SNMMI and FDA Compounding Guidance

SNMMI leadership submitted comments on February 28 to the U.S. Food and Drug Administration (FDA) on draft guidance for "Compounding and Repackaging of Radiopharmaceuticals by State-Licensed Nuclear Pharmacies." The guidance was published in December 2016, with language explaining that, under current law, radiopharmaceuticals compounded or repackaged by state-licensed nuclear pharmacies and federal facilities are subject to all applicable provisions of the Federal Food, Drug, and Cosmetic Act related to production of drugs. However, FDA also stated that the agency recognizes that state-licensed pharmacies and federal facilities sometimes compound or repackage radiopharmaceuticals for specific patients without obtaining FDA approval or meeting certain other requirements. According to the FDA, "the policies proposed in the draft guidances attempt to strike an important balance between patient access to radiopharmaceuticals compounded or repackaged by state-licensed nuclear pharmacies, federal facilities, and outsourcing facilities, and the risks that such unapproved drugs present to patients." These risks have been highlighted by widely publicized adverse events associated with products from compounding pharmacies, including 64 deaths from meningitis in 2012.

SNMMI indicated that the society is "broadly supportive" of the new guidance. However, the comments submitted to the agency strongly recommended that the FDA work with the U.S. Pharmacopeial Convention (USP) to develop a common understanding of activities defined and involved in the compounding of radiopharmaceuticals. In a related statement, SNMMI leaders noted that the society "has submitted comments on other general guidances related to compounding but has long awaited specific guidance for radiopharmaceuticals."

Concerns addressed in the SNMMI comments included the need for specific language to: address PET drugs prepared from kits, stipulate the need for physician-supervised compounding in hospital nuclear medicine departments, more precisely define "minor deviations," and identify appropriate beyond-use dates for compounded radiopharmaceuticals. In encouraging the FDA to work directly with the USP to develop a public standard for the compounding of sterile radiopharmaceuticals (i.e., a separate chapter), SNMMI recommended that the FDA withhold further development of guidance documents related to radiopharmaceutical compounding, including the current draft guidance under consideration. The comments concluded: "Instead, we believe the FDA should be an active participant in the USP standards-setting process. By actively supporting the USP process and foregoing its own standards through guidance documents until after the USP public standard process, FDA efforts will lead to stronger, more comprehensive standards that are easy to understand, follow, and enforce."

SNMMI

2017–2019 SNMMI Councils and COE Interns

On February 23, SNMMI announced the names of the 2017–2019 interns for its Clinical Trials Network, councils, and centers of excellence. The internship program was created to provide young professionals (physicians, technologists, and scientists) with the opportunity to become involved with society activities. Interns are provided with a mentor and are expected to be actively engaged in the work of their council or center, as well as to complete a project. Each internship includes a travel stipend of up to $1,500 per year for attendance at the SNMMI Mid-Winter and/or Annual Meetings. Interns may be nominated to serve on their council boards of directors and may stand for election upon successful completion of their internships. Applications for internship are reviewed by each council and center board of directors. These internships will begin in mid-June, at the end of the SNMMI 2017 Annual Meeting.

The 2017–2019 interns are: Clinical Trials Network—Courtney Lawhn Heath, MD, University of California San Francisco, and Lt. Commander Colin Raymond Young, MC, USN, Walter Reed National Military Medical Center (Bethesda, MD); Academic Council—Rustain Morgan, MD, MS, University of Colorado (Aurora); Brain Imaging Council—Kristina Hoque, MS, MD, PhD, University of Southern California Keck School of Medicine (Los Angeles); Cardiovascular Council—Stephanie Thorn, PhD, Yale Translational Research Imaging Center (New Haven, CT), and Richard D. Weinberg, MD, PhD, University of Michigan (Ann Arbor); Computer and Instrumentation Council—Nikolaos Karakatsanis, PhD, Icahn School of Medicine (Mount Sinai, NY); Correlative Imaging Council—Christopher Owens, RT, CNMT, Chattanooga Imaging (TN); General Clinical Nuclear Medicine Council—-Kasha Balestrieri, CNMT, Spectrum Radiology (Williamsville NY); Pediatric Imaging Council—Matthew Robertson, MD, Nationwide Children's Hospital (Columbus, OH); Radiopharmaceutical Sciences Council—Emily Ehlerding, BS, MS, University of Wisconsin–Madison; Center for Molecular Imaging Innovation & Translation—-Thomas S.C. Ng, MD, PhD, Brigham and Women's Hospital (Boston, MA); and PET Center of Excellence—-Shelley Acuff RT, CNMT, University of Tennessee Graduate School of Medicine (Knoxville), and Sonya Park, MD, Stanford University Medical Center (Palo Alto, CA).

