in PET and PET/CT, CT, nuclear cardiology, molecular imaging, brain imaging, and basic science.

The SNMTS has been moving forward on 2 major education initiatives: (1) meeting the SNMTS recommendation of a baccalaureate degree for entry-level nuclear medicine technologists; and (2) establishing an advanced nuclear medicine technologist position. The Educators' Committee Curriculum Task Force completed the fourth edition of the *Nuclear Medicine Technologist Curriculum Guide* in 2008 as a starting point for following through on the nuclear medicine technologist entry-level recommendation. The first edition of the *Nuclear Medicine Advanced Associate Curriculum Guide* was also completed in 2008. The NMAA position has been recognized by the SNM, ACR, Joint Review Committee on Educational Programs in Nuclear Medicine Technology, Nuclear Medicine Technology Certification Board, American Registry of Radiologic Technologists, and American Society of Radiologic Technologists. Efforts now focus on launching the first NMAA program in 2009 and obtaining recognition from the U.S. Departments of Labor and Education.

New live courses were introduced in 2008 for nuclear medicine technologists. Those seeking PET certification had the opportunity to participate in the first PET Review Course and Mock Exam, which focused specifically on materials needed to prepare for the actual exam. The first Nuclear Cardiology Technologist Review Course and Mock Exam were held at the 2008 SNM Annual Meeting. A second nuclear cardiology technologist course was held in September, and more courses for both PET and nuclear cardiology certification preparation will now be held annually.

Scientific Program Committee: The 2008 SNM Mid-Winter Education Symposium was the second to be held in conjunction with the American College of Nuclear Physicians (ACNP) Annual Meeting. The meeting was quite successful, with the highest attendance to date. The CT Case Review Workshop was held on Friday and Saturday and was recorded to develop an online version of the workshop. Presentation topics included Instrumentation and Radiopharmaceuticals for Molecular Imaging, Cardiovascular Nuclear Imaging, Gastrointestinal Update, and SPECT and PET Quantification. Technologist sessions focused on the business and science of nuclear medicine.

The 55th SNM Annual Meeting, held in New Orleans, LA, offered new features. A third basic science summary session in molecular imaging was introduced, as well as a new molecular imaging–related scientific track. More than 1,600 presentations and posters and more than 80 continuing education sessions were included. InfoSNM was continued, offering expanded topics. Live SAM credit sessions were held for the first time, with much success. More than 20 sessions were captured for the 2008 Annual Meeting Highlights Webcast, which went live in October.

Continuing Education Committee: This year has been very challenging for continuing education. With the ACCME Revised Criteria now guiding all activities, efforts have focused on involving all aspects of SNM in meeting the criteria and raising the bar on content and evaluation of education activities. In addition, the outside focus on commercial support and conflicts of interest has created real challenges in planning and meeting budgets for this year's Mid-Winter Education Symposium and Annual Meeting.

Young Professionals Committee: The second year of the YPC Strategic Plan saw many of the goals and objectives completed or in progress. Most SNM committees, councils, and centers of excellence now have young professional members. The YPC has been active over the past year, offering the opportunity to exchange information, ask questions, and obtain updates on activities and issues relevant to all young professionals. Efforts to increase the number of scientist members continue to be at the top of the list for the committee.

The 55th SNM Annual Meeting offered the most YPC activities since the formation of the committee. In addition to the annual YPC Luncheon, which for the first time offered continuing education credit, the YPC hosted the 2nd Annual YPC Knowledge Bowl. The committee also organized 3 continuing education sessions: The Robert Lull Forum on leadership topics, which was cosponsored by the ACNP Residents Section; Basics of MRI, which was 1 of the SAM sessions; and a session on grantsmanship.

George Segall, MD
Chair, SNM Commission on Education
N. Lynn Barnes, MEd
Director of Education, SNM

From the SNM Committee on Continuing Education

Since its inception in 1954, SNM has offered continuing education (CE). At first, CE was almost entirely didactic lecture delivered by distinguished faculty to attendees at meetings. In the 1970s, some of these lectures began to be distributed to members more widely via reproduction of lectures slides and later by slide sets accompanied by audiotapes captured at these meetings. In the 1980s, videotapes of CE lectures replaced slide sets. In 1998, SNM first began offering CE "enduring materials" from sessions at the annual SNM scientific meetings in digital format on CD-ROM. In 1999, SNM began offering CE credit to readers of specially designated CE articles in *The Journal of Nuclear Medicine* (*JNM*).

