AAPM Annual Meeting, San Antonio, July 13-18, 2019
How international actions interface and support Med Phys 3.0

European actions beyond the European Directive

Dr Virginia Tsapaki
EFOMP leadership module Chair
EUTEMPE Network Secretary
IOMP Secretary General

Konstantopoulio General Hospital
Eurosafe 5-star hospital
Athens, Greece
virginia@otenet.gr

Contents of lecture

- Current recommendations on education/training and professional development of the medical physicist in Europe
- How these are connected to the new European Basic Safety Standards and other relative European or national laws
- How these relate to the Med Phys 3.0 initiative
- Actions to develop Medical Physics profession throughout Europe beyond the European Radiation Protection Laws.

AAPM Newsletter — Volume 43 No. 4 — July | August 2018

- Medical Physics 3.0 is an initiative to push physics into new territories of scholarship and practice in medicine……
- This reality requires us first to be competent in what we are meant to do for medicine. Next, we must determine how we can make that sustainable from a workflow, technical resource, and financial standpoint. This is sustainable excellence, one of the key objectives of MP3.0.

Medical Physics 3.0, physics for every patient. *J Appl Clin Med Phys 2018; 19:6:4–5*

- ….. Is quality and safety for clinical practice any less important than those for clinical trials? Physicists have the ability and skill to make their contributions more consistently excellent everywhere. But to do so, we need a stronger peer expectation, an explicit regulatory mandate, better tools, and models of effective practice. We have an opportunity to improve upon these needs through MP3.0……

28 member countries of the EU

- The idea to make the European Union came after two big wars happened in Europe.
- The European Union made it easier for people to move freely from one country to another.
- They can live, study or work in any country of the European Union they want.
- For example, a person from France can choose to move to Italy and work there.
- Or a student from Belgium can go study in a university in Greece.

Bologna Declaration

- The Bologna Declaration marked the beginning of the Bologna Process. It is set up as a process such that there would be follow-up ministerial meetings every two years to assess the progress made and to determine further steps needed to be taken.
- proposed a European Higher Education Area in which students and graduates could move freely between countries, using prior qualifications in one country as acceptable entry requirements for further study in another.
- The Bologna Process is generally one of the most influential policy reforms in Europe with significant contributions to the formation of a more coherent higher education and research area in the continent.

Bologna Declaration, "The Bologna Declaration of 19 June 1999. Joint Declaration of the European Ministers of Education," 1999, http://media.ehea.info/file/Ministerial_conferences/02/8/1999_Bologna_Declaration_English_553028.pdf.

RECOMMENDATIONS EUROPEAN PARLIAMENT COUNCIL
RECOMMENDATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
on the establishment of the European Qualifications Framework for lifelong learning 2008

The European Qualifications Framework (EQF) acts as a translation device to make national qualifications more readable across Europe, promoting workers' and learners' mobility between countries and facilitating their lifelong learning. The EQF aims to relate different countries' national qualifications systems to a common European reference framework. Individuals and employers will be able to use the EQF to better understand and compare the qualifications levels of different countries and different education and training systems.

Level 8	Knowledge at the most advanced frontier of a field of work or study and at the interface between fields	the most advanced and specialised skills and techniques, including synthesis and evaluation, required to solve critical problems in research and/or innovation and to extend and redefine existing knowledge or professional practice	demonstrate substantial authority, innovation, autonomy, scholarly and professional integrity and sustained commitment to the development of new ideas or processes at the forefront of work	Doctorate, PhD, Professional Doctorate, (Italy) Dottorato di ricerca, RQF level 8.[2]

Current recommendations on education and training of the medical physicist in Europe

Key activities of the MPE according to the European Guidelines (2014)

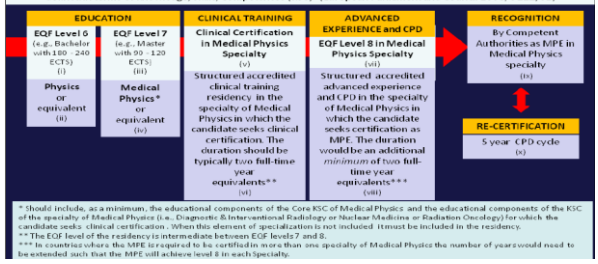
1. Scientific problem solving service.
2. Dosimetry measurements.
3. Patient safety / risk management.
4. Occupational and public safety / risk management.
5. Clinical medical device management.
6. Clinical involvement.
7. Development of service quality and cost-effectiveness.
8. Expert consultancy.
9. Education of healthcare professionals.
10. Health technology assessment (HTA).
11. Innovation.

