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# The Evolution of Training in Nuclear Medicine in the UK

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Andrew Hilson

Training in Nuclear Medicine in the UK has evolved over the years. This memoir is a personal view, based on a (fallible) memory and documents kept over the years.

It was in the late 1960s that physicians became involved in the developing speciality, which had been predominantly a development of the strong Medical Physics community. A key driver was the creation of the Institute of Nuclear Medicine at the Middlesex Hospital. A particular leader was Professor Edward Williams.

There was much discussion before the MSc was set up as an Intercollegiate Exam of London University. Several Nuclear Medicine physicians felt that the a degree was too rigid, and that there should be a diploma of the Royal College of Physicians (RCP) Other specialties had Diplomas – there was the DOBs in Obstetrics, the DA in anaesthetics, the DMRD in radiology, and the DTMH in tropical medicine amongst many. However the Colleges were trying to get rid of Diplomas, so the MSc it was.

In 1971, there was a joint meeting of the British Institute of Radiology, the British Nuclear Medicine Society, the Faculty of Radiologists, the Hospital Physicists' Association and the Section of Radiology of The Royal Society of Medicine, held at The Royal College of Surgeons, Lincoln's Inn Fields, on Friday, May 21, 1971 [1]. The Chairman was Dr. James Bull (Senior Radiologist at the National Hospital for Nervous Diseases). The title was "Whither Nuclear Medicine?" This looked at the provision of Nuclear Medicine services in the light of the Windeyer Report (Report of the Working Party on the Organization of Radioisotope Services, 1970) set up in 1966. Edward Williams gave a paper on "The training programme of future medical Consultants and staff of nuclear medicine departments" in which he proposed that the UK should follow Australia and consider Nuclear Medicine as a specialty which belonged in internal medicine, rather than radiology.

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Desmond Croft from St Thomas's Hospital was the RCP representative on the UEMS, and thanks to him Nuclear Medicine was recognised as a separate specialty.

When I started on the MSc in 1974, the course was a 2-year course if taken part-time (which is what UK trainees did), or 1 year for overseas students – the majority. The clinical part of the course was taught via the Institute of Nuclear Medicine, and the science via the department of Medical Physics at the Royal Free Hospital School of Medicine, which had smart new teaching facilities in the new hospital in Hampstead (the RFHSM was the only London medical school which accepted candidates without A-level physics, who then had to take a 1st MB course). The resources included a neutron source – one of the practicals I remember involved producing a short-lived isotope by neutron activation then calculating its half-life.

There were lectures on PET – I remember thinking that this would never take off.

Nuclear Medicine in those days included much more in-vitro work, and I remember seeing with relief that one of the questions in the written paper involved giving a full account of an in-vitro assay. That was simple for me – I had set up and ran an assay for Human Placental Lactogen (HPL) – a hormone found in the blood during pregnancy, whose level fell about 2 weeks before birth (this was before obstetric ultrasound).

The dissertation had to be typed – I still have my copy with the text getting fainter as the ribbon wore out.

In 1993 I became an Examiner for the London University Intercollegiate Course for the M.Sc. in Nuclear Medicine, and in 1994 Chairman of the Board of Examiners.

In 1999 Manchester was approved as a teaching centre – prior to that, students had to be attached to a London centre.

In the same year the MSc underwent a major change. London University decided that it didn't want to organise and validate intercollegiate courses, such as the MSc in Nuclear Medicine. There was again discussion about a possible College diploma, but this was even less popular. The Institute of Nuclear Medicine was unable to take over the whole course, so in 2000 the MSc moved to King's College London School of Medicine (KCL). This involved a massive amount of paperwork as the course was remodelled to comply with their regulations. This was mainly undertaken by Drs Sue Clarke and Muriel Buxton-Thomas.

I continued as Chairman of the Board of Examiners, but at short notice KCL said that the post had to be occupied by a KCL academic, so Professor Ignac Fogelman was appointed. As he hadn't actually set papers before, I stayed on as Intercollegiate examiner until 2004.

The rubric for the course – now the MSc Nuclear Medicine – Science and Practice, GKTMS – read:

#### 1. Entry Requirements

- *A registrable qualification in Medicine awarded by UK university or a recognised European or overseas university.*
- *Two years post-registration experience in general & acute medicine (to include management of medical emergencies)*
- *A mark of 6.5 in each section of IELTS examination or equivalent*

*For limited GMC registration (exemption from PLAB):*

- *As above but must pass at 7.0 in all sections of IELTS*

## 2. Curriculum

*The course consists of 6 modules of which 4 are taught. The 6 modules are:*

*Physics & Basic Medical Science (T)*

*Clinical & Diagnostic Nuclear Medicine (T)*

*Radiopharmaceutical and Regulatory Aspects of Nuclear Medicine (T)*

*Therapy, Radiation Protection & Radiobiology (T)*

*Nuclear Medicine – Practical (P)*

*Nuclear Medicine – Research (R)*

*(T=Taught, P=Practical and R=Research)*

## 3. Duration of programme of study

*Full-time: 1 year*

*Part-time: 2 years*

## 4. Examination

*Unseen written examinations: 2 Papers*

*End of Year 1 assessment viva (part-time students)*

*Continuous assessment consisting of 5 Assessed essays of 2000 words each, logbook and 6 experiments*

*Two oral examinations (clinical and physics)*

*Dissertation/Report of 10,000 words and two Oral examinations.*

*This may seem very organised, but an idea of the true state comes from an urgent fax sent to the students shortly before the exams:*

### **Memo to students:**

*Contrary to my previous memo there will be two written papers each of 3 h duration.*

*Paper 1 will have two parts.*

*Part 1 – Radiopharmaceutical and Regulatory Aspects*

*Part 2 -Physics and Basic Medical Science and*

*It is recommended that students spend 1 h on Part 1 and 2 h on Part 2. Please bring a Scientific calculator to the examination.*

*Paper 2 will have two parts.*

*Part 1 – Therapy, Radiobiology and Radiation Protection*

*Part 2 – Clinical/Diagnostic Nuclear Medicine*

*It is recommended that students spend 1 h on Part 1 and 2 h on Part 2*

There were five candidates, one of whom was unable to complete the examination as he had been called home for military service. It was possible to use the new flexibility of KCL and award him a diploma. There was a total of seven examiners!

