

**Report on a Visit to the University Medical Schools and
University Hospitals in Ioannina, Athens and Heraklion
12 – 17 June 2000**

Remit of Mission

To review the in-service training element of the Inter-University Post-Graduate Course on Medical and Radiation Physics offered by five university medical schools in Greece and to make recommendations for the future.

Acknowledgement and Thanks

I would like to thank all the staff I met in the medical schools and hospitals in the three centres visited for giving me their time so generously and answering so fully my questions.

In particular I would like to thank Professor Proukakis, Associate Professor Dimitriou, Associate Professor Kalef and Assistant Professor Damilakis for their kind hospitality.

Background

In 1984 the European Federation of Organisations for Medical Physics (EFOMP) produced a policy statement on the training of medical physicists.

It identified four main elements.

1. Recruitment of new graduates with a good degree in physics or closely related physical sciences.
2. An academic taught course to Masters Degree standard in the relevant subjects.
3. A significant period of in service training.
4. Examination and accreditation.

Since that time many national medical physics organisations have set up training programmes for medical physicists in accordance with the policy statement. Programmes differ fairly significantly in detail, as determined by national circumstances, and to improve harmonisation EFOMP has recently set up a system for accreditation of national registration schemes in which education and in-service training play an important part.

The inter-university post-graduate course on medical and radiation physics being offered by the five university medical schools in Greece has been set up to meet the academic and vocational aspects for training of medical physicists in an efficient and cost effective manner.

Review of the in service training of the course is timely in view of the recent European Directive 97/43/Euratom of 30 June 1997 on “Health Protection of Individuals against the Dangers of Ionising Radiation in relation to medical Exposure, and repealing Directive 84/466/Euratom.”

Article 6.3 of this Directive requires the involvement of Medical Physics Experts in various practices that use ionising radiations (radiotherapy, diagnostic and therapeutic nuclear medicine and diagnostic imaging with X-rays). Each member state must incorporate this requirement into legislation and will be responsible for ensuring that there are sufficient medical physics experts to meet the need. The MSc has been designed to cover the first two phases of the necessary training. A period of in-service experience and responsibility is then required so that the medical physics expert can both act and advise in appropriate circumstances as required by the Directive.

Organisation of the Review

Information gathering followed the same general format in all centres.

1. Discussion with the training co-ordinator of the overall training plan.
2. Discussion with the subject supervisors for the three areas of radiotherapy, nuclear medicine and radiological imaging.
3. Inspection of the facilities – both in the hospital and in the medical school.
4. Discussion with the current trainees (three in Ioannina, six in Athens and two in Heraklion)

It was also possible to visit the Greek Atomic Energy Commission to discuss the input their various departments are making (or can make in the future) to in-service training.

General Observations

There are many aspects of this programme on which I wish to comment favourably.

1. In each centre there is a training co-ordinator who is well aware of the purpose of the in service component of the MSc. The co-ordinator has frequent contact with the trainees, which is most important.
2. There was a general uniformity of standards with each centre being aware of the need to train in routine service elements of radiotherapy, nuclear medicine and diagnostic radiology. This uniformity is encouraged by the collaboration of the universities in ensuring that all trainees are recruited on the same criteria and all receive the same scientific base-line during the first year through common lectures.
3. Students were, without exception, positive and enthusiastic. They had been given a clearly defined programme of work and expressed themselves well satisfied with the level of supervision received. As part of the programme, all the trainees are brought together as a group to discuss progress and problems during the year.
4. Library facilities were good and relevant text books and bench manuals were available in the three centres visited. All centres have a programme of seminars in which the trainees participate actively.
5. I was particularly impressed by the input of the laboratories of the Greek Atomic Energy Commission. The National Calibration Laboratory provides students with an almost unique opportunity to carry out a traceability exercise on a piece of radiation measuring equipment. The Departments of Licensing and Inspections and of Personnel Dosimetry also provide very relevant practical experience for a medical physicist.

6. At the Greek Atomic Energy Commission I was also impressed by the high quality research work on identification of chromosomal and chromatid anomalies, either of malignant or radiation-induced origin, by Dr Pandelias and his team. All centres are aware of the need for trainees to engage in applied research and development that has the potential to improve service support.
7. I was very supportive of the attempts being made to give trainees a brief acquaintanceship with other applications of physics in medicine outside radiology.
8. Taken overall, the standard of work being carried out on this programme compares favourably with that in other countries in the European Union.

Specific Points

Subject Supervisors – The degree of supervision at this level is more uneven than at “Training co-ordinator” level. The problems are somewhat different in the three centres and are related to other issues such as staffing levels and interaction between “university staff” and “hospital staff”. In Ioannina, for example, owing to unfilled vacancies there is quite a shortage of physicists employed by the hospital and I felt there was not a “critical mass”. In both Ioannina and Athens there seem to be some physicists who have little involvement in, or knowledge of, the day-to-day services in the hospital.

Equipment – With one notable exception, the lack of a functioning gamma camera at Ioannina, basic radiological equipment is available in all three centres. It is important that the new gamma camera at Ioannina is installed and commissioned as soon as possible, otherwise the training of the current cohort of trainees who are based there will be seriously deficient.

