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## Euro-American discussion document on entry and advanced level practice in nuclear medicine

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***Euro-American discussion document on entry and advanced  
level practice in nuclear medicine***

*Produced by a joint working party of EANMTC and SNMTC*

June 2011

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## **Background**

### *The Euro-American working party*

The European Association of Nuclear Medicine Technologist Committee (EANM TC) and the Society of Nuclear Medicine Technologist Section (SNM TS) meet bi-annually to consider matters of mutual importance. These meetings are held during the SNM and EANM annual conferences. For several years, within these meetings, EANM TC and SNM TS have considered the value of having a Euro-American initiative in defining entry level and advanced practice competencies for nuclear medicine radiographers (NMRs) and nuclear medicine technologists (NMTs). In June 2009, during the SNM annual conference in Toronto, it was agreed that a Euro-American working party would be established to consider advanced practice. It was recognized that any consideration of a definition for advanced practice would be predicated on an understanding or definition of entry level practice. As a result both types of practice would have to be considered. This discussion document outlines some of the background issues associated with advanced practice generally and specifically within nuclear medicine. The primary purpose of this document is to stimulate debate, on a Euro-American level, about the perceived value of

1. Advanced practice for NMRs and NMTs within nuclear medicine; and
2. Having an internationally accepted list of entry level competencies / scope of practice for NMRs and NMTs within nuclear medicine.

It was not the working party's intention to say whether countries should or should not attempt to advance their practice; this would be for them to determine. However the working party does: wish to encourage NMTs and NMRs to take a critical look at and evolve, where possible, their professional roles; wish to develop Euro-American consensus for entry-level and advanced practice competence; wish to provide a framework for a national / international ambition on how NMT and NMR roles could develop and how clinical career ladders may be developed; wish to facilitate 'learning from others' experience. The working party also recognized that while its central remit was to NMRs and NMTs, the contents and philosophy of this document may have value

to other non-medical<sup>1</sup> staff working in nuclear medicine (e.g. nurses, physicists) as they may have similar ambitions toward patient care and management.

A draft *consultation document* was written by August 2010 and key elements of this document have been presented at four conferences: World Federation of Nuclear Medicine and Biology (WFNMB), September 2010; EANM, October 2010; Croatian Radiography Conference, 2011; and SNM, 2011. Comments have been received from delegates at these events and some changes have been made to the document. Having created this final version of the document an interactive session is planned in order to debate several issues within it (EANM conference 2011).

*Advanced practice – an international perspective*

To date, several countries have supported their non-medical workforce to develop competencies and responsibly to improve patient care and management. Such progression has involved these professionals working in areas not usually associated with their traditional remit. Development of professional roles in this fashion is not without grounds. For instance, there is a significant and growing body of literature (grey and peer reviewed) which supports the value this has to patient care and management; additionally there is evidence to suggest this is a cost effective way to manage and deliver quality health care. Alongside this, in certain countries, robust professional and hospital-based mechanisms have been implemented to assure quality. In some countries legal arrangements have been modernized to facilitate the formal recognition of advanced practices, and mechanisms have also been put in place to minimize the incidence of clinical negligence claims. The latter obviously seeks to protect professionals as well as patients.

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<sup>1</sup> Definition - In this context ‘non-medical’ means those who have not received medical education which would result in them becoming registered medical practitioners. Examples of medical practitioners would include radiologists and nuclear medicine physicians. Examples of non-medical practitioners would include nurses, radiographers, technologists, pharmacists and physicists.

This consultation document outlines the background of advanced practice generally and specifically within nuclear medicine and how its definition is dependent on a definition of entry but its primary purpose is to stimulate debate as noted above.

### **Practice and Advanced Practice**

There is a need to universally and constantly improve patient care. Improvement takes many forms but always includes striving to increase the efficiency and quality of care with the goals of a higher standard of patient care and an increase in patient satisfaction. Changes in technology have helped serve as an underpinning to the continual improvement and advancement of the field of nuclear medicine. The technology in nuclear medicine has evolved from the routine clinical use of rectilinear scanners in the 1960s to the routine clinical use of PET/CT scanners in the 21<sup>st</sup> century. In addition, the computers and instrumentation used in nuclear medicine have increased in sophistication and complexity of operation. The evolution of such technology has been accompanied by the use of a broader range of radionuclides as well as advancements and changes in radiopharmaceuticals. As one would expect, changes in radiopharmaceuticals as well as technology have resulted in both new and modified imaging procedures. The changes in nuclear medicine have not occurred in a vacuum but rather amidst continual changes in health care on the whole including modification to regulation / law, accreditation requirements, patient expectations and professional accountability.

