Overview of Current Education of Nuclear Medicine Technologists in Europe

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Considerable differences between countries

2 models of training exist:

1. University-based training:
   - undergraduate/postgraduate
   - BSc(3 years)/MSc(2 years)

2. Professional school:
   - following secondary school
   - 2/3 years
   - no university degree
Education Schemes in Europe

- **Course focus:**
  - specialised nuclear medicine training only
  - radiography/nuclear medicine/radiotherapy combined

- No international harmonisation of curricula:
  - content
  - hours of theory
  - practical training
Issues for Consideration

- European qualifications not comparable
- Technologists cannot freely work throughout Europe
- Technologist duties vary between countries:
  - in accordance with National Legislation
  - role development
- 25 countries:
  - many different languages
  - cultural differences
Overview of Training in Europe

Models of Technologist Training

University-based

Professional School

2 years

3 years
University-based Training

- United Kingdom
- Ireland
- The Netherlands
- Bulgaria
- Portugal
- Slovenia
- Malta
United Kingdom

- Radiographers:
  - undergraduate radiography BSc (3/4 years)
  - 1-2 years postgraduate radiographic experience mandatory
  - nuclear medicine (n/med.) postgraduate course:
    (1) Diploma - usually 18 months
    (2) MSc - 2 years
  - role development encouraged:
    (1) advanced level practitioners/consultant radiographers
    (2) image interpretation by radiographers in some centres
United Kingdom

- Medical technical officers (MTO’s):
  - range of qualifications:
    - (1) Higher National Diploma in Medical Physics and Physiological Measurement
    - (2) biological science degree
  - on-the-job experience
  - may undertake same postgraduate courses as radiographers
Ireland

- Radiographers only
- Training similar to UK:
  - undergraduate radiography BRad (4 years)
  - 1-2 years postgraduate radiography experience
- Postgraduate n/med. course:
  - 1 year Higher Diploma in Nuclear Medicine
  - 2 year MSc
The Netherlands

- 4 year BSc
- Graduates licensed to work as technologists in:
  - diagnostic radiography, including CT, MRI, U/S
  - nuclear medicine
  - radiation therapy
- N/med. curriculum: 770 hours
- Old 3 year hospital-based programme still exists
The Netherlands

- N/med. only training scheme:
  - Higher General Continued Education (HGCE) graduates (3.5 years)
  - Individuals changing profession, e.g., chemical analysts with a background of HGCE (2.5 years)
  - Practical training in n/med. dept. supervised by high school
Bulgaria

- Technologists trained in radiology and n/med.
- BSc - 3 years
- MSc - additional 2 years
- N/med. undergraduate curriculum:
  - lectures = 19 hours
  - tutorials = 26 hours
  - clinical training = 2 weeks (+ further 1 month)
Portugal

- Separate n/med. technologist training
- BSc - 3 years
- Licence in nuclear medicine - 1 additional year
- Intended to amalgamate two training cycles
- Postgraduate Master’s available - early stages
Slovenia

- “Radiological engineers”
- Combined radiographic, radiotherapy and n/med. training
- Diploma - 3 years’ full-time study
- Graduates supervised for first 9 months
- State examination
- Additional nuclear medicine training:
  - 2 semesters
  - certificate of “radiological engineer specialist in nuclear medicine”.

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Malta

- BSc - 4 years
- n/med. training included in undergraduate radiographic course
- 4 weeks clinical placement
Professional School - 2 years

- Czech Republic
- Hungary
- Poland
- Slovakia
- Spain
Czech Republic

- Nurses and technologists train in specialised secondary medical schools - 2 years
- May specialise in radiography, radiotherapy or n/med. after 3 years professional practice
- Specialisation:
  - 1 year in own workplace
  - 2 weeks external placement
  - oral exam
- Under reform
Hungary

- Nuclear medicine training is separate
- Training within or outside the school system
- Individuals with a state licence are permitted to educate others
- 1 technologist’s school:
  - (1) basic training (2 years’ full-time)
  - (2) advanced:
    - 1 year postgraduate training
    - 4 years n/med. practice mandatory
Poland

- “Radiology technologists”
- Combined radiography, radiotherapy and n/med. training
- N/med. curriculum = 60 hours
- Incorporation of schools into medical university system
- Proposed 5 year course:
  1. Licentiate of Sciences (3 years)
  2. Optional MSc (2 years)
Slovakia

- "Senior" technologists:
  - university degree in engineering or physics
  - "physicists"
- "Junior" technologists:
  - combined radiography, radiotherapy, n/med. training course
Spain

- “Higher Technologist of Diagnostic Imaging”
- Combined radiology and n/med. technology training
- N/med. comprises 30% of curriculum
Professional school: 3 years

- Austria
- Belgium
- France
- Germany
- Italy
- Norway
- Switzerland
Austria

- Combined radiography, radiotherapy and n/med. technologist training.
- N/med. curriculum:
  - 185 hours
  - 8 weeks practical
- Laboratory technologists also work in n/med:
  - no obligatory postgraduate training
  - attend regular meetings and courses 3 times a year
Belgium

- N/med. technologists include:
  - engineers
  - nurses
  - pharmacy assistants etc.
- Combined radiography, radiotherapy and n/med. training
- Postgraduate training organised twice a year by the Belgian Society of Nuclear Medicine - 6 hours
- Transition to 3 year training programme:
  - first graduates, June, 2004
France

• Awards:
  1. French State Diploma (DE) for Radiographers
  2. Diploma for Superior Technologists in Medical Imaging and Therapeutic Radiology (DTS IMRT)
• Combined radiography, radiotherapy and n/med. training
• Major part of French curriculum devoted to radiology and radiotherapy.
• N/med. theory hours much higher in DE training (60 vs. 40)
• Practical training:
  - DE = 80 hrs
  - DTS IMRT = 112 hrs
• Radiopharmacy not taught in detail
Germany

- “Medical-Technical Assistants of Radiology”,
  = radiographic/nuclear medicine technologists
- Licence and title issued by regional government
- Combined radiographic, radiotherapy and n/med.,
  radiation protection and measurement training
- N/med. curriculum:
  - theory = 120 hrs
  - practical = 300 hrs
  - clinical = 300 hrs
Italy

- **Combined radiographic, radiotherapy and n/med. training**
- **Transfer to university system (2001):**
  1. **Level 1 (basic)**
     - 3 years
     - n/med. and PET covered in 3\textsuperscript{rd} year (200 hrs)
  2. **Level 2 (postgraduate title or Master)** - 2 years
Norway

- Nuclear medicine technologists recruited from radiographers or medical laboratory technologists
- Supplementary nuclear medicine training course undertaken
- Curriculum - 100 hours
- Proposed university-based education
Switzerland

- Combined radiography, radiotherapy and n/med. training
- Move to university-based education in French-speaking part of country (BSc level)
No Established System

- Greece
- Croatia
Greece

- Technologists come from public technology schools specialising in medical equipment or laboratory medicine
- 1 radiography technologist’s school with n/med. on the curriculum
- Most nuclear medicine education learnt from practice
Croatia

- No established training
- Each hospital trains its own technologists in radiography/nuclear medicine
- Technologists originate from high schools for nursing or are clinical laboratory technologists
Miscellaneous

● Finland:
  - n/med. included in radiographic studies
  - polytechnics organise extra n/med. courses for medical laboratory technologists and nurses.
  - more n/med. training is being sought
Conclusions

- Wide difference in n/med. technologist training in Europe
- Technologist movement within Europe limited
- Move towards university-based training
- CPD not compulsory in all European countries
References


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