The European Federation of Organisations for Medical Physics
Policy Statement Nr. 5

Departments of Medical Physics - Advantages, Organisation and Management

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I. INTRODUCTION

The objective of this document is to demonstrate the advantages of departments of Medical Physics and to provide guidance for the organisation and management of medical physics resources that will best meet the needs of the Health Service and will best be able to respond to continuing advances in technology.

The skill and inventiveness of physicists and engineers has led to the development of many of the techniques and instruments that form a vital part of modern medicine. Many examples can be cited, including the historical application of X-rays and radionuclides for therapy and diagnosis, measurement of body electrical activity, electromedical instrumentation, ultrasound, design and construction of rehabilitation devices, use of lasers particularly for therapy, and advanced computer-based imaging techniques such as X-ray computed tomography and magnetic resonance imaging.

In all these and other applications of physics in medicine, medical physicists co-operate with clinicians and other medical staff in a variety of ways to the benefit of the patient.

II. THE ADVANTAGES OF DEPARTMENTS OF MEDICAL PHYSICS

The Medical Physics service can only continue effectively to play its role in the care of the patient on the one hand and in the research and development of new medical technologies on the other, if it can draw on the specific skills and typical methods of work of the physicist for routine tasks, development projects, research, and teaching. It is the firm policy of EFOMP that this can only be realised in Departments of Medical Physics which have at the head an experienced medical physicist.

Advantages of an integrated Department of Medical Physics include: - links with many clinical specialities, a multidisciplinary approach to problems, cost-effective use of time and equipment, peer review of work, a broad training base and realistic career development prospects.

This policy statement elaborates on some of these advantages and considers the structure and organisation necessary to achieve them.

The close co-operation with medical departments should be emphasised. This may even have a formal character agreed upon in a written contract.

III. TASKS AND STRUCTURE OF DEPARTMENTS OF MEDICAL PHYSICS

Many techniques in medical therapy and diagnosis, even some routine tasks, require the collaboration of medical physicists, since not only technical but also physical parameters have to be controlled and optimised.'This

collaboration between medical and physics departments ensures the efficient and safe application of such techniques. These tasks can be handled successfully if Departments of Medical Physics exist with the following structure:

a. The professional and organisational responsibility for all aspects of medical physics is vested in an experienced physicist who has a thorough understanding of the field and of competing service requirements. Only a medical physicist, by training and experience, has the qualifications and expertise to decide how the department can best solve the problems referred to it by the various clinical departments.

b. The staff of a Medical Physics Department must support the widest possible range of services. A Medical Physics Department, particularly if it is integrated over several specialities of a hospital or several small clinics of a district, allows a given total number of staff to sustain a wider range of services during periods of staff absence, e.g. leave, sickness, training, resignation etc.

c. A properly structured Medical Physics Department promotes cost-effective use of equipment and staff (particularly by avoiding wasteful duplication) and permits medical problems to be solved by drawing on a number of separate areas of science.

d. An integrated Medical Physics Department comprising physical scientists, technicians and clerical/administrative staff, equipped with the appropriate resources (laboratories, workshops, office, library) provides good training facilities and a proper career development for both scientific and technical staff. With regard to professional quality and staff motivation this is indispensable.

e. In hospitals where a medical physics service is still in its early stages, the number of staff will be too small for a separate department and also the scope will be limited. Nevertheless, the long term aim should be the structure described in this Policy Statement.

IV. THE ORGANISATION OF MEDICAL PHYSICS

To optimise the benefits of an integrated Medical Physics Department, specific management arrangements are recommended. One important requirement, especially if the diversity of applications discussed in Appendix l is to be covered or the department is to be integrated over several clinics in one district, is that physics services must be organised or co-ordinated at the highest practicable level.

A medical physicist must be designated as Head of a financially and administratively independent Medical Physics Department. He or she should be the budget holder and must be responsible for allocating resources as appropriate to supply the service required.

The Departmental Head should have comparable standing with the Heads of Medical Departments with a seat on appropriate administrative committees. This will enable scientific input at all levels in the optimisation of the service to the patient in a cost-effective manner.