In this constantly changing environment it has been the expectation of the clinical sites that NMTs and NMRs will find ways to learn and adapt to new technology, radiopharmaceuticals and procedures. It has also been the expectation that educational organizations will modify curricula to address the current and future needs and practices in the field. Although the expectations and responsibilities of the NMT and NMR have increased greatly over the last four decades, in some instances these increases have not always been accompanied by a formal recognition of their practice. Although NMTs and NMRs have long been able to find alternate career paths which match their interest or increased skills and abilities (e.g. management and education) until recently, within the

clinical setting, an extended career ladder has not been available. Today, some countries have encouraged their NMTs and NMRs to enhance the clinical service they offer in order to improve patient care and management and they have been rewarded for their enhanced contribution with elevated pay scales and a professional career ladder, status and title which reflect their true contribution.

In several countries this enhancement of role has resulted in the NMTs' and NMRs' clinical skill and knowledge to be increased to a level where they are given clinical responsibilities previously or currently undertaken by medical practitioners. In many instances this has enabled medical practitioners to move on from certain tasks thereby enabling them a better opportunity to place their time, energy and skill into higher order and more demanding medical challenges. Other examples of an increased level of responsibility include adopting competencies previously restricted to health care professionals other than medical practitioners (e.g. nurses). Advanced clinical responsibilities, often as a group referred to as advanced practice, now performed by NMTs and NMRs in some countries have been conducted by NMTs, NMRs, and *general* radiographers for almost two decades.

Since responsibilities among NMTs and NMRs vary between countries, and even within a particular country, one may wonder what responsibilities and requirements exist for entering into or qualifying for employment level NMT or NMR, and what responsibilities would be considered as advanced practice. Each country has its own requirements for becoming an NMR or NMT and generally the requirements involve a programme of study that includes theory and practice. In many countries there is a requirement to formally assess competence to practice and the theory which underpins competence in the field. In addition to the marked formative professional educational variations between and within countries and the differences in expectations of skill and ability of the NMTs and NMRs on qualification and entry in the field, there are also differences in post qualification educational opportunities and requirements.

Differences in formative professional education and post qualification education, politics, culture and regulation / law tend to be reflected in the clinical responsibilities in which NMTs and NMRs might engage, both on qualification and throughout their practice. Given the differences in competencies, skill-sets, and clinical responsibilities at the level of entry into the profession, it is natural that there would be differences among the countries with respect to the characterization of what might constitute an advanced role for NMTs and NMRs. Simply put – one country might recognize a specific role or competency as one which would be included in formative professional education, whilst another would see the same role or competency as advanced practice because it would be acquired in a post qualification framework. Because of this, at present, no clear international statement of intent for advanced practice exists. Some might argue such statements should exist and may involve the following-

- *The competence and skill set that is acquired after basic training*
- *The competence and skill set would be at a higher cognitive and clinical level than basic training / formative professional education*
- *The competence and skill set would seek to improve patient care and management*
- *The competence and skill set would seek to offer clinical career progression opportunities*
- *The competence and skill set scope will vary widely between countries; various factors account for this (e.g. law, politics, culture, economy)*

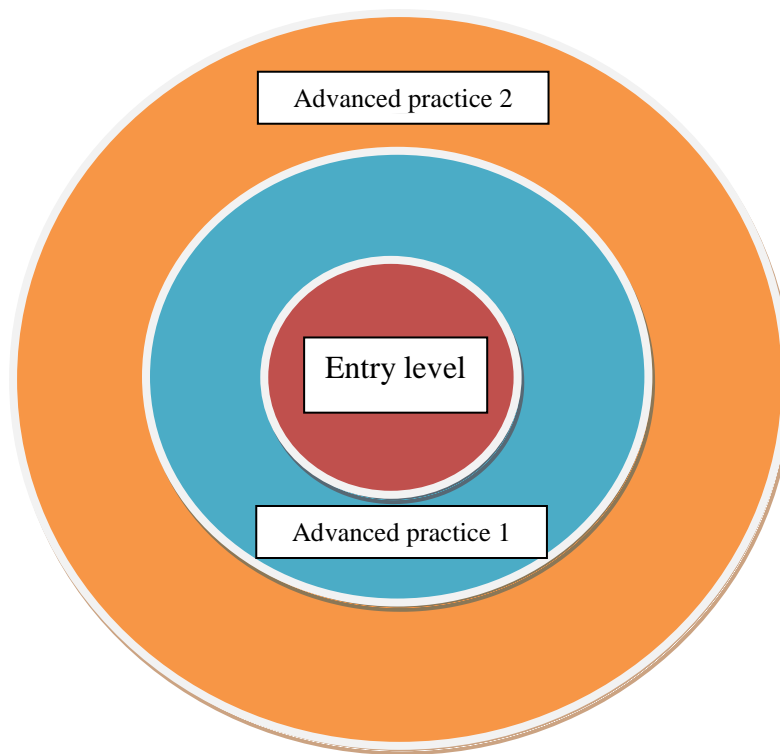
In addition, there is no internationally agreed statement on what would be considered as entry level competencies. Perhaps a way to define entry level competencies and skill sets might be as follows-

