

Redesigned Curricula, Stringent Licensing Criteria, and Integrated Independence Are Conditions for a Bright Future for Nuclear Medicine in the United States

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In a recent editorial entitled, “The Future of Nuclear Medicine in the United States,” Graham lists several major problems jeopardizing the future of the field in the United States (1). These include the dwindling number of active Accreditation Council for Graduate Medical Education–certified training programs, the low number of qualified trainees, the inadequate training (often only 1–2 y) of future nuclear medicine physicians, the woefully inadequate 4 mo of nuclear medicine training for radiologists, resulting in a license to provide all diagnostic and therapeutic nuclear medicine services (nuclear medicine is defined by the medical application of radiopharmaceuticals for diagnosis and therapy; internationally, only after extensive training can certified nuclear medicine personnel [physicians, technologists] administer these agents), and the resulting shortage of the workforce required to provide quality services for the rapidly evolving and growing field of theranostics.

Graham proposes solutions including more rigorous requirements for licensing and extending nuclear medicine training by at least 1 y. Yet, his proposed solutions are not sufficiently far-reaching. To prosper in the United States, nuclear medicine requires a redesigned training curriculum, stringent licensing criteria, and a status as a well-integrated but independent department as outlined below.

A REDESIGNED CURRICULUM AND STRINGENT LICENSING CRITERIA ARE NEEDED

We previously proposed a 4-y training program that matches the educational standards applied worldwide (2). The first 3 y of the training program should be mandatory for any physician seeking single or dual board certification in nuclear medicine (e.g., radiologists, radiation oncologists, cardiologists, or internists). The license to practice nuclear medicine services should be granted only after certification by the American Board of Nuclear Medicine. Training in hybrid imaging with our colleagues in radiology and mastering the essentials of nuclear medicine are essential. However, interpreting scans at high quality is only one of many skills required to practice nuclear medicine. Training also requires meaningful rotations and reciprocal experience in oncology, radiation oncology, urology, neurology, cardiology, and endocrinology,

selected by trainee interest and preference. Figure 1 depicts the domains of nuclear medicine and how these intersect and are integrated with other disciplines. This is of particular importance with the emergence of theranostics as a key component and growth area of nuclear medicine. Patients deserve the best diagnostic and therapeutic care by a team of exceptionally trained experts. The demand for theranostic services will increase, and specialists need to serve as consultants on an equal level with oncologists, urologists, and radiation oncologists to appropriately integrate nuclear medicine therapies into patient care. Nuclear medicine has done decades of research and translation to establish these therapies. Only nuclear medicine has the license, the established infrastructure, the technical and nursing expertise, and the radiation safety knowledge to provide these services safely. Nuclear medicine must deliver these services competently and consistently at high quality.

INTEGRATED INDEPENDENCE IS THE FOUNDATION OF SUCCESS

Nuclear medicine is a highly successful independent specialty in most parts of the world. The lack of independence is among the key reasons for its current problems in the United States. Although close collaborations with radiology are necessary and highly desirable, they are not sufficient (Fig. 1). Integration of some aspects of training and practice does not preclude independence. Nuclear medicine departments headed by certified or dual-certified nuclear medicine experts need to become the rule rather than the very rare exception. This is because programmatic and fiscal responsibility foster a sense of ownership that is among the strongest drivers of progress and success in research and the clinic. The research and clinical investments depend on the expertise of the investors. In nuclear medicine, the investors should be nuclear medicine experts. They need direct access to highest-level decision makers in hospitals and academic centers to move the field forward. Such direct access is often not available at the level of radiology divisions.

As Graham emphasizes (1), research is the backbone and core and is essential for the future of nuclear medicine. Nuclear medicine has integrated biology, radiation biology, radiochemistry, physics and instrumentation, radiopharmaceutical sciences, radiochemistry, and pharmacology to create molecular imaging with PET and SPECT and to develop the field of theranostics and radiopharmaceutical therapies (Fig. 1). Science is the foundation of what we do. Our research priorities are different from those

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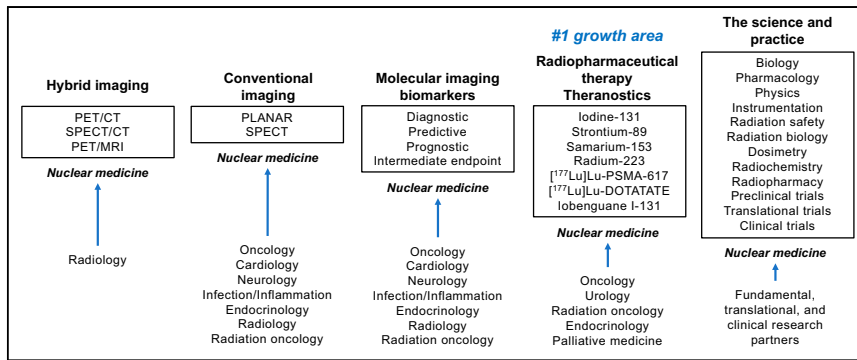


FIGURE 1. Core competencies and alliances in nuclear medicine in 2020s.

of other fields. That is why integrated but fiscally independent nuclear medicine departments with programmatic decision power need to become the rule in the United States.

In summary, training programs need to produce highly competent consultants who provide diagnostic and therapeutic nuclear medicine services, well integrated in the care of patients. Only fully trained specialists should be licensed to provide diagnostic and therapeutic nuclear medicine services. We thus agree with Graham but suggest a more forceful approach based on integrated programmatic and fiscal independence. In the United States, we need completely revised board certification and stringent licensing standards. We must promote nuclear medicine as a highly sophisticated individualized breakthrough technology to attract young talent to the field. All this can result in a revitalized, vibrant, financially healthy, academically exciting, and clinically powerful discipline matching the status and promise of the field in other parts of the world.

Implementation of a more rigorous and expansive curriculum following international models (3,4) will take time and thus will not address the urgent problem of the shortage of well-trained

physicians. However, some strategies could be immediately implemented. Centers of excellence as certified by Society of Nuclear Medicine and Molecular Imaging should offer 1-y fellowships with comprehensive society-sanctioned curricula. These could attract interested clinicians from other disciplines, including radiology, radiation oncology, and oncology. This time could be credited toward board certification in nuclear medicine for those who are interested in dual certification.

There may be a risk that extending nuclear medicine training may decrease the interest and enthusiasm of potential trainees. However, our field has recently become so attractive with its leadership in precision medicine that a longer period of training together with much improved professional opportunities might be not only acceptable but in fact embraced.

DISCLOSURE

No potential conflict of interest relevant to this article was reported.

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