In the subsequent decade, the SNM CE program has evolved from a minor aspect of the society into a multifaceted educational operation. In 2006, the Accreditation Council of Continuing Medical Education (ACCME) mandated that CE become integral to all aspects of SNM. The ACCME also required CE to refocus on continuous professional development. In response and to retain ACCME accreditation, a global review of SNM in 2007 resulted in revision of the SNM mission, with a new aim to become the primary international provider of multidisciplinary education for nuclear medicine constituents, with CE central to all operations. This immediately resulted in 2007 in an expansion of CE programs, including both live CE courses (at the SNM annual scientific meetings, SNM Mid-Winter educational symposia, SNM Learning Center workshops, and jointly sponsored meetings with local SNM chapters and other medical professional educational organizations) and expanded enduring CE materials (educational CD-ROMs, publications, online courses, *JNM* CE, Lifelong Learning and Self-Assessment Program [LLSAP] materials, etc.).

The average nuclear medicine practitioner obtains approximately 30 h of live SNM-sponsored CE (category 1 American Medical Association) credit each year from onsite attendance at SNM-sponsored CE sessions. Because most U.S. practitioners generally need on average a minimum of 50 category 1 credits annually for relicensure and hospital reappointment, demand is growing for additional CE offerings to fill this gap. SNM is meeting this demand with digital capture of offsite enduring CE materials that can be made readily available to SNM constituents. The growing complexity of our practitioners' professional lives and the rising expenses involved in travel to attend CE meetings are shifting CE utilization in this direction. These enduring materials are continually reviewed by SNM experts on a revolving basis (at least once every 3 y) for accuracy and timeliness to determine the need for updating or replacement of content. Polling of SNM members, meeting attendees, and *JNM* readers is a frequent and valuable source of data for CME needs assessment. Recent surveys in 2008 identified a need for enhancement of CE offerings in pure cardiology, CT case interpretation, and the science of molecular imaging.

Another major external driver of CE is the influence exerted by think tank organizations such as the Institute of Medicine of the National Academies and the Council of Medical Specialty Societies (CMSS), which together have called for significant improvements in delivery of U.S. medical care through a mandated integration of performance improvement (PI) principles into CE offerings by professional organizations. This has placed pressure on the accrediting medical professional certifying boards, such as the American Board of Nuclear Medicine (ABNM) and American Board of Radiology (ABR), to mandate recertification each decade for all diplomates, requiring proof that they have maintained their foundational professional knowledge (i.e., that they know it). This program is now entitled Maintenance of Certification (MOC). The MOC II program, requiring documentation by diplomates of longitudinal and continuous self-assessment of knowledge through CE participation, and the MOC III program, with formal examination of knowledge (written test), are the vehicles provided by the various member boards to satisfy these requirements. In this way, all CE must now be centered around MOC. In effect, this unfunded mandate requires all medical specialty boards, including the ABNM and the ABR, to become actively involved in CE. This has created ever-tighter connections between the ABNM and SNM and between the ABR and the American College of Radiology (ACR), with bridges formed by CE across all 4 organizations and others representing the U.S. imaging specialties.

In 2008, CMSS announced that the CE focus should shift from a reinforcement of minimum current knowledge and skills to a study of the components that define mastery (i.e., those that qualify an individual as an expert). All medical specialties will be challenged in the attempt to define that combination of horizontal and vertical thinking with clinical experience that becomes the gestalt of the master clinician/diagnostician. The CMSS goal in this effort is to improve measurable patient outcomes, another mandate delivered to all medical specialty societies by their accreditor through a CMSS directive in 2006 that defines this effort as Part IV of MOC. Part IV MOC calls for all medical specialties to enact practice performance assessment (PPA) as an integral part of CE (i.e., verifying that diplomates know it AND do it). In response, the ABR and the ABNM, together with SNM and the ACR, have called for 3 PPA projects per 10-y certification/recertification cycle for diplomates. This moves each diplomate beyond the earlier goal of proving that the CE material has been learned (MOC III) into PI analysis of their clinical outcomes to prove not only that they know it but also that they do it (MOC Part IV). Completion of these PPA projects, as well as passing recertifying exams, will be necessary for ABNM and ABR recertification in the future. There have been suggestions that satisfaction of these CE requirements in the future may be linked to reimbursement approval by third-party payers of all types.

Obviously, the continuous, career-long transfer of knowledge, proof of understanding through testing, and collection of various outcomes data will place ever-greater responsibility on digital information collection and transfer. SNM is rapidly moving to accomplish this goal. Members will begin to see a more user-friendly Web interface. MOC IV projects will link SNM, ACR, ABNM, and ABR through shared CE and PPA projects in 2009. Feedback from nuclear medicine practitioners will be valuable as we develop these educational partnerships and as we tie CE content to ABNM and ABR educational requirements for recertification. As awareness grows among members about MOC IV, SNM anticipates the need for more CE on outcomes assessment methodology to build upon the large and varied inventory of CE designed to satisfy MOC II and III.