- *The competence and skill set that is considered necessary to ensure that nuclear medicine procedures are conducted to an appropriate level*
- *The competence and skill set would be engendered during basic training / formative professional education*

- *The competence and skill set scope will vary between countries; various factors account for this (e.g. law, politics, culture, economy)*
- *Any agreed international entry level 'list' of skills and competencies is likely to be small because of the above*

Figure 1 illustrates the present situation which includes a marked variation of views on entry level and advanced practice.

**Figure 1**



On examining Figure 1 the entry level zone could represent an agreed common set of competences / responsibilities for all countries. The 'advanced practice 1' zone contains those competencies / responsibilities which some countries might view as 'advanced'; however we must acknowledge that some or many of these competencies could be viewed as entry level by other countries. This explains why Figure 1 has two zones for advanced practice. The advanced practice 2 zone would be acknowledged by all countries as containing advanced competencies / responsibilities; all of these would be engendered in a post qualification framework and not included within formative education and



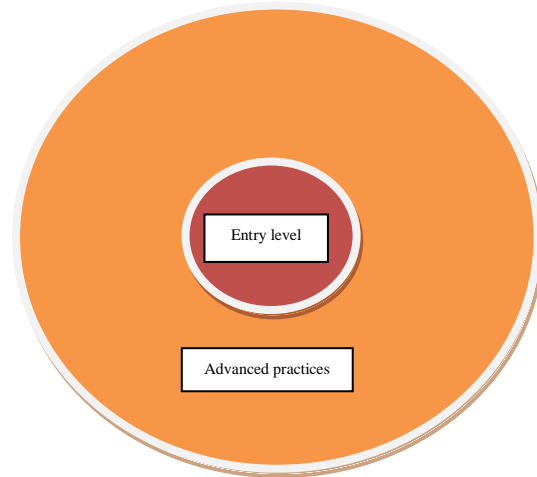
training. With these arguments in mind it could be, for this model, that the entry level competence / responsibility range could be relatively small, because if not there would be potential for excluding some countries who have smaller competency and responsibility ranges. The purpose of this document is to be inclusive and not to exclude any country or professional group within a country.

In this document we do not seek to argue the precise detail of what would or would not be included within entry level, advanced practice one or advanced practice two zones, rather we would wish to reach a common understanding that the model in Figure 1 could represent adequately an international perspective for entry level practice and advanced practice. With this international perspective in mind we believe it would not be right for any individual or country to comment critically upon the scope of practice (entry level or advanced) of another country – principally because it is unlikely one would have adequate understanding of the underlying professional, political, legal, financial, cultural, and social contexts. We should simply acknowledge that differences will exist and we would acknowledge and value these differences accordingly. Having acknowledged the principle of advanced practice zones one and two it follows logically that an advanced role or competency to one country might be recognized as entry level by another; the reference point for role or competency classification and recognition would be set nationally and not internationally. An agreed international statement could be that an advanced practice would be so characterized if

*the role is perceived to require post qualification education and training and that the role itself would demand a higher cognitive and skill level than that engendered during formative professional education*

With the above proposal in mind each country could populate its own national model for entry level and advanced practice, as illustrated in Figure 2. The purpose of this activity would be to help set out a national ambition on how NMT and NMR roles could develop.

**Figure 2**



We acknowledge that this approach will still result in difficulty with respect to the portability of the title of NMT or NMR and one's ability to be employed outside of their home country. This is because, as yet, we are not proposing an internationally agreed competence range / scope of practice for entry level or advanced practices. However the proposal in this document would form a first and important step towards establishing internationally accepted roles, responsibilities, competencies, and scope of practice for entry level and advanced practice and would form a clinical career progression possibility.

