

of campus and programs in radiation safety, radio-pharmacy, radiochemistry, health physics, nuclear engineering, and nuclear physics, all of which are working in concert on the project. Purdue has organized an executive committee of deans and vice presidents to provide oversight and policy for the NBTF application process. An Indiana state agency is also involved, analyzing the prospective facility's economic impact on the area. In an ironic twist to the DOE's idea of avoiding federal dependence for the NBTF, Dr. Zeimer said, "Wherever this facility goes, there will have to be state support."

But Donald Erb, director of DOE's Isotope Production and Distribution program, remains confident that the direction the DOE has taken for the NBTF is the best. "We're trying to break new ground and see what new arrangements are possible in cost-sharing," he said. "Knowing the way

the bureaucracy works, and that there's a commercial accelerator capacity in this country, this is the way to answer the needs of radio-pharmacy professionals: to form a partnership to move this forward, using industry plus government." Dismissing those critics who say "we should just give away appropriations," Mr. Erb asserts that the DOE approach DOE to siting and other aspects of NBTF development will lend a healthy element to the process. In a January 11, 1993 letter (*see Newsline*, April 1993, p. 18N), SNM and ACNP advised William Happer, PhD, director of the Office of Energy Research, that to one of the healthiest elements DOE can offer in the process is the use of peer review every step. Mr. Erb stated that the decision of who will grant the funds will probably be made by the director of energy research.

*Lantz Miller*

## HIGHLIGHTS OF FIFTH ANNUAL INTERNATIONAL PET CONFERENCE

### **Cost-effectiveness and competitiveness are the key words on applications in neurology, cardiology, and oncology**

THE INSTITUTE OF CLINICAL PET sponsored the Fifth International PET Conference in Tysons Corner, Virginia, October 28-31, 1993. The conference had as one theme the practicality of PET, but with health care reform in the air, this took on the aspect of PET's competitiveness in the medical marketplace. In sessions on neurology, oncology, and cardiology, lecturers returned to PET's position among other diagnostic tools, among therapies, and in relation to surgery, to show PET can cut costs by avoiding expensive medical procedures.

#### **PET's Cost-Effectiveness**

In fact, the first day's entire second session was devoted to "Cost-Effectiveness of PET." Elizabeth F. Brown, MD, medical director at Aetna Health Plans (Chicago, IL), addressing the problem of managed competition in the future health

care system, discussed the use of technology assessment (TA)—an analysis of a technology's safety and effectiveness. Aetna uses TA on medical technologies in determining coverage for PET scans. "We need a process to apply legally to all things from PET scans to quackeries," she said. "We need evidence that a diagnostic technology will change a patient's management." The evidence must appear in a peer-reviewed journal, she said, though this kind of information is limited in the literature (often a study is written by someone whose career is interested in promoting PET, she added). "We'd like more information from specialty societies."

On the issue of cost-effectiveness, Dr. Brown said that her company does not use it now in reimbursement decisions because nothing in the literature allows them to do this; Aetna must rely on what is in the literature, which has few studies focusing on cost-effectiveness as the gist of the study; and something is cost-effective only if it used in a cost-effective way—which is difficult for an insurance company to assess. Thus she called for the development of practice guidelines which cross the various sub-specialties. "PET scanning and diagnostic imaging are high profile," she said. "In the future, they will be under the 'microscope' in cost-cutting discussions."

Mywood C. Besozzi, MD, director of Nuclear

**"PET scanning and diagnostic imaging are high-profile. In the future they will be under the 'microscope' in cost-cutting discussions," said Dr. Brown**

Cardiology at the University of Tennessee Medical Center (Knoxville, TN), spoke on cost savings in cardiology. After pointing out that in 1992 there were an estimated 2.8-3.0 million myocardial perfusion studies at a cost of about \$2.8 billion, and 265,000 bypass procedures at a cost of \$10 billion, he asked how do we bring these numbers down? His institution identifies patient categories, then uses an algorithm to determine the most cost-effective way to treat the patient. For example, patients that have known or suspected cardiovascular disease, with heart failure the main symptom, no chest pain, left ventricular ejection fraction of 35% or less, and a New York Heart Classification of Class III or IV are assessed in the cardiologist's office for a decision on cardiac catheterization. If the condition is not bypassable, the patient is classed as non-surgical; if there are lesions suitable for surgery or angioplasty, then a PET scan can show if the tissues are viable or nonviable. Nonviable tissues call for medical treatment or transplant. Dr. Besozzi pointed out that the cost of false positives in the U.S. that go on to catheterization is \$1.68 billion, but if PET studies had been done, the cost would be only \$400 million—a vast savings.

Jamshid Maddahi, MD, director of the Clinical PET Center at the UCLA School of Medicine (Los Angeles, CA) discussed PET's economic benefits in neurology and oncology. PET scans may determine intractable complex partial epilepsy, dementia, or brain tumor recurrence vs. radiation necrosis. In each case, the neurologist uses PET with neuropsychological techniques, electroencephalographic telemetry, and other methods to narrow down the possible diagnoses; but he pointed out how in some cases, using PET early in the diagnosis can reduce the numbers of patients needing additional tests. In oncology, PET can have an impact on health care costs by avoiding planned surgery; avoiding biopsy of low grade tumors; providing a cost-effective metastatic survey; charting early change in the course of ineffective chemotherapy; and providing a noninvasive differentiation of tumor necrosis from recurrence.