Opportunities to gain experience in commissioning equipment and acceptance testing will vary from year to year. Trainees at Ioannina have been able to make checks on a range of diagnostic X-ray equipment this year. It is important that all trainees make base-line checks on at least one new piece of equipment.

It was disappointing to hear of situations where equipment was not being used for patient treatments because of shortage of staff to operate it.

Because of rapid advances in technology, virtually no teaching hospital anywhere in the World has all the latest facilities. However, wherever possible, opportunities should be provided for the students to obtain hands-on experience, even if this means going outside the public sector. For example, I understand that facilities for electron beam radiotherapy and brachytherapy are available in at least one private hospital. Adequate supervision by a trained medical physicist must of course be arranged.

Training records – Partly because of language problems, I was not able to inspect the students’ portfolios. However, it is well-known that students are reluctant to write up their work and I gained the impression that some subject supervisors had no well-defined system for checking that students were writing up their work experiences.

Outcome of training – Two specific points which arose from the discussions are worth making.

1 The role of the medical physicist is more prescriptive in some areas (e.g. radiotherapy) than in others (e.g. diagnostic radiology). As part of their training, students must learn to look for areas where there is no prescribed input on a daily basis but measurements the physicist can make (e.g. patient doses) or advice they can give is valuable to the service as a whole.

2 Trainees need to be given sufficient opportunities to participate in small development/applied research projects to perfect the above skills.

Implications of the new Patient Directive – There are many areas, especially in diagnostic radiology, where the new Directive will require greater involvement of physicists. Examples include patient dose measurements, estimation of risk, special procedures (paediatrics, computed tomography, interventional radiology) and research projects. The remit of training in some of these areas is limited at present.

Data processing and image analysis – I was impressed by the work being done in the training centres, especially in Heraklion, to introduce students to the concepts and ideas of the digital radiology department of the future – networking, image formation and analysis, retention of information and understanding new technology. Whereas radiation protection aspects, for patients and staff, are an important part of the work of the medical physics expert, the physicist's input to better diagnosis and therapy will come from understanding and implementing these newer technologies.

Student funding – This is a long training course (two and a half years minimum, often extending to three years because of the project). It is important to ensure that students who would make excellent medical physicists are not prevented from taking the course because of inadequate finances (perhaps little support available from the family). This is especially true during the in-service training year when students are expected to spend long hours in the hospital and there is little opportunity to take a part-time job.

Other facilities for students – In Ioannina and Heraklion trainees had an excellent quiet working area and very good access to computing facilities. Accommodation was considerably more cramped in Athens.

Recommendations

1. The overall structure of the MSc course that has been set up should be maintained
2. Since supervision of the in-service training component is very labour intensive, all trained medical physicists, whether employed by a university or a hospital, should be encouraged to contribute to some aspect of routine patient service work and to participate in the training scheme as a supervisor.
3. Involvement of the Greek Atomic Energy Commission in the second year of training should be enhanced, and all students should have the opportunity to use the Commission's facilities in Athens.
4. Adequate funding should be provided a) to ensure that modest bursaries are available for students in need, b) to meet travel costs in ensuring that all students have hands-on experience with facilities/techniques which are not available in their own training centre.

5. Use of facilities in the private sector, under appropriate supervision, should be explored, both to give practical experience in some specialised techniques and as a source of project work.
6. Supervisors should be encouraged to formalise and standardise arrangements for trainees to prepare log books/portfolios/diaries recording their work. The use of case studies should be encouraged in some circumstances.
7. In conjunction with the National Medical Physics Association, the possibility of arranging a peer-reviewed meeting at which trainees presented their project work should be explored.
8. Co-ordinators and supervisors should review the likely expanded role of the physicist in diagnostic radiology, especially in patient dose measurement and newer interventional techniques, and revise the training accordingly.
9. Co-ordinators and supervisors should ensure that trainees are aware of the latest technology, especially where this is linked to newer forms of radiotherapy or digitisation of radiological images.
10. Training co-ordinators should continue to give trainees an opportunity to have brief acquaintanceship with medical applications of physics outside radiology.

Conclusions

- The Inter-University Postgraduate Course on Medical and Radiation Physics has made good progress during the short period since its inception.
- The framework of the course is consistent with the recommendations of the European Federation of Organisations for Medical Physics and the standards appear to be comparable with those in other countries in the European Union where such structured training exists.
- Introduction of National Legislation to comply with the 1997 Directive of the European Union on the safe use of ionising radiations in medicine will result in a greater need for medical physics experts.
- The realistic approach to ensuring that such experts exist is through a National training programme
- The course should receive adequate funding so that all trainees can be selected on the basis of academic ability and motivation with minimal risk of non-completion.
- The rather limited number of medical physics experts currently in post will have to be well co-ordinated and used to maximum effect to ensure that trainees receive adequate supervision during in-service training, which is very labour intensive.
- A number of detailed recommendations are made with a view to further improvement in the quality of the course.

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July 2000