It deserves mention that there are some countries, such as the Netherlands, in which the entry-level requirements are very broad and include competencies in several medical imaging modalities as well as radiation therapy. In countries such as this, a need may exist to create a rung on the career ladder that precedes entry level NMT and NMR, such as an NMT assistant or radiographer assistant or a nuclear medicine assistant. At this level the individual would have roles and responsibilities that are not as inclusive as entry level NMT or NMR. Such a career framework model has existed within the UK for almost a decade, where a technical grade (or employment level) below that of radiographer or NMT exists. Individuals in these positions have responsibility that is less

than NMT or radiographer but support the work of NMTs and NMRs. Interestingly performing imaging procedures under the supervision of a qualified staff member, such as an NMT or NMR is often part of the assistant's role. Elaborating further on UK experience, it might be worth noting that there are four tiers within their radiographer and allied professions<sup>2</sup> career ladder

1. Assistant practitioner
2. Practitioner (e.g. radiographer)
3. Advanced Practitioner
4. Consultant practitioner – This is the pinnacle clinical grade within the UK is consultant and all allied health professional groups can achieve the same title status and scope of practice and pay scale

### **Rationale for advanced practice**

The introduction for advanced practice should not be without reason and on reviewing literature and listening to a range of people in several countries three beneficiaries have been identified: patient; NMR / NMT themselves; the services as a whole.

Advanced practice has demonstrated many patient benefits, including increased efficiency (e.g. speed of service) and enhanced quality of care. Interestingly, in some clinical settings, the access to medically trained personnel (physician) is limited and we have found that having available practitioners with advanced skills brings many benefits to patients.

There are clear values to NMTs / NMRs for performing advanced roles. We have identified that some staff have been conducting advanced practices for quite some time but they have not been formally valued or recognized for their additional skills. When advanced practice has been formally introduced it has enabled these staff to legitimately conduct the roles and also be valued for doing them. Several countries have established clinical career ladders for those with advanced competencies. In the UK, for instance, two

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<sup>2</sup> Example of allied professions include physicist/ clinical scientist, radiographer, nurse, physiotherapist and so on

relatively new grades have been introduced in order to reflect the enhanced responsibility level and increased scope of practice – *advanced practitioner* and *consultant* grades. Such grades define the status of those practicing at these levels. Alongside these new career structures come improved clinical pay scales, thereby reflecting and valuing the importance of the clinical work being conducted. Finally NMTs and NMRs who engage in advanced competency roles appear to have a higher job satisfaction; this fact was established from the literature and also through listening to those who engage in these activities. Perhaps an added benefit related to this (which also has clear value to the service and the patient) is that retention of good quality clinical staff can now be facilitated through advanced practice, through matters such as enhanced satisfaction, pay and status.

The service as a whole can benefit too. Many studies have been published to illustrate increased efficiency through the introduction of advanced practices, this is in part brought about through cost reduction (for instance, getting the same task completed by a staff member who is paid less). There is also considerable evidence to demonstrate that there is a much better use of staff *capability*.

### **Examples of advanced practices**

Using our earlier definition(s) of advanced practice we have solicited opinion from several countries and been given several examples of what could constitute specific examples. The first set of advanced practice examples are shown here

1. Scanning the patient
2. Processing of images
3. Patient care and management
4. Equipment quality control

In some countries the above are not within basic training / formative education and consequently not part of the basic job role; these skills might be engendered after

qualification (but not always). Strictly speaking, using our proposed definition(s), they are would be classified as advanced practices. This raises questions, for instance

*“Should there be a minimum requirement for entry level?”*

*“If so, should a date be set by which all countries would agree to achieve the minimum requirement in order to consider oneself to be an NMR or NMT?”*

Other examples of advanced practices were also identified and these are illustrated in Figures 3a to 3f.

### **Figure 3a**

#### *Medicines management*

- Deciding when medication needs stopping
- Deciding when to give medication (adjunct)
- Deciding what dose to give
- Assessing for contraindications / drug incompatibilities
- Administering medications
- Responding to adverse reactions - minor and major
- Report writing after a reaction

### **Figure 3b**

#### *Non-medical cardiac stressing*

- *No physician in the stress room*
- *Preparing the patient*
- *Taking the lead in cardiac stressing*
- *Being responsible for monitoring patient*
- *Taking appropriate action if patient has a problem*
- *Taking decision on when to administer radiopharmaceutical*
- *Deciding when to cease stress test*
- *Responding to cardiac events; deciding when help is required*

