

## Nuclear Medicine in Europe

The practice of nuclear medicine in Europe is as variable as the cultural diversity that blesses that continent. Despite significant progress in the harmonization of delivery of goods and services across the European Union (EU), similar gains in medicine, including service delivery and training, have not kept pace. The recent enlargement of the EU to 25 countries will further challenge the progressive integration of best medical practices and optimal training. Differences in access to health care technology, in health economy systems, and in reimbursement policies are major obstacles in the uniform delivery of medicine, including nuclear medicine. Let me stress at the outset that cultural diversity is indeed a blessing, even as it presents clear challenges. Language continues to form a significant barrier, and this explains the need for and relative success of independent national journals of nuclear medicine. At the same time, the success of the *European Journal of Nuclear Medicine and Molecular Imaging* and of the European Association of Nuclear Medicine have proven beyond dispute the added value of a common European delivery.

Although the EU issues its directives for implementation in a true democratic model, the pace of this implementation lies with each member state. A longstanding 1989 directive clarified the status of nuclear medicine as an independent medical speciality. In most European countries, nuclear medicine has been a physician-based speciality, and in many European nations it continues to flourish. In Spain alone, 40 physicians are trained each year as nuclear medicine specialists. Significant growth can be seen in other countries, such as France and Italy. Germany trains some 60–65 physicians each year. The training for nuclear medicine physicians follows a European model of a 4-y program. Although licensing and regulation of radioligands increasingly affect the practice of nuclear medicine, the individual physician retains the authority to prescribe unlicensed tracers for the benefit of the individual patient.

Has nuclear medicine been practiced as an independent specialty throughout the EU space? Yes, by and large. A strong association can be seen between models of independent practice and the significance, clinical acceptance, and growth of the field. If we



wish to learn from past experience, this should be recognized by all. Conversely, it is in those member states where the clamor for integration with the rest of imaging has been the greatest that we find an environment in which nuclear medicine has been at its weakest. In general (and with notable exceptions), where delivered by non-physician-based specialities, nuclear medicine has developed slowly and haphazardly.

A report entitled *Facilitating Interdisciplinary Research*, published in early 2004 by the U.S. National Academy of Sciences ([www.nap.edu/books/0309094356/html/](http://www.nap.edu/books/0309094356/html/)), was the focus of the U.K. Royal Society Annual Discussion Day in March of 2004 ([www.royalsoc.ac.uk/annualdiscussion](http://www.royalsoc.ac.uk/annualdiscussion)). Among the comments and conclusions:

- Interdisciplinary activity enables new insight into both basic and applied sciences;
- Ample intellectual rewards and challenges are part of this process;
- Traditional compartmentalization of university faculties into single-discipline departments may be unfavorable;
- Advantages would be obtained from more flexible structures within universities;
- Interdisciplinary research may take

longer to yield results than those expected from single disciplines;

- Interdisciplinary research is relatively difficult to support within existing grant structures;
- Employment by research funding bodies of scientists from single-discipline backgrounds to referee interdisciplinary projects can yield narrowly based evaluations;
- Solutions involving thematic rather than subject-driven panels, with members from many disciplines, should be recommended;
- When crossing between disciplines, individuals will be unlikely to have a track record in the new discipline, which may be disadvantageous when applying for funding; and
- Communication between experts is crucial.

Nuclear medicine is clearly not the only major noninvasive technology for the assessment of disease—those days belong to the past. Major new technologies, such as spiral CT, MRI, bioluminescent and fluorescent imaging, and others, have now blurred the artificial distinction that once set nuclear medicine apart as a “functional” rather than “anatomic” discipline. Nuclear medicine maintains a unique status in the delivery of targeted therapies, but its superior picomolar sensitivity is being challenged by competing technologies such as those using superparamagnetic contrast agents. At the same time, nuclear medicine also maintains its potential for unique target selection in diagnostics.

Nuclear medicine must preserve its status as an independent gatekeeper, both in service delivery and in research and teaching. It must also be able and willing to cross fields and disciplines and offer and receive cross-fertilization. Although this will not be easy, it is the welcome consequence of the coming together of several disciplines and imaging technologies. Multimodality imaging—and not just PET/CT and SPECT/CT—is here to stay.

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