a brief FAQ available at: https://questions.cms.gov/faq.php?id=5005&faqId=7731) clarifies confusion over the fact that a single Provider Enrollment, Chain, and Ownership System (PECOS) code did not exist for the entirety of radiology. It also clarifies which radiologists are eligible to apply for a hardship exception to avoid Medicare payment adjustments in 2015. Under the revised guidance, the PECOS code now lists radiology as including diagnostic radiology, interventional radiology, and nuclear medicine.

SNMMI

Molecular Imaging Workshop in India

A 1-day preconference workshop on "Molecular Imaging in Oncology" was held on November 21 ahead of the International Conference on Radiation Biology 2012 at the Advanced Centre for Treatment Research and Education in Cancer in Mumbai, India. The aim of the workshop was to introduce the fundamentals and various applications of molecular imaging, along with hands-on demonstrations of various imaging techniques. The first session reviewed applications of nuclear imaging in clinical oncology and preclinical studies. The second session was dedicated to the principles, techniques, and in vitro and in vivo applications of bioluminescence, fluorescence, and multimodal imaging, including nanotechnology. The talks were followed by a laboratory demonstration of microscopy, preclinical PET, and fluorescence imaging techniques.

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IN MEMORIAM

Paul Numerof, PhD 1922–2013

Paul Numerof, PhD, a nuclear pioneer and member of the Manhattan Project research team, died on January 12 in St. Louis, MO. He grew up in Philadelphia (PA), the son of Russian immigrants. He graduated from Temple University and enlisted in the U.S. Army in World War II. His interest in chemistry led to an invitation to join more than 2,500 chemists, physicists, mathematicians, and others in Los Alamos, NM, for what would become the Manhattan Project. Numerof led a team that developed the process for preparation of weapon-grade uranium.

At the end of the war, he enrolled in Carnegie Institute of Technology and completed a doctorate in chemistry. He then worked for E.R. Squibb and Sons in early medical isotope investigation and sales and went on to lead the Squibb Division of Nuclear Medicine. He developed small nuclear isotope generators for hospital use and lectured and published widely on medical isotopes. After 25 years with Squibb, retiring as vice president of the Hospital Division, Numerof left to serve as a private consultant for major corporations. He developed techniques to neutralize hazardous chemicals spills for industries and emergency response units. He taught college level mathematics, management, and marketing, and became a full professor at Pace University. In 1990, he moved to Vail, CO, where he was an ardent hiker, skier, and naturalist, as well as a popular lecturer and tutor at Vail Mountain School and Colorado Mountain College.

He traveled the world to every continent, including Antarctica, which he visited twice. He was a lover of classical music and an admirer of Native American art. With his wife, he established The Collector's Room, a gallery in Vail.

In 2007 Numerof published a memoir of his participation in and perceptions of the Manhattan Project, titled *In August 1945*.

Arthur Weis, JD, PhD 1922–2013

Arthur (Art) Weis, JD, PhD, founder and chair of the board of Capintec, Inc. and a pioneer in the development of nuclear medicine, died on January 20. Capintec has been a global consultant and supplier of nuclear medical equipment and systems for almost half a century.

Weiss entered the U.S. Naval Academy in the last year of World War II and was a graduate of the Rensselaer Polytechnic Institute. He received his JD from Rutgers Law School and became a patent attorney, later inventing a nuclear thermionic fuel cell that was used as a power supply for spacecraft launched in the 1960s. In addition to his longtime career at Capintec, he served as president and director of Brevatome USA, Inc. and was a consultant to the French Atomic Energy Commission, the Italian Atomic Energy Commission, and numerous Japanese companies in nuclear power and nuclear medicine.

In 2008, Weis received the SNMMI Presidential Distinguished Service award in recognition of continual dedication to the society. In 1993, Weis was featured in an interview in Newsline (*J Nucl Med.* 1993;34[6]:30N–32N), where he drew on his deep experience in the field to provide prescient insights into the future of the field. "The future of nuclear medicine obviously is dependent on the development of new radiopharmaceuticals, but you can't compete with static imaging modalities like CT and MRI. You've got to be able to do things that they can't and do them very cost effectively. That means reliance not so much on pretty pictures but useful information," he told the interviewer. Weis went on to predict the

challenges that would be posed by radioisotope supplies in the United States: "It's in our national interest to have a domestic source of these basic, important materials. If we as a country can spend $8 billion on the Superconducting Super Collider, why can't we spend the relatively small sum it would take not only to develop new types of radionuclides but also to supply isotopes for clinical nuclear medicine?"