### **Figure 3c**

#### *Requesting x-ray imaging*

- Prior to VQ
- After bone scan for unexplained hot areas
- After SPECT for CT to establish
  - Precise location (could be low dose CT)
  - Diagnostic (diagnostic quality / high dose CT)

### **Figure 3d**

#### *Mark up for surgery*

- *Be 'involved with' NM scanning*
- *Identify the node / nodes on scan*
- *Use appropriate method to mark skin to suggest where node is for surgeon*

### **Figure 3e**

#### *Writing formal report about the scan*

- *A description of what is seen*
- *Whether there are incidental findings*
  - *Are they clinically significant?*
- *Providing an answer to the clinical question*
  - *Making a (pathological) diagnosis or indicating normality*
  - *Suggesting a prognosis based on scan findings*
  - *Suggesting 'what next' (e.g. further imaging)*

### **Figure 3f**

#### *Leading radionuclide therapy sessions*

- *Assessing clinical presentation*
- *Evaluating diagnostic workup information*
- *Deciding whether the case is suited to radionuclide therapy*
- *Taking a lead role in calculating the dose*
- *Preparing the patient for the dose; including contraindications*
- *Administering the dose*
- *Assessing the patient for complications*
- *Following the patient up*

On considering some of the examples in Figure 3a – 3f, during our consultation exercises in various countries, questions have been asked about where the limit of advanced practice might be. Simply put-

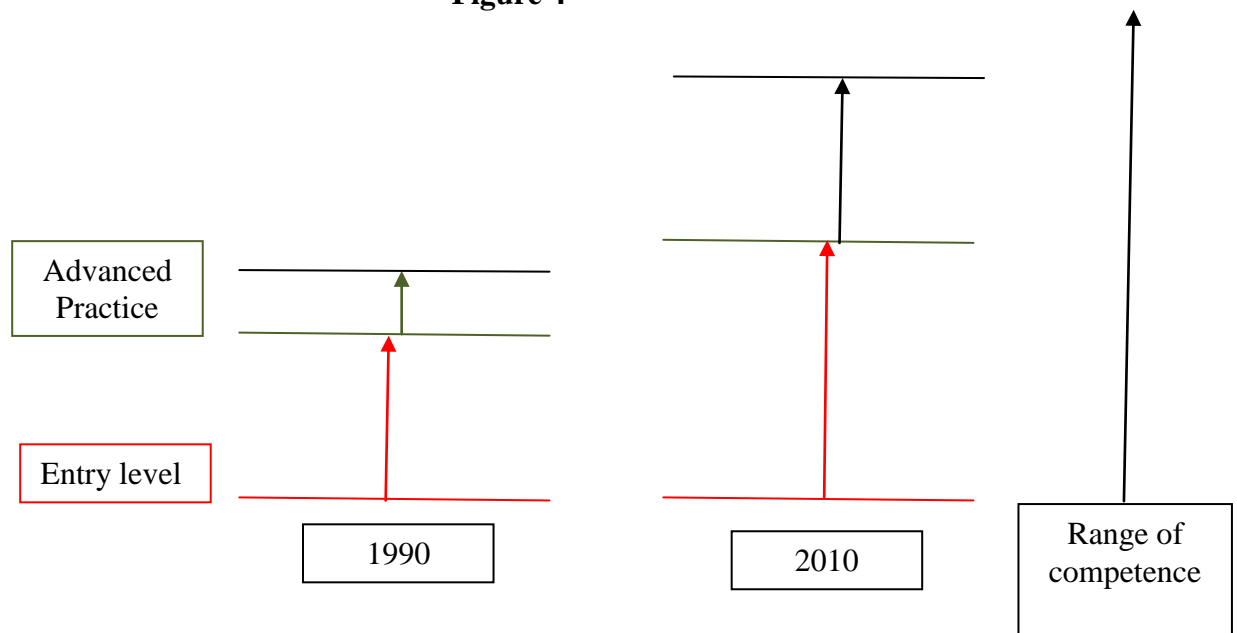
*“At what point would you have to be medically trained to assume a particular responsibility?”*

Like with the entry level question we have not attempted to answer this question either, but we have included it as food for thought.

### **Evolution of Professional Responsibilities**

We acknowledge that legitimate differences exist between countries such as culture, politics, economics, and regulation / law. We should also accept that there will be a time component to professional role evolution and the role overlap zones that might exist between different professional groups. This has been recognized in some countries (notably the UK) and is partly illustrated conceptually in Figure 4 by comparing entry and advanced levels in 1990 and 2010.

