

A Distance-Assisted Training Program for Nuclear Medicine Technologists

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We have developed training materials for nuclear medicine technologists to be used in distance-assisted training programs. We have completed our first pilot project in Asia and report that there will be nearly 500 students around the world, in Asia, Africa, Central America and South America, using our materials during the coming year.

Key Words: distance-assisted training; nuclear medicine technology training; allied health education

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Many countries have made a significant investment in nuclear medicine technology with the acquisition of modern equipment and the establishment of facilities. However, the lack of appropriate training for nuclear medicine technologists is a major constraint to the effective use of this technology. Surveys conducted in Asia identify that there are few formal training courses for nuclear medicine technologists, although many people working in the field have training in related specialties, such as radiography or medical technology.

In 1992 the Australian government, under its AusAID program, agreed to fund a project to train nuclear medicine technologists using distance learning. This project commenced in 1994 and is directed by the International Atomic Energy Agency (IAEA), Vienna, Austria, through the Regional Cooperative Agreement (RCA), to which most Asian governments are signatories. The project implementation is coordinated through Westmead Hospital, Sydney, Australia. During the project a group of practicing technologists and scientists developed a set of educational materials, which provides practical fundamentals of nuclear medicine. The materials were used to train a small group of students as a pilot project in 4 Asian countries. The materials are well-suited to in-service training and they are a valuable resource for teachers in formal coursework.

The aims of this versatile program include:

- Providing training, in countries where none exists, by supplying learning modules from Australia;
- Complementing existing training courses by providing materials for teaching staff;
- Encouraging the further development of training courses by providing materials to stimulate progress;
- Encouraging in-country distance training, particularly in countries where student access to courses is limited by geography;
- Establishing a regional standard for basic training, with appropriate recognition for students who complete basic training; and
- Promoting quality improvement in the practice of nuclear medicine.

COURSE DESIGN

An advisory committee was formed to provide ongoing advice on the project with representatives from the 14 Asian countries that are signatories to the RCA. At the initial meeting of the committee, a course syllabus was established and plans for implementation were developed. For the purpose of the pilot project, it was agreed that students in Malaysia, Sri Lanka and Indonesia should be involved as no formal courses existed in these countries and translation of materials from English into another language was considered unnecessary. India also agreed to test the material with the goal of possible development of an in-country distance-education program.

The initial materials guide the student through a basic overview of scientific subjects, which then are applied in the development of protocols for common nuclear medicine procedures. The course of study (Phase 1) was designed to occupy 224 h, normally requiring about 4–5 h study per week over 16 mo. This was considered realistic for students in the workplace, although delivery easily could be accelerated for full-time students. The material was designed specifically to assist individuals in developing basic practical skills that enable them to perform high-quality nuclear medicine studies. The course attempts to focus on factors that are important from a practical

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perspective rather than, as in many academic courses, offering a broad coverage of information. It is hoped that this focus highlights the relevance of underlying theory so that students can understand the importance of what is presented and can better identify problems which may occur in their daily work.

Central to the project is the objective to provide countries with the teaching resources, for developing nuclear medicine technologist education, which are appropriate to the background of the students and the geographical distribution of nuclear medicine practices. The goal is to provide a framework for delivery of training courses that can be adapted to best suit local need. The project is referred to as a "distance-assisted" training (DAT) program, which encourages adoption of a distance-learning approach that can be conducted in the participating countries. This is in contrast with conventional distance education where a continuing program of education is provided by an institution remote from the countries concerned. The particular advantage of the project is that it seeks involvement of the local nuclear medicine community and encourages indigenous development of training courses.

IMPLEMENTING THE PILOT PROJECT

In each of the 4 countries selected for the pilot project, several students were nominated to participate. These students had already worked in nuclear medicine but had no previous formal training in nuclear medicine. A key factor in selecting students was that they each have a supervisor available to provide ongoing support in the workplace. The study materials, together with progress questionnaires and assignments, were sent to each student on a regular basis.

To assess progress, a midcourse workshop was held for the students and supervisors in each country, conducted by Australian physicists and senior technologists. Feedback from the workshops indicated that students were responding well to the training program. In particular students showed a questioning attitude in their daily work and were much more attentive to radiation safety and quality control. There also was evidence that department protocols had been changed, illustrating the value of the materials in providing practical advice at a departmental level rather than just for the individual. The workshops also highlighted limitations where students had a poor understanding of English or received insufficient support and motivation.