https://publications.europa.eu/en/publication-detail/-/publication/b82ed768-4c50-4c9a-a789-98a3b0df5391/language-en

Qualification Framework for the Medical Physics Expert (MPE) in Europe

MPE: "An individual having the knowledge, training and experience to act or give advice on matters relating to radiation physics applied to medical exposure, whose competence to act is recognized by the Competent Authorities" (Revised BSS)

The Qualifications Framework is based on the European Qualifications Framework (EQF). In the EQF learning outcomes are defined in terms of Knowledge, Skills, Competences (KSC) (European Parliament and Council 2008/C 111/01)



* Should include, as a minimum, the educational components of the Core KSC of Medical Physics and the educational components of the KSC of the specialty of Medical Physics (i.e., Diagnostic & Interventional Radiology or Nuclear Medicine or Radiation Oncology) for which the candidate seeks clinical certification. When this element of specialization is not included it must be included in the residency.
** The EQF level of the residency is intermediate between EQF levels 7 and 8.
*** In countries where the MPE is required to be certified in more than one specialty of Medical Physics the number of years would need to be extended such that the MPE will achieve level 8 in each Specialty.

Some recommendations included in the European Guidelines on MPE (2014) (1)

- The Competent Authority designated for the recognition of the MPE, **should use the Qualifications Framework and KSC** of the MPE specified in the Guidelines, for the recognition of the MPE to Level 8 of the European Qualification Framework.
- To allow the mobility of the MPE between Member States, it is recommended **that the education and training of each MPE be recorded in a document** that can be used as proof of the recognised competence.
- Recommended **staffing factors** have been set for estimating the number of MPEs required for a given **medical physics service** involving the use of ionising radiations for radiotherapy, nuclear medicine and diagnostic and interventional radiology services. **The factors are both equipment and task/patient based.**

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How these are connected to the new European Basic Safety Standards and other relative European or national laws

European BSS: 59/2013

Directive Published in the Official Journal of the European Union

17 January 2014
73 pages, 109 articles

All Member States must have adopted the European Law into their respective laws

Medical exposure in special section:

Chapter VII articles 55-64 (pages 25-28)

1. Article 55: Justification
2. Article 56: Optimization
3. Article 57: Responsibilities
4. Article 58: Procedures
5. Article 59: Training and recognition
6. Article 60: Equipment
7. Article 61: Special practices
8. Article 62: Special protection during pregnancy and breastfeeding
9. Article 63: Accidental and unintended exposures
10. Article 64: Estimates of population doses

Medical Physics Expert

1997/43/Euratom (previous legislation).

Medical Physics Expert only in 2 articles:

- Art. 2 (definitions) and
- Art. 6 (procedures).

2013/59/Euratom.

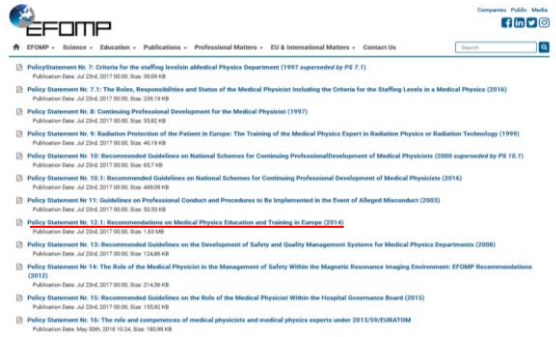
MPE in 9 articles:

- Art. 3 (definitions).
- Art. 14.2 (training).
- Art. 22.4.c.i (non medical imaging).
- Art. 57.b (responsibilities).
- Art. 58.d (procedures).
- Art. 59 (training and recognition).
- Art. 79.d (recognition of services and experts).
- Art. 82.3 (radiation protection expert).
- Art. 83 (medical physics expert).

Article 3: Meaning of Terms

- Medical physics expert means an individual having the knowledge, training and experience to act or give advice on matters relating to radiation physics applied to medical exposure, whose competence to act is recognised by the competent authorities;