**Figure 4**



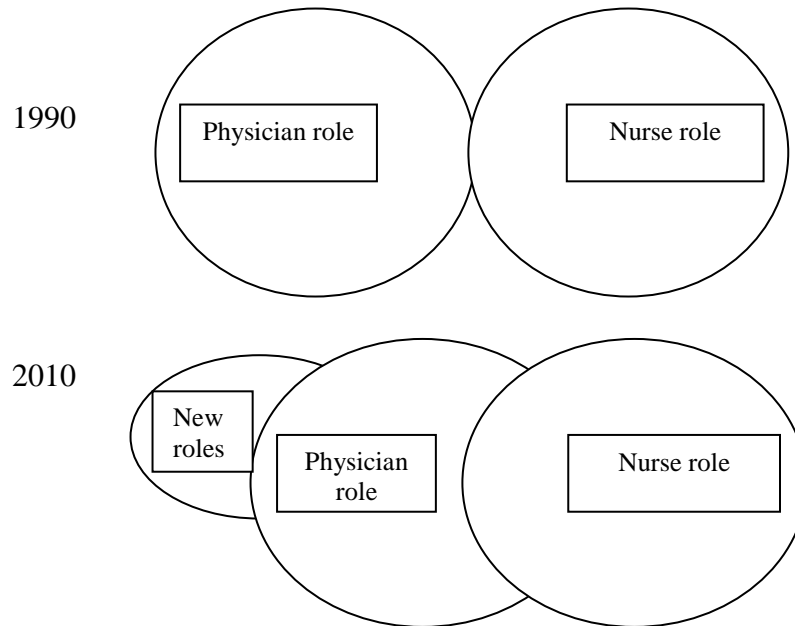
For a particular professional group Figure 4 illustrates that over time the number / range of entry level competencies can increase over time; in 1990 the range is more narrow than in 2010. Similarly the number / range of advance practices have increased over time.

What this simple illustration does not reflect is that the complexity of the competencies can also increase over time. Reflecting again from experience, within the UK the range and also the complexity of entry level and advanced practice competencies have both increased over time as the field continues to evolve. Such evolution of the field of nuclear medicine can also involve the evolution of responsibilities and competencies moving from one role to another – for instance the assistant NMR /assistant NMT could move into responsibilities normally associated with NMRs / NMTs. It is therefore fair to assume that entry level and advanced practice competencies would be dynamic and would likely reflect the needs of any given health care system at a particular point in time, on the assumption that the roles keep up to date with clinical and other demands.

It has probably become clear by now that for a professional role to expand, another professional role may have to contract on the point of overlap. Alternatively it could be that a novel technique is introduced on which no one profession has had monopoly and as such roles would be up for negotiation from the onset. Of course the professional whose role is being ‘eroded’ at a specific point might in fact have role expansion into other areas. A notable example of this within nuclear medicine might be that the medical practitioner could have taken on new and more complex roles in PET/CT and still be expected to cover existing responsibilities within routine nuclear medicine. Let us return to role erosion, for those who would effectively give up an aspect of their remit. Building on the concept of Figure 4, Figure 5 illustrates how, within the UK, the nursing profession has negotiated roles that were formerly within the medical profession domain.



**Figure 5**



As illustrated, in 1990 the overlap between nurse and physician within the UK was minor; by 2010 that overlap had grown because of nurse advanced competencies. In fact for certain responsibilities many doctors simply moved on from those roles into more complex roles that made better use of their medical training; this is illustrated by the area entitled ‘new roles’. In the USA, the role of nurse practitioner was introduced for the same purpose. The literature has many examples of where role evolution is occurring or has occurred. Considering Figure 4 again, as the vertical line for advanced practice increases it is likely that the overlap into another professional group will increase and the inter-professional boundary will become blurred; it may also shift overtime. For the blurred overlap areas this could easily result in two professional groups having the many of the same job roles for a period of time – and for certain practice areas this is extremely common within the UK. This type of change has been met with resistance and at times caused conflict among health care professionals within both the UK and the USA, and it will no doubt cause concern and conflict elsewhere.

When considering resistance to change there are two likely sources that could result from the conflict between roles - the person giving up a role and the person taking on an additional role. The receiver may not wish to take on an advanced role and added

responsibilities; equally the person giving a role up may not wish to do that. Clearly there should be a negotiation between the stakeholders. Interestingly the UK's experience included a government consultation exercise of which the results indicated that the patients and public alike welcomed the notion that professionals who were capable of carrying-out a responsibility or task should be allowed to perform that responsibility or task and a professional title should not be a limiting factor.