STUDENT ASSESSMENT

An important aspect of the project has been the development of appropriate assessment methods, which test not only completion but also the level of understanding and practical skills achieved. These essential components are included in the final certificate of achievement issued by the IAEA. Successful completion was based on the return of regular assignments and maintenance of a workbook in which the student recorded ongoing practical work. In the final assessment, practical capabilities and general understanding were examined by 2 senior Australian technologists, who visited students in their own departments. The assessors observed hot-lab practice,

safety precautions, patient positioning and imaging procedures during the 2-day visit. Each student completed a written assignment, including multiple-choice questions and calculations, and had to demonstrate their general understanding of all procedures. The visit also provided an opportunity for discussing areas where the students demonstrated difficulties.

An interregional panel of experts is currently reviewing the criteria for final assessment of students. It is planned that both national and international committees be involved in the ongoing assessment process.

RECOGNIZING THE COURSE

The training material has been designed specifically to introduce basic nuclear medicine concepts, building on essential knowledge and practical skills required by a practicing nuclear medicine technologist. The course provides vocational training as opposed to a broad education as would be achieved through a university-based course. It is important, however, that individual countries establish dialogue with relevant authorities to recognize the relevance of the training course and, where possible, integrate the content into local courses. Several Australian universities are currently assessing the value of the training material in its present form with the view to offering suitable bridging courses. The University of Sydney already has offered an option for students to undertake an independent examination based on the DAT course syllabus with successful students being awarded a faculty diploma and the opportunity to participate in a degree program through the university distance education program. Universities in other countries are being encouraged to adopt the same principles for nuclear medicine technologist training with extension of the DAT material to meet college requirements. It is hoped that the course may be considered a relevant component in establishing regional standards for technologist training.

PROJECT EXTENSION

The Australian government has funded an extension to the original 3-y project, which will include additional subjects such as SPECT, tumor and infection imaging, behavioral science and literature review (Phase 2). It is the course developers' intention to further complement the materials with the introduction of additional teaching resources, including audiovisual and interactive media. The additional subjects will result in a full course of approximately 450 h.

The use of the material has not been limited to those countries with students formally involved in the pilot scheme. Several other Asian countries have used the materials either in short courses or as part of their own course development. For example, in Pakistan new courses for nuclear medicine technologists have been developed at Lahore and Karachi. Both courses included material from the DAT project with the syllabus extended beyond that currently offered. It is anticipated that these centers in Pakistan may further use the training materials so that students, remote from the main cities, may benefit. Approximately 100 students will undertake the English version of the complete course in Asia commencing in October 1999.

The Chinese Society of Nuclear Medicine has taken the initiative to translate the complete set of materials into Chinese and this has been used as a reference text for short courses conducted in Shanghai and central China, as well as a 1-y course for about 100 technologists in southern China. After further refinements to the translated materials, courses will be conducted in 6 regions of China to include about 200 technologists over a 2-y period. In addition the materials are being translated into Korean and will be used for in-service training of about 50 students, commencing early 2000.

There also is considerable interest in the project outside Asia. A pilot project is being organized in Africa by the IAEA (African Regional Cooperative Agreement for research development and training related to nuclear science and technology, or AFRA, section), coordinated from Peninsula Technikon, Capetown, South Africa commencing in mid-1999. As French and Arabic are spoken in several North African countries, it is foreseen that translation may be required at a later stage of this project. A more recent initiative is that the materials are being translated into Spanish for use in Central and South America. This project, which is supported by the IAEA (Regional Cooperative Arrangements for the Promotion of Nuclear Science and Technology in Latin America, or ARCAL, section), has attracted interest from the combined societies of nuclear medicine in the Latin American region and is being coordinated from the University Hospital, Montevideo, Uruguay. Several other institutions have received copies of the material for evaluation including centers in the United Kingdom and Saudi Arabia where formalized in-service training is being considered. Most groups are very enthusiastic regarding the style and ease of understanding of the materials and the relevance of coverage to clinical practice.

SUMMARY

The DAT project has had a very positive effect on accelerating the development of nuclear medicine technologist training throughout Asia, with the material already being used to complement formal courses in several countries. The material is directed at an appropriate level with a mechanism of delivery that is flexible and well-suited to local needs. The project provides a basis for standardizing at least the basic training in nuclear medicine technology throughout the region and, perhaps, even globally.

A large number of technologists could benefit from the training program, particularly those already working in nuclear medicine who have difficulty in returning to full-time study. In the long term there are significant cost savings compared to the alternative of providing large numbers of fellowships and short courses for these individuals. By the end of 2000 the complete materials will be translated into Chinese, Korean and Spanish and will involve approximately 500 students on 3 continents. The project continues to attract wide international interest.

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