Participation in European and International Projects

Presently, EFOMP is participating in the following projects that have within their objectives: the education, training, competence, roles and responsibilities of the Medical Physicist and other Health Professionals working with ionising radiation.

2.3.1. Guidelines on Medical Physics Expert

This is a European Commission project with the objective to provide improved implementation of the Medical Exposures Directive (MED) provisions related to the Medical Physics Expert (MPE) and to facilitate the harmonization of the MPE among Member States aiming at their cross-border mobility. Up to date information on this project can be obtain from the project’s web side at: http://portal.ucm.es/web/medical-physics-expert-project/inicio.

2.3.2. European Medical ALARA Network

This is also a European Commission project and its main objective is to establish a sustainable European Medical ALARA Network (EMAN) where different stakeholders within the medical sector will have the opportunity to discuss and to exchange information on various topics relating to the implementation of the ALARA principle in the medical field.

This network will also support the European Commission (EC) in its activities relating to the optimisation of radiation protection of individuals submitted to medical exposures. In addition, EMAN will also aim to:
• Disseminate up-to-date information about literature, studies, research and good practices relating to the ALARA principle in the medical sector,
• Identify and communicate to the EC needs for development and update of European Union (EU) guidance,
• In particular cover the areas of education and training as well as continuous quality improvement as requested in the Directive 97/43 EURATOM,
• Formulate proposals to the EC on harmonization issues,
• Propose to the EC solutions of identified issues at the European level,
• Establish co-operation with appropriate international organizations and associations.

Up to date information on this project can be obtained from the project’s web site at: http://www.eman-network.eu/.

2.3.3. Medical Radiation Protection Education and Training
The complete title of this project is “Study on the Implementation of the Medical Exposure Directive’s Requirements on Radiation Protection Training of Medical Professionals in the European Union”.

It is another EC project with the overall aim to provide an improved implementation of the Medical Exposure Directive provisions related to radiation protection education and training of medical professionals in the EU Member States.

The activities of the proposed project will focus on three main tasks:
• The conduction of an EU-wide study on radiation protection training of medical professionals in the EU Member States,
• The organisation of a European Workshop on radiation protection training of medical professionals in the EU Member States,
• The development of a European Guidance document on radiation protection training of medical professionals.

As a result of the European Guidance, the creation of a permanent multidisciplinary working party to draft and maintain European standard sets of competences at various levels for minimum radiation protection training and CPD required for all different groups of medical staff working with ionising radiation shall be envisaged.

Up to date information on this project can be obtained from the project’s web site at: http://www.medrapet.eu/.

2.3.4. IAEA Interregional Cooperation Project INT/6/054: “Strengthening Medical Physics in Radiation Medicine
The objective of this IAEA Interregional project is to promote the recognition of medical physics in radiation medicine and to harmonize educational material in order to ensure safe and effective diagnosis and treatment of patients.

More information about this project can be obtained from the projects Technical Officer, Dr. Ahmed Meghzifene (A.Meghzifene@iaea.org or Dosimetry@iaea.org).

4. Conclusions
The above brief discussion describes the activities of EFOMP in the area of Education, Training and Professional Development of the European Medical Physicist.

These activities can only materialise through the collaboration of all the Medical Physicists of EFOMP’s NMOs. The NMOs must actively adopt and implement the guidelines of the policy statements as well as participate in the various events organised by EFOMP in collaboration with its NMOs.

The contributions of all interested parties are more than welcome in order to further develop the harmonisation of the education, training and professional status of the Medical Physicist in Europe.
Acknowledgements
EFOMP acknowledges all those that have contributed to the development of its policy statements, all those involved in the organisation of educational and training events under its auspices, as well as those representing EFOMP in European and International projects.

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