### **Leading and Managing Change**

In light of the changing environment to keep pace with the changes in the clinical workplace, this document is proposing that NMTs and NMRs take a critical look at their current and potential future roles. Since a future role may include the overlapping of responsibilities with another health care professionals' current role, it would be naïve to assume that this process would not meet with anxiety and even resistance within the two professional groups or even within professional groups who work closely with NMTs and NMRs. Consequently when constructing this document we were mindful to include this small section leading and managing 'change'.

For the proposals within this document to be realized, new ways of thinking would need adopting and new ways of working would be required. It could be anticipated that current and perhaps long-held values and beliefs would be challenged and this would have an impact on hospitals and educational establishments. Because of this, early inclusion of all stake holders in the process of change is advisable. It is well described within leadership and management literature that when something new is considered, some people seize the opportunity whilst others become highly resistant and entrenched and they describe a range of counterproductive and often destructive behaviours. Strategies have been described in the management and leadership literature to help people manage their own emotions and actions as well as those of others, so that a positive process can be embraced and mutually agreeable outcomes can be achieved. It is well worth consulting such literature prior to approaching any change management situation. It is also worth noting that many years beyond a change having occurred that differences of opinion can

still exist and from time to time old arguments can resurface; this should be viewed as natural. In the context of NMT and NMR advanced practice some factors that can facilitate and inhibit the process of change are illustrated in Figure 6.

**Figure 6**

Facilitator	Barriers
<ul style="list-style-type: none"> <li>• Law or regulation that enable change</li> <li>• Guidelines for practice that enable change</li> <li>• Having ‘key players’ who support the desired change</li> <li>• Shortage of nuclear medicine physicians</li> <li>• Technology advancement</li> <li>• Financial pressure in the healthcare sector</li> <li>• Valuing and making effective use of the potential skills and capabilities of all professionals</li> <li>• Role models who already do advance practices</li> </ul>	<ul style="list-style-type: none"> <li>• Law or regulation that restricts role advancement or change in responsibilities</li> <li>• Fear of litigation</li> <li>• Trainee doctors - as they want roles that allow them to develop</li> <li>• Fear of change</li> <li>• Fear of losing money in cases of ‘fee for service’</li> <li>• Fear of losing turf</li> <li>• Fear of losing power and status</li> <li>• Conflict of roles</li> <li>• Inability to support suitable advanced practice education and training</li> <li>• Fear of accepting new responsibilities</li> </ul>

At all stages effective leadership skills are required across all professional groups. Effective leadership will require involving the right people at the right time, including those with political authority and political power. In most countries this would normally include members of the medical profession as they often have position power that could inhibit or effect change. An effective communication strategy is necessary to promote a clear understanding of what is being proposed and how it might be achieved. Sharing of experiences, with respect to the implementation of change and adoption of advanced competencies or even extending the entry level scope of practice, may serve as catalysts to inspire others. There will be a need to help those in NMT and NMR professions, as well as those in other professions, to understand that advanced practice can bring significant benefits to patient management and care. Discussions and debates will be required and the articulation of proposals ‘for’ and ‘against’ the adoption of advanced practices may also be necessary. The arguments for the change will undoubtedly place an

emphasis on how patient care will be enhanced, perhaps also how financial savings might be brought about and how careers can be enhanced.

It should be acknowledged that advanced practice is not for everyone. Some experienced NMTs and NMRs may not be interested in adopting added responsibilities and they may not value the change.

Learning from those countries who have ventured into advanced practice it is important to realize the transition process takes time. It is a process that is evolutionary not revolutionary. The first step could be small and cautionary; reflecting critically on this step an informed decision would be taken on what to do next. Figure 4 illustrates, conceptually, how role evolution has occurred over a 20 year period.

The regulations / laws in some countries will allow for NMTs or NMRs to practice certain competencies, yet in other countries the laws may prohibit this occurring. The methods used to influence a change in law / regulation will also vary among countries, but in all situations, it is important to include all stakeholders early in the development stage. This approach will provide those in a position of national responsibility with an understanding of the purpose of advanced practice and the need to modernize law / regulation to accommodate the proposed change. It may also help to achieve buy-in and acceptance early on in the process thereby circumventing obstacles that could have inhibited change. For new practice areas (e.g., PET-CT) it may be important to implement changes in law / regulations, and/or scope of practice related to who can perform the procedures, prior to the equipment entering routine clinical use, or as soon thereafter as possible.