This was also the last year of the University of London MSc – there was one candidate re-sitting from the previous year.

2000–2001 was the first proper year of the KCL course. There were eight students in the second year of taking the course part time, and six new students (two full-time and four part-time). There was a formal 70-page prospectus giving full details of the course.

In 2002–2003 there was a formal review by KCL, and the opportunity was taken to implement the options of having a Diploma and a Certificate.

A diploma course would still need a clinical attachment, but would not have a research module, whereas a certificate course would be a purely taught course with no practical or research and both should be able to use the MSc modules as they were.

Discussion took place concerning increasing the number of taught modules from 4 to 5. These modules would be examined in 4 papers as follows:

Paper 1: Physics & Basic Science

Paper 2: General Clinical (including GI, Neuro, Paediatric, Cardiovascular & Pulmonary Nuclear Medicine)

Paper 3: Radiopharmacy

Paper 4: Radiobiology & Radiation Protection and Therapy & Nuclear Medicine Oncology

This gave more flexibility for offering individual modules.

In 2005 came Modernising Medical Careers (MMC) and new training schemes.

There were hours of talks between RCP, RCR and BNMS about rationalising training schemes. There was also much heart-searching about what sort of specialty Nuclear Medicine was. One good outcome was that Nuclear Medicine was recognised as a shortage specialty. This led to the creation of several F2 (second-year) rotations with a Nuclear Medicine component.

In 2007–2008 there was the introduction of the concept of “Knowledge-Based Assessments” as an essential part of physician training. For some specialties it was a new exam – now known as a Specialty Certificate Examination.

For Nuclear Medicine, the Postgraduate Diploma was recognised. The MSc is recommended but not mandated and it was agreed in the 2007 and the 2010 Curriculum that the PG diploma was what was regarded as equivalent to the Specialty Certificate Examination of the other Physician specialties.

The MSc continues at King’s College London <https://www.kcl.ac.uk/prospectus/graduate/nuclear-medicine-science-and-practice>, as part of a new training scheme designed to overcome the problems introduced by multimodality imaging including formal radiology training. However it’s too soon to tell that story.

The current state of play is to be found at <http://www.jrcptb.org.uk/specialties/nuclear-medicine>.

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**Andrew Hilson** I qualified in 1967, when medicine was much simpler. My house jobs were in cardiothoracic surgery and medicine, and then I became SHO in intensive care (which didn't exist). Effectively I was an applied physiologist. As I wanted to be a general physician, I did further jobs in general medicine, neurology and rheumatology before being offered a locum position in endocrinology and nuclear medicine at Guy's hospital. I realised that this is what I wanted to do, and became Senior Registrar in Nuclear Medicine. This was a time of rapid growth – we bought the first 37-tube gamma camera in the UK, then the first LFOV camera, as well as one of the first dedicated computers – the DEC GAMMA-11 which had a full 16 k of memory. I developed an interest in renal nuclear medicine [2]. We moved from localising the placenta with a hand-held probe to using labelled RBCs, then gave it up when ultrasound came along. Phosphonate bone scanning revolutionised our work load, taking over from F-18-fluoride.

In 1983 I became a Consultant, half time at the Royal Free Hospital and half at the Institute of Urology. In 1993 the Institute moved into the Middlesex Hospital, and I became full-time at the Royal Free. Later Dr John Buscombe joined me.

The department had started in Medical Physics, where its specialism was pancreas imaging using a subtraction technique with Selenomethionine (taken up in the liver and pancreas) and Gold colloid (taken up only in the liver). It also had a long tradition of work with lung aerosols, so we carried out some of the early work on Technegas.

Because the Royal Free had a major liver unit, we were the first unit in the UK to use I-131-Lipiodol therapy for hepatocellular carcinoma. This led in turn to using In-111-Octreotide initially for diagnosis and then for therapy in neuro-endocrine tumours. The RFH now has a world-wide reputation in this field. We were leaders in scintimammography, which led to early involvement in sentinel node studies. This in turn led to my involvement in the “New Start” programme to teach sentinel node techniques to UK breast surgeons.

Inevitably, I became involved in medical politics. In addition to my involvement in the MSc, I was on the RCP Joint Specialty Committee from 2001, becoming Chair from 2004 to 2007; I served two terms on Council of the BNMS, becoming President from 2004 to 2006.

I have a strong interest in setting and improving standards, and was a member, of the National Audit and Standards Group (later Professional Standards and Education Committee) of the BNMS from 1995 to 2008 and was Chairman 2001–2004. I was a member of the Committee on Accreditation of Nuclear Medicine Departments, UEMS/EBNM) (2003–2014) and Vice-Chair 2010–2014. I was a member of the expert panel which led to the European Commission Radiation Protection report No 159 “European Commission Guidelines on Clinical Audit For Medical Radiological Practices (Diagnostic Radiology, Nuclear Medicine and Radiotherapy)”.

I was an early member of the National Diagnostic Imaging Board and then was involved in the development of a national PET/CT strategy [2].