Actions to develop Medical Physics profession throughout Europe beyond the European Radiation Protection Laws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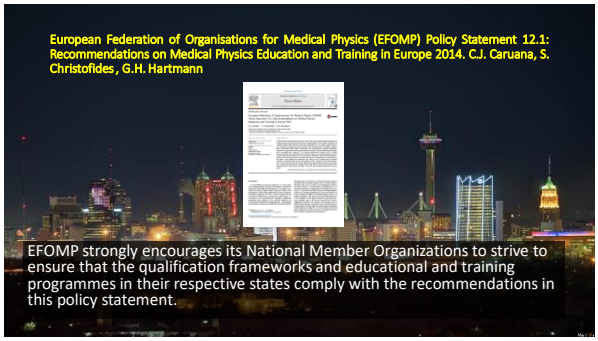
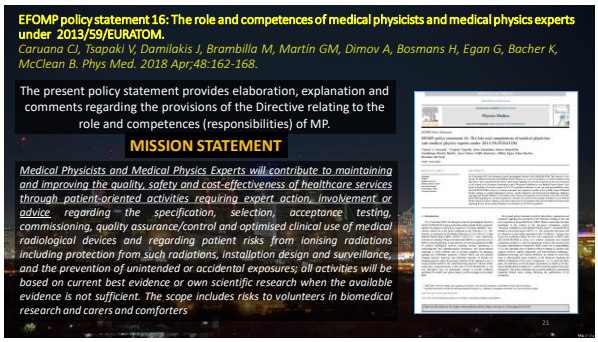
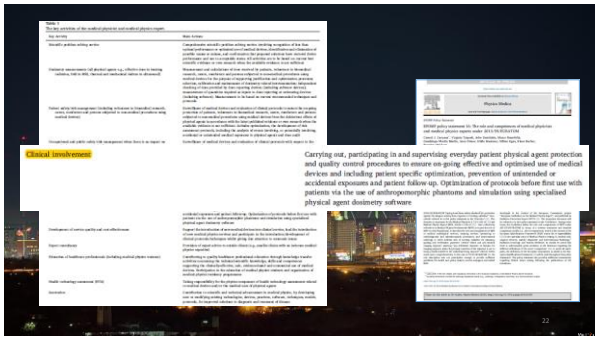
PolicyStatement Nr. 7: Criteria for the staffing levelsin aMedical Physics Department (1997 superseded by PS 7.1)
Publication Date: Jul 23rd, 2017 00:00, Size: 39.09 KB
Policy Statement Nr. 7.1: The Roles, Responsibilities and Status of the Medical Physicist Including the Criteria for the Staffing Levels in a Medical Physics (2016)
Publication Date: Jul 23rd, 2017 00:00, Size: 238.19 KB
Policy Statement Nr. 8: Continuing Professional Development for the Medical Physicist (1997)
Publication Date: Jul 23rd, 2017 00:00, Size: 35.82 KB
Policy Statement Nr. 9: Radiation Protection of the Patient in Europe: The Training of the Medical Physics Expert in Radiation Physics or Radiation Technology (1999)
Publication Date: Jul 23rd, 2017 00:00, Size: 46.19 KB
Policy Statement Nr. 10: Recommended Guidelines on National Schemes for Continuing ProfessionalDevelopment of Medical Physicists (2000 superseded by PS 10.1)
Publication Date: Jul 23rd, 2017 00:00, Size: 65.7 KB
Policy Statement Nr. 10.1: Recommended Guidelines on National Schemes for Continuing Professional Development of Medical Physicists (2016)
Publication Date: Jul 23rd, 2017 00:00, Size: 489.09 KB
Policy Statement Nr 11: Guidelines on Professional Conduct and Procedures to Be Implemented in the Event of Alleged Misconduct (2003)
Publication Date: Jul 23rd, 2017 00:00, Size: 53.53 KB
Policy Statement Nr. 12.1: Recommendations on Medical Physics Education and Training in Europe (2014)
Publication Date: Jul 23rd, 2017 00:00, Size: 1.03 MB
Policy Statement Nr. 13: Recommended Guidelines on the Development of Safety and Quality Management Systems for Medical Physics Departments (2008)
Publication Date: Jul 23rd, 2017 00:00, Size: 124.86 KB
Policy Statement Nr 14: The Role of the Medical Physicist in the Management of Safety Within the Magnetic Resonance Imaging Environment: EFOMP Recommendations (2012)
Publication Date: Jul 23rd, 2017 00:00, Size: 214.56 KB
Policy Statement Nr. 15: Recommended Guidelines on the Role of the Medical Physicist Within the Hospital Governance Board (2015)
Publication Date: Jul 23rd, 2017 00:00, Size: 155.92 KB
Policy Statement Nr. 16: The role and competences of medical physicists and medical physics experts under 2013/59/EURATOM
Publication Date: May 30th, 2018 10:24, Size: 180.98 KB


European Federation of Organisations for Medical Physics (EFOMP) Policy Statement 12.1: Recommendations on Medical Physics Education and Training in Europe 2014. C.J. Caruana, S. Christofides, G.H. Hartmann
EFOMP strongly encourages its National Member Organizations to strive to ensure that the qualification frameworks and educational and training programmes in their respective states comply with the recommendations in this policy statement.