### **Advanced Practice - Education and Competence**

Educational programmes that engender advanced practice abilities should include theory, practice, and formal assessment of competencies. Of those countries that have implemented advanced practices the educational framework in which they are engendered tend to be post graduate - e.g., Master of Science degrees, Post Graduate

Diploma and Post Graduate Certificate. Such an educational framework builds upon an undergraduate formative academic process which is generally at the degree / bachelors level in many countries.

The rationale for selecting a postgraduate framework for advanced practice is philosophy that advanced competencies include clinical skills that are at a higher responsibility and ability level than those of the experienced NMT or NMR and which demands intellectual acuity to be developed in a critical and reflective fashion. The depth of understanding demanded by the critical and reflective approach is often best served through postgraduate study. Consequently advanced practice describes higher clinical skill sets and also the need for higher order cognitive processes; this would be a combination of the ability to reason from a conflicting evidence-base and to apply that understanding to take decisions during common or even novel clinical encounters.

Arising from the autonomy associated with the aforementioned aspects of advanced practice is a component of clinical leadership. The advanced practice NMR or NMT would be expected to apply knowledge to improve service delivery (e.g., establishing clinical benchmarks) and evidence-based practice accompanied by the expectation of disseminating information learned. Another aspect of leadership is the expectation to participate in and publication of results of research some of which may be used to establish benchmarks.

The consideration to adopt advanced practice requires a radical re-thinking of formative and post basic educational curricula, not simply in terms of syllabi content but the depth and level to which the material is taken as well as how cognitive and psychomotor skills are assessed.

### **Evaluation of Advanced Competencies - Audit**

Some countries regulate their healthcare professionals with a firm intention to protect patients / public from poor practice; such regulation seeks to identify and then deal with poor performers. This is true at both the level of entry into the field as well as in advanced practice. Evaluation / audit of those who engage in advanced practice can

generate data with respect to these intentions but also data could be used to demonstrate to others whether or not they are effective in their new role with respect to facilitating patient care, patient satisfaction, and having a positive effect on the financial bottom line of the department. This data would have value to the employer and also to the healthcare community generally.

Various types of audits exist for advanced practice, but generally the approaches fall into two categories - 'internal' or 'external'. Of the methods described in the literature 'internal' audits have tended to involve electing a clinical professional (e.g., radiologist) to be the reference standard against which the person performing the advanced practice is compared. In the case of image reporting this could involve comparative analysis of parameters such as sensitivity and specificity (in the case of image reading / interpretation). However, this sort of approach has come under scrutiny in recent times because of its lack of robustness, most notably because the local standard (radiologist) might not be a suitable gold standard. *'To err is human'*. Consequently there has been a move towards more robust audit designs. A progressive example of an external audit can be found within the UK in the field of mammography. Here, on an annual basis, all mammography film reporters are highly encouraged to participate in an annual external audit exercise in which they receive 120 cases to report. The data are analyzed centrally and each reporter receives their own sensitivity and specificity score, which should be given to their line manager during yearly staff performance review sessions. Interesting this external audit is profession independent or in other words, both radiologists and radiographers participate in the external audit. It might be worth noting that this national data demonstrates no significant difference in specificity and sensitivity between these two professional groups and radiographers and radiologists each hold about 50% of the national image reporting responsibilities for the UK breast screening programme. Radiographers and radiologists perform similarly.

Various methods exist on how to perform audits and it might be that no single one is correct. The most important point is that audits of advanced practice should be performed and, as required, action should be taken on the outcome. It might be that the process

demonstrates the right standard is met; it might be if the right standard is not met then a period of further training would be required.

## **Conclusion**

With increased communication and collaboration among the nuclear medicine professional organizations and countries around the world, NMTs and NMRs are in a strong position to collaborate in order to respond to matters of common interest. One area would be to agree on some points of principle for entry level competencies as a first step toward improved mobility between countries. Another area would be to consider whether advanced competencies are of value in different countries and for those who feel they are valuable to provide support mechanisms for implementing them into practice.

In this document we feel we have set out some important issues that need consideration if a country wishes to consider introducing advanced practices. The next stage for the working party is to consider 'what next'. Whilst this still needs to be agreed upon, some initial thoughts have surfaced: forming an implementation and support group to assist those countries wishing to introduce advanced practices; extended the initial working party to include representation of a broader range of countries (i.e. outside Europe and America) to consider a global perspective.

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