Every medical physicist should be employed as a member of a Department of Medical Physics but may be seconded to another department to perform specific and clearly defined tasks. Individual medical physicists should not be employed directly as members of a medical department and must in all cases be professionally responsible to the Head of Medical Physics.

Medical physicists are responsible for the work of medical physics technicians in the Department. Therefore, they should be involved in the management of and provision of training courses for medical physics technicians as well as within their own profession.

V. THE TASKS OF MEDICAL PHYSICS IN RESEARCH, TEACHING AND TRAINING

One of the tasks of Medical Physics Departments (especially those in universities and large hospitals) is to further the development of physical techniques and procedures in medicine. For this, the necessary resources must be provided.

Another is to help students approach medical physics at the level of a subsidiary subject within the framework of the academic curriculum and to organise in-service training for medical physicists.

In-service training for members of related professions (medical physics technicians, physicians, nurses etc.) must also be organised and provided.

EFOMP recommends (reference 2) that entrants to Medical Physics training should normally have, as a minimum requirement, the Bachelor's Degree (BSc) or its equivalent in Physics. Individuals with degrees in Mathematics, Engineering, Chemistry, Biology or Medical Sciences could be considered but would need preparatory training to ensure that their knowledge of Mathematics and Physics is up to the required standard.

Postgraduate education in Medical Physics then comprises three stages, i) one or more formal courses of lectures, seminars, practical and tutorial work, ii) on the job training, iii) professional work.

Each training scheme should allow the physical scientist in training to have maximum flexibility and choice of subject within the practicalities of the daily commitments of the department. In view of the diverse range of modern medical physics and clinical engineering, such training can only be provided in a properly co-ordinated Department of Medical Physics.

VI. CONCLUSIONS

1. 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.
2. 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.
3. 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.
4. These services must be organised or co-ordinated at the highest practicable level, which can be through a regional or subregional structure.
5. The Head of 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.
6. The Head of Department should be responsible for the departmental budget.
7. University Departments of Medical Physics have the further tasks of teaching, research and training in this field.

APPENDIX 1

The Expanding and Developing Role of Medical Physics in the National Health Services

The demand for medical physics services and the range of work in Medical Physics Departments in the national health services of the member countries has increased markedly in recent times. Although physicists began to be employed in medicine in the 1920s, initially in the field of radiotherapy, the most dramatic growth has occurred during the last thirty years as new technologies have been developed.

Physics is remarkable in the number of other disciplines it influences. Virtually every field of medicine depends to a greater or lesser extent on understanding the laws of physics in the diagnosis, care and treatment of the patient. It is increasingly important that physical scientists in Medical Physics Departments are actively involved in the clinically developing areas of their sciences and associated technologies in order to secure the maximum benefit for patients.

Techniques developed in one field can be transferred and utilised in other areas of medicine, using the very same physical phenomena or technology and sometimes even the same equipment. Recent examples include developments in nuclear medicine imaging, ultrasound imaging, digital radiography, X-ray computed tomography, magnetic resonance imaging, medical uses of lasers and rehabilitation engineering. In all of these fields physics and bioengineering contributions have crossed recognised boundaries of medical specialities.

The role of the medical physicist in various specialities is dealt with in more detail in other Policy Statements of the EFOMP and its various associated national Medical Physics Societies. The following EFOMP Policy Statements have already been published:

Ref. 1 The Roles, Responsibilities and Status of the Clinical Medical Physicist

Ref. 2 Medical Physics Education and Training: The Present European Level and Recommendations for its Future Development

Ref. 3 Radiation Protection of the Patient in Europe: The Training of the Medical Physicist as a Qualified Expert in Radiophysics

Ref. 4 Criteria for the Number of Physicists in a Medical Physics Department.

Departments of Medical Physics are involved in the initiation, development and application of new technology throughout health care, from research to service commitment in areas spanning the use and measurement of ionising and non-ionising radiation, data handling information technology, bioengineering, the fabrication of equipment, safety, and routine equipment management. Management structure within the department takes account of the needs and responsibilities of the individual sections and of responsibility to supra-structures to which they are related.

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