EFOMP policy statement 16: The role and competences of medical physicists and medical physics experts under 2013/59/EURATOM.
Caruana CJ, Tsapaki V, Damilakis J, Brambilla M, Martín GM, Dimov A, Bosmans H, Egan G, Bacher K, McClean B. Phys Med. 2018 Apr;48:162-168.
The present policy statement provides elaboration, explanation and comments regarding the provisions of the Directive relating to the role and competences (responsibilities) of MP.
MISSION STATEMENT
Medical Physicists and Medical Physics Experts will contribute to maintaining and improving the quality, safety and cost-effectiveness of healthcare services through patient-oriented activities requiring expert action, involvement or advice regarding the specification, selection, acceptance testing, commissioning, quality assurance/control and optimised clinical use of medical radiological devices and regarding patient risks from ionising radiations including protection from such radiations, installation design and surveillance, and the prevention of unintended or accidental exposures; all activities will be based on current best evidence or own scientific research when the available evidence is not sufficient. The scope includes risks to volunteers in biomedical research and carers and comforters



EFOMP PS 14 for MRI Safety

- The Policy Statement can help eliminate or at least minimize accidents or incidents in the magnetic resonance environment and is recommended as a step towards harmonization of safety of workers, patients, and the general public regarding the use of magnetic resonance imaging systems in diagnostic and interventional procedures.

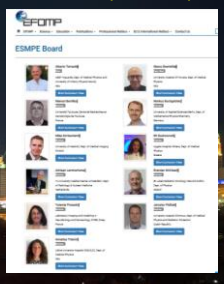
The EFOMP White Paper on Big data: "Big data and deep learning in medical imaging and in relation to medical physics profession"

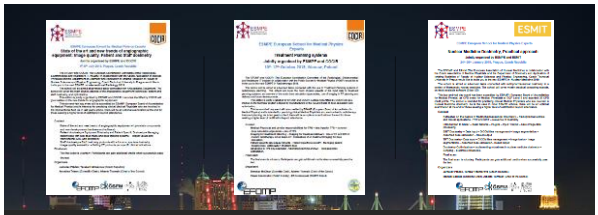
"….as medical physicists, we should pursue beyond the concept of technical quality to extend our methodology and competence towards measuring and optimising the diagnostic value in terms of how it is connected to care outcome…"

How can medical physicists start to prepare?

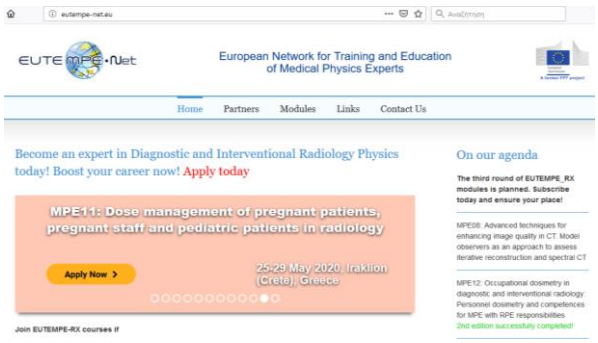
EFOMP European School for Medical Physics Expert

- ESMPE organizes medical physics education and training events specifically targeted by Medical Physicists who are already Medical Physics Experts or would like to achieve Medical Physics Expert (MPE) status.
- These events are open to all European Medical Physicists aiming Level 8 of the European Qualifications Framework.

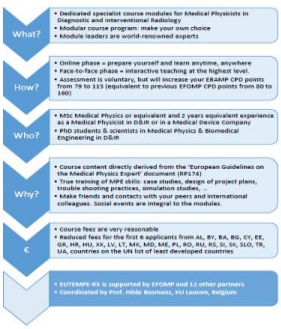


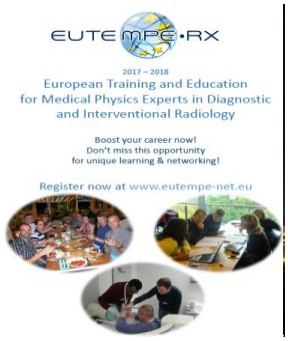


2019 editions of ESMPE




A succesful training and education program needs an optimal environment:
excellent teachers, teaching tools & quality monitored teaching
high end X-ray systems (for practical training)
hospital environment (esp. for colleagues in industry & authorities)
high end applications (ex. automated dose monitoring, ...)
think tanks of promising future applications (ex. virtual clinical trials)
prototype / preclinical systems (ex. phase contrast)
specific software platforms (ex. Monte Carlo tools)
experience with standards
Most EC member states don't have the capacity to offer courses in medical physics in radiology & interventional radiology up to EQF level 8
Sharing is most efficient -> common project