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.

FLT + FDG PET Tumor Imaging

Kadmas et al. from the University of Utah (Salt Lake City) reported in the February 7 issue of *Physics in Medicine and Biology* (2013;58:429–449) on an investigation of techniques for single-scan, dual-tracer ^{18}F-FDG and ^{18}F-fluorothymidine (^{18}F-FLT) PET tumor imaging. Although the 2 tracers provide complementary information, the combination is technically challenging because the tracers have similar half-lives and a short delay between injections. The authors described simulation studies performed to characterize dual-tracer signal-separation performance for imaging protocols with varying injection orders and with varied injection delays (10–60 min). They identified superior performance when ^{18}F-FLT was injected first and noted an optimal 30-min delay time between injections. They also investigated the robustness of these findings in PET/CT imaging of 5 patients with primary brain tumors. Data from separate scans of each tracer were combined to synthesize dual-tracer scans with known single-tracer components. The results showed similar dual-tracer signal recovery performance and confirmed the simulation study findings. The authors concluded that "rapid dual-tracer FLT + FDG tumor imaging is feasible and can provide quantitative tumor imaging measures comparable to those from conventional separate-scan imaging."

Physics in Medicine and Biology

ImmunoPET and Lymph Node Lymphangiogenesis

In an article in the January issue of *Methods in Molecular Biology* (2013;961:129–140), Mumprecht and Detmar from the Swiss Federal Institute of Technology (Zurich, Switzerland) reported on a PET-based noninvasive methodology for imaging lymphangiogenesis in vivo in mice, originally described by their group in *Cancer Research* (2010;70:8842–8851). In addition to reviewing current literature on the significant role of lymph node angiogenesis in tumor metastasis, inflammation resolution, and dendritic cell migration to the lymph nodes, the authors described their in vivo imaging approach using a radioactively labeled antibody against the lymphatic vessel endothelial hyaluronan receptor-1 (LYVE-1), which is almost exclusively expressed on lymphatic vessels. Initial investigations showing accumulation of the injected anti-LYVE-1 antibody in mouse lymphatic vessels were reviewed, and the authors discussed the potential translational and clinical implications of this technique.

Methods in Molecular Biology

Hypoxia-Targeted RT Dose Painting for HNSCC

Chang et al. from Austin Health (Victoria, Australia) reported on January 15 ahead of print in *Acta Oncologica* on a study investigating the use of ^{18}F-fluoromisonidazole (^{18}F-FMISO) PET-guided radiation therapy (RT) dose painting as a means for overcoming the radioresistant effects of hypoxia in head and neck squamous cell carcinoma (HNSCC). The study included 8 patients with HNSCC who were scheduled for definitive RT. Pre-RT PET imaging results were used to automatically generate hypoxic subvolumes, and 3 RT plans were generated for each patient: a standard (STD) plan to a dose of 70 Gy, a uniform dose escalation (UDE) plan to standard target volumes to a dose of 84 Gy, and a hypoxia dose–painted (HDP) plan with dose escalation only to the hypoxic subvolume to 84 Gy. Tumor control probabilities (TCP), normal tissue complication probabilities (NTCP), and uncomplicated tumor control probabilities (UTCP) were used to calculate and compare results with each of the plans for each of the patients. The mean TCPs increased to 73% with STD plans, 95% with the UDE plans, and 93% with the HDP plans. The mean parotid NTCP increased from 26% to 44% with the UDE plans, which also increased the mean mandible NTCP from 2% to 27%. The mean UTCP increased from 48% with the STD plans to 66% with the HDP plans and fell to 37% with the UDE plans. The authors concluded that these results suggest that "hypoxia-targeted radiotherapy dose painting for head and neck cancer using FMISO PET is technically feasible" and that "this approach is superior to uniform dose escalation."

Acta Oncologica