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IAEA Projects on Training Medical Physicists in Asian Countries

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There is common agreement that there is a shortage of medical physicists worldwide. This concern is probably felt most in the developing world as there are fewer educational and training opportunities and more transfer of skilled professionals to more advanced countries. The solution to this problem is surely more education and training opportunities and better recognition of professionals in their country of origin to retain skills locally. However before we can achieve these educational and professional goals it is necessary to define what is required of a clinically competent medical physicist.

Clinically competent medical physicists work in radiotherapy in the delivery of radiation to cancer patients, diagnostic radiology and nuclear medicine. While much of the emphasis is directed towards cancer treatment, it is instructive to realize that 50% of physicists in the USA are involved in image sciences and that world research output is perhaps greater now in the medical image sciences that it is for therapy.

Hospital based physicists need to be competent in a diverse range of technical skills and importantly to see an integrated picture of the whole medical physics enterprise, in order to operate safely and efficiently. Experience in the UK and in the USA have shown that the entry level for medical physics is at postgraduate level, building on a physics degree and to follow this with clinical training in a structured programme. The recognition of medical physics standards is a common problem in almost all countries, however accreditation processes, either national or regional and ideally through professional organisations, are seen as vital in the education process.

From a world wide perspective the above ideal is far from being accomplished. A compilation of IAEA data for those countries with academic, clinical and accreditation processes shows that most African countries have no programme at all, while large areas of Asia, Europe and Latin America do not have clinical or accreditation programs. The IAEA monitors radiotherapy centre dose delivery through a postal TLD audit system and a data base (DIRAC) and also conducts clinical audits (called QUATRO missions). From these two

activities it is clear that many centres are struggling to achieve good services due to a range of reasons including; staff shortages, inadequately trained staff, equipment problems and huge workloads.

The IAEA seeks to address these problems in a number of ways. Firstly the work of academic institutions is being supported; by the strengthening of on-going national MSc programs in Medical Physics, help in establishing new programs, development of syllabus material, and in the training of University staff through fellowship placements and the provision of laboratory equipment. In the Asian region a good example of this is the development of the graduate school in medical physics of the University of Santo Tomas (UST), Manila, with Agency assistance provided under Project PHI/6/010 and completed in 1989. Other similar projects have been held in Thailand, are ongoing in Pakistan and planned for Indonesia. Recently a Handbook in Radiation Oncology Physics has been published, and is intended as guide for radiotherapy study. This is being followed by similar activities in Diagnostic Radiology and Nuclear Medicine Physics.

Perhaps the most difficult area of medical physics education is the area of clinical training. In order for this to be effective it must be planned and be effective over an extended time period with the recommended time of at least two years largely adopted. The intensity of training necessary is similar to that required for medical specialists and cannot be achieved through a number of short courses. Many places feel they cannot afford the time and investment in the clinical training of physicists. However a simple analysis shows that within a short period of time the medical physicist in training is contributing more to the clinical environment that he is costing in terms of the effort of training. Once this is realized what is then required is a well designed course of clinical instruction.

The IAEA currently has projects running in Asia, Africa and Latin America that include clinical training. The Asian project, however is the most advanced in terms of defining the requirements of clinical education and in developing a training package that is assessable to the physicist in training and also for the supervisor. The key to this modular approach is in the competency based assessment that allows the participant to determine his or her skill level at regular intervals and to then plan their program to either increase their range of skills or to improve their competence in these skills. Competencies, associated with the key skills in a clinical module, are graded on a five point scale from at the low end – level 5 for example, "Demonstrates a limited understanding of the principles and processes of brachytherapy. Has not performed a QA program", up to "Demonstrates a good understanding of the principles and processes and is able to perform a QA program unsupervised to acceptable clinical standard" at the high end – level 1. Competencies are graded by internal supervisors with the help of external supervisors who then assure uniformity of the level achieved between clinical centres and assist with instruction as required. Once a physicist under

training completes the program he or she would undergo an accreditation assessment in order to be considered clinically competent.
The current project design recognises the role of the professional societies. These societies would be invited to assist with support through assessment, supervision and the mentoring of the physicist in training. The vital task of developing mechanisms of accreditation is also in the domain of the professional society.
The area of ongoing education and training and support of existing medical physicists has traditionally been a significant part of IAEA activity. Targeted training workshops are an efficient way to transfer highly technical knowledge to physicist in a region. Another role that could be considered is a joint approach with regional professional bodies in the fostering of clinical and scientific meetings, to encourage excellence in clinical practice and to transfer skills and maintain communication between professionals.

The IAEA has a long history of successful involvement in Asia. A regional cooperation agreement (RCA) is in place that assists in providing IAEA support on a regional basis which complements IAEA support to individual countries. There is an RCA web site that could be utilized for communication of ongoing activities and may be useful in administering educational and training programs across the Asian region. However the IAEA needs partners to be effective in any program or region and the role of professional bodies, both national and regional is seen as pivotal for this to occur.