What?
Dedicated specialist course modules for Medical Physicists in Diagnostic and Interventional Radiology
Modular course program: make your own choice
Module leaders are world-renowned experts
How?
Online phase = prepare yourself and learn anytime, anywhere
Face-to-face phase = interactive teaching at the highest level.
Assessment is voluntary, but will increase your EBAMP CPD points from 79 to 115 (equivalent to previous EFOMP CPD points from 80 to 160)
Who?
MSc Medical Physics or equivalent and 2 years equivalent experience as a Medical Physicist in D&IR or in a Medical Device Company
PhD students & scientists in Medical Physics & Biomedical Engineering in D&IR
Why?
Course content directly derived from the 'European Guidelines on the Medical Physics Expert' document (RP174)
True training of MPE skills: case studies, design of project plans, trouble shooting practices, simulation studies, ...
Make friends and contacts with your peers and international colleagues. Social events are integral to the modules.
€
Course fees are very reasonable
Reduced fees for the first 6 applicants from AL, BY, BA, BG, CY, EE, GR, HR, HU, XK, LV, LT, MK, MD, ME, PL, RO, RU, RS, SI, SK, SLO, TR, UA, countries on the UN list of least developed countries
EUTEMPE-RX is supported by EFOMP and 12 other partners
Coordinated by Prof. Hilde Bosmans, KU Leuven, Belgium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Many countries eligible for reduced fees (check website)
Information & Registration
www.eutempe-net.eu
Course fees and dates may still be subject to change
Program 2019-2020
[MPE01] LEADERSHIP
[MPE03] MONTE CARLO SIMULATION
[MPE04] NEW DEVELOPMENTS
[MPE05] ANTHROPOMORPHIC PHANTOMS
[MPE06] NEW QA PROTOCOLS
[MPE07] OPTIMISATION
[MPE08] IMAGE QUALITY IN CT
[MPE09] BREAST X-RAY IMAGING
[MPE11] DOSE MANAGEMENT
[MPE12] OCCUPATIONAL DOSIMETRY
[MPE13] INTERVENTIONAL RX


Module 3. Monte Carlo Simulations


Module 11 on Pregnant and paediatric patients
2016
2018


APPLY FOR EUROPEAN GRANTS TO ATTEND THE SCHOOLS YOU WANT!
ENEN+ PROJECT
https://plus.enen.eu/grants/.
• In order to attend the all MP and MPE schools you can apply for the ENEN grants
• The ENEN project supports financially, through mobility grants, students and professionals wishing to carry out education or training activities in medical physics.
• These actions need to be completed before the end of the project (31st September 2020).

Actions to develop Medical Physics research across Europe

EURAMED
European Alliance for Medical Radiation Protection Research

The European Alliance for Medical Radiation Protection Research (EURAMED) represents a consortium of associations involved in the application of ionising radiation in medicine:

- **European Association of Nuclear Medicine (EANM)**
- **European Federation of Organisations for Medical Physics (EFOMP)**
- **European Federation of Radiographer Societies (EFRS)**
- **European Society of Radiology (ESR)**
- **European Society for Radiotherapy and Oncology (ESTRO)**

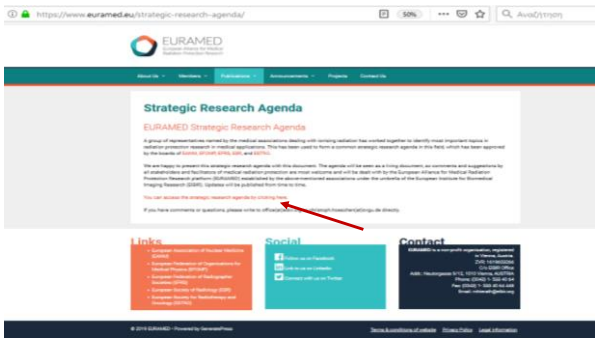
with the goal of jointly improving medical care and its radiation protection issues through sustainable research efforts.

VISION

Leading European research activities in medical radiation protection and harmonising clinical practice to advance the European radiation protection safety culture in medicine

MISSION

- Improving medical care through sustainable research efforts in medical radiation protection
- Identifying common research areas
- Serving as a platform for medical radiation protection research
- Developing an aligned approach and response to European research calls



Conclusions

..”skill”, “competent”, “excellence”, “regulatory mandate”……
All these words are found both in the Med Phys 3.0 initiative and European documents.

- The new European Law is a unique opportunity for medical physicists in Europe.
- It provides the tools to develop and expand our profession for the next 10 years or more
- It is NOW or NEVER for Europe

THANK YOU