In summary, SNM CE in 2009 will be expanding to provide members and the larger medical community a bridge to the knowledge required for the future practice of our specialty and to recertification. The greatest challenge will be to convert this knowledge into documented improvements in our delivery of care through MOC Part IV.

Arnold M. Strashun, MD
Chair, SNM Committee on Continuing Education

From the Medical Internal Radiation Dose Committee

The Medical Internal Radiation Dose (MIRD) Committee was formed in 1965 "to provide medical and scientific communities with the most accurate estimate of the dose that a patient receives from radiopharmaceuticals administered for diagnostic studies" (*1*). The committee's charter was to "collect, collate, and evaluate metabolic, chemical and nuclear data on various radiopharmaceuticals and merge this information into a realistic estimate of the patient dose using the most appropriate dose calculation techniques." At its founding, Monte Blau, PhD, and Ed Smith, DSc, served as cochairs, and the initial membership also included John McAfee, MD, Richard Peterson, MD, James Robertson, MD, PhD, and Henry Wagner, Jr., MD. Mones Berman, PhD, Robert Loevinger, PhD, and Gordon L. Brownell, PhD, served as consultants to the committee. The group agreed that the mission of the committee would be the technical evaluation of dose and not the evaluation of hazards, efficacy, and other such topics as "critical" organ dose.

Early committee discussions focused on moving away from assumptions of uniform distributions of activity throughout the whole body and also on establishing a unified approach to performing dosimetry. The results of these efforts, published as MIRD Pamphlet No. 1 (Loevinger and Berman, 1968), revolutionized dosimetry by abandoning the use of the roentgen as a unit and devising a formulation that no longer used the specific γ-ray constant, Γ, and the geometric factor, $\bar{g}$, in absorbed dose calculations. In subsequent pamphlets, the MIRD Committee introduced the concepts of absorbed fraction and S value that now form the basis for almost all radionuclide dosimetry and that are embedded in such popular dosimetry software as OLINDA (*2*). Even more recently, the MIRD formalism has been extended to cellular and subcellular source and target regions, with the publication of a volume tabulating cellular S values (*3*).

Forty years after the publication of MIRD Pamphlet No. 1, the MIRD Committee is engaged in an expansion of its mission. To address the requirements of therapeutic nuclear medicine and the emerging use of α-particle–emitting radionuclides, the committee is moving beyond "the technical evaluation of dose" for diagnostic studies and is cautiously espousing radiobiological modeling to help translate absorbed dose to biological effects for therapeutic studies. The committee has taken the first step in this direction with the recently published Pamphlet 20 (*4*). Pamphlet 20 uses the multiregion kidney model of Pamphlet 19 to examine the biological implications of different spatial absorbed dose distributions delivered at different dose-rates. As shown in the Pamphlet 20, this analysis utilized the linear-quadratic model to characterize dose-dependent clonogenic cell survival and a model to describe repair of radiation-induced damage in order to arrive at a radiobiological model that accounts for the impact of dose-rate and spatial nonuniformity on cellular and organ survival.

George Sgouros, PhD

Radiobiological modeling requires expansion of the well-established MIRD schema described in Pamphlets 1–12 and in the MIRD primer (*5*). As a first step toward this objective, the MIRD Committee has extended the schema (Pamphlet 21, in press) to encompass calculations related to radiation protection as originally defined by the International Commission on Radiological Protection (ICRP). Accordingly, Pamphlet 21 is coauthored by 2 members of Committee 2 of the ICRP, who have endorsed the MIRD dose calculation formalism. To the relief of medical physics and radiation protection students, this should eliminate the confusion arising from having 2 different sets of symbols and equations representing the same physical quantities and calculations.

In recognition of the increasing prominence of α-particle–emitter therapy in therapeutic nuclear medicine and the challenges that use of such high linear energy transfer emissions will present to absorbed dose estimation, the committee recently submitted a detailed review of α-particle emitters considered or used in targeted radionuclide therapy as well as their dosimetry and radiobiology (Pamphlet 22).

Absorbed dose estimates for α-particle emitters, as well as DNA-incorporated Auger-electron emitters, have highlighted a fundamental problem with the current dosimetry formalism in terms of the available dosimetric quantities and related units. In radiation protection or in the diagnostic use of radiopharmaceuticals (in the realm of stochastic effects), the product of absorbed dose in grays and the radiation weighting factor is defined as the equivalent dose. Equivalent dose values are designated by a special named unit, the sievert. Unlike the situation for stochastic effects, no well-defined formalism or associated special named quantities have