SNMMI

IAEA and EANM Collaborate on NM Training

The International Atomic Energy Agency (IAEA) and the European Association of Nuclear Medicine (EANM) announced on March 21 that a cooperative agreement between the 2 entities had been signed, aimed at increasing

global training opportunities in nuclear medicine and hybrid imaging. The IAEA and EANM have a long history of cooperative endeavors both in Europe and in countries undergoing technologic and economic development. "The arrangement signed today will further expand this cooperation, increasing educational opportunities for professionals in nuclear medicine and hybrid imaging," said Diana Paez, MD, MEd, head of the Nuclear Medicine and Diagnostic Imaging Section at the IAEA. Under the new agreement, EANM will provide experts and infrastructure for IAEA training courses and expert missions to low- and middle-income countries and will work closely with the IAEA on development of more no-cost and interactive educational materials for the IAEA Human Health Campus.

"The agreement is an incentive for EANM to further improve the quality of education in nuclear medicine," said EANM President Kristoff Muylle, MD. In response to rising demand for dedicated training in hybrid imaging and new therapeutic applications in nuclear medicine, EANM has recently modernized its educational offerings and founded the European School of Multimodality Imaging and Therapy, which will now be open to IAEA-nominated professionals.

To date, more than 90 nuclear medicine professionals have benefitted from ongoing cooperation between the 2 organizations. Sergei Nazarenko, MD, head of the Nuclear Medicine Department at the North Estonia Medical Centre (Tallinn), has been among the beneficiaries. "Smaller European countries like Estonia have practical challenges because of their size," he said. "In order to assure availability of knowledge and competences to our local specialists, we need extensive international cooperation like the one just signed."

International Atomic Energy Agency

FROM THE LITERATURE

Each month the editor of Newsline selects articles on diagnostic, therapeutic, research, and practice issues from a range of international publications. Most selections come from outside the standard canon of nuclear medicine and radiology journals. These briefs are offered as a monthly window on the broad arena of medical and scientific endeavor in which nuclear medicine now plays an essential role. The lines between diagnosis and therapy are sometimes blurred, as radiolabels are increasingly used as adjuncts to therapy and/or as active agents in therapeutic regimens, and these shifting lines are reflected in the briefs presented here. We have also added a small section on noteworthy reviews of the literature.

PET and Nanoparticle Monitoring in Breast Cancer

In an article e-published on March 15 ahead of print in *Clinical Cancer Research*, Lee, from Merrimack Pharmaceuticals, Inc. (Cambridge, MA), and a consortium of academic and industry researchers from across the United States reported on a study using PET to assess the enhanced permeability and retention effect (EPR) of therapeutic nanoparticles in patients with HER2-positive metastatic breast cancer. The study included 19 such patients who underwent serial PET imaging after administration of ^{64}Cu-HER2-targeted PEGylated liposomal doxorubicin (^{64}Cu-MM-302) during a clinical trial of MM-302 and trastuzumab with or without cyclophosphamide. In imaging acquired at 24 and 48 h postadministration, MM-302 uptake varied 35-fold (0.52–18.5 %ID/kg), with accumulation in bone and brain lesions independent of systemic plasma exposure. Additional analyses classified patients by lesion deposition with a cutpoint comparable to response thresholds in preclinical studies. Separate retrospective analyses of patient outcomes by drug levels in tumor lesions found high ^{64}Cu-MM-302 deposition to be associated with more favorable treatment outcomes. The authors concluded that these findings "provide important evidence and quantification of the EPR effect in human metastatic tumors and support imaging nanoparticle deposition in tumors as a potential means to identify patients well-suited for treatment with therapeutic nanoparticles."

Clinical Cancer Research

MRS- and PET-Guided Biopsy and Neuronavigation

Grech-Sollars et al. from Imperial College London (UK) and Salford Royal NHS Foundation Trust (UK) reported on March 17 ahead of print in the *Journal of Neurosurgery* on a technique integrating presurgical PET and MR spectroscopy with intraoperative neuronavigation to guide surgical biopsy and tumor sampling of brain gliomas. The technique is targeted at improving intraoperative tumor-tissue characterization and imaging biomarker validation. The article described the development of the intraoperative neuronavigation tool to sample high-choline tumor components identified by multivoxel MR spectroscopy and ^{18}F-methylcholine PET/CT. Coregistered data from the 2 imaging modalities were assembled into structural datasets and loaded into the intraoperative system. The system depicted high- and low-choline uptake/metabolite regions as color-coded hollow 3D spheres to facilitate targeted stereotactic biopsy and tumor sampling. In surgical trials, the spherical targets were easily visualized on the interactive system. In one example case, areas of high uptake on PET and elevated choline ratios on MR spectroscopy identified sites of high mitotic activity in an otherwise low-grade tumor. The authors concluded that although "the technique was applied for characterizing choline metabolism using MR spectroscopy and ^{18}F PET. . .this approach provides proof of principle for using different radionuclide