Richard J. Neeson, president and CEO of Keyston Ventures (Bala Cynwyd, PA), spoke on the "Cost Effectiveness of PET from an Insurer's Perspective." His study involved analysis of a Blue Cross Blue Shield claims payments database, determining the real costs of claims paid for cardiac intervention cases. The study then assumed a certain number of those cases were unnecessary, then calculated what the difference in cost if PET scans had been used in these cases. Neeson determined that PET would have curtailed many of the cardiac interventions and saved money. He con-

cluded that though an insurance company would first have to put forward extra money for PET scans, in the long run it would save by having to pay claims for further treatments.

Edward Coleman, MD, professor of radiology and director of Nuclear Medicine at Duke University Medical Center (Durham, NC), described the ICP Cost-Effectiveness Project, which focused primarily on oncology and specifically on solitary pulmonary nodules (SPN). At the time of the conference, the study had enrolled 10 patients, aiming for 100 by the end of the year. Dr. Coleman pointed out that in 1992 there were 168,000 new lung cancer cases and 130,000 solitary pulmonary nodules caused by both malignant and benign tumors—and differentiating benign from malignant prior to thoractomy is suboptimal. ICP initiated the study of PET's role in this differentiation. For this procedure, PET has a sensitivity of 96% and a specificity of 90%, suggesting there can be an increase in patient outcome by using PET: to maximize thoractomies for malignancies and minimize them for benign cases, to provide significant global and patient savings.

"We conclude from this retrospective analysis that PET will make a significant difference in.. patient outcome and cost reduction for the diagnosis and treatment of SPNs," Dr. Coleman said. Current work is in SPNs, breast cancer, and colorectal cancer, covering 4 of 33 PET applications.

#### **Cardiology, Neurology, and Oncology**

Heinrich R. Schelbert, MD, professor of molecular and medical pharmacology at the UCLA School of Medicine, introduced the cardiology session summing up recent trends and development in clinical cardiac PET. Many reports have focused on blood flow metabolism imaging with <sup>18</sup>F deoxyglucose uptake or mismatches in patients with severely reduced left ventricular function, with 75-100% accuracy in predicting post-revascularization improvement. Retrospective analyses showed that PET played a critical role in identifying patients with high 12 month mortality and those likely to benefit from interventional revascularization. <sup>11</sup>C acetate and the perfusable tissue index with <sup>15</sup>O water and CO have recently proven useful for assessing myocardial viability, Dr. Schelbert said, and they hold promise for predicting post-revascularization outcomes in contractile function. Other developments include assessment of myocardial adrenergic density and function using <sup>11</sup>C hydroxyephedrine uptake, and noninvasive quantification of myocardial blood flow using PET.

Echoing the theme of cost-effectiveness, Peter E. Valk, MD, medical director of the Northern Cal-

ifornia PET Imaging Center (Sacramento, CA), discussed methods of increasing patient throughput in the clinical PET center and decreasing tomograph time and imaging costs. He examined the stages of a PET study: transmission acquisition, tracer uptake and localization, emission acquisition, and tracer decay time, with pre-injection transmission acquisition making the most demand on total instrument time. He suggested three ways to increase throughput: through creative scheduling, 3-D data acquisition, and post-injection transmission measurement—the last two recent developments that he felt could reduce imaging time. Tomographs with retractable septa have made possible 3-D or volume data acquisition, which increases detection efficiency and allows 50% reduction in emission acquisition time—though not decreasing total cardiac imaging time, which depends more on  $^{13}\text{N}$  decay time. But postinjection transmission measurements allow use of the tracer decay for transmission acquisition and thus reduce instrument time. A survey of the three ways of increasing throughput showed that scheduling strategies or 3-D data acquisition alone did not significantly increase throughput, but 3-D acquisition combined with postinjection transmission acquisition allowed one more study per day.

K. Lance Gould, MD, professor of medicine, University of Texas-Houston Health Science Center, discussed using noninvasive PET and medical reversal for low-cost management of coronary heart disease. Scientific trials and Dr. Gould's clinical experience showed that 50-80% of patients that undergo arteriography, bypass surgery, or balloon dilation can be managed by PET diagnosis of

coronary artery disease followed by a vigorous risk factor management at cost reductions of 20-50%. Risk factor management includes lowering cholesterol by low-fat diet and cholesterol-lowering drugs, stopping smoking, and establishing an exercise program. He offered his regimen as an example of why PET reimbursement would be cost-effective.

Putting PET within the context of the marketplace, Daniel S. Berman, MD, covered competing modalities in evaluating coronary artery disease, like SPECT, MRI, and ultrafast CT. PET's competitiveness was also significant in the neurology session, as when Sid Gilman, MD, professor and chair of the Department of Neurology, University of Michigan Medical Center (Ann Arbor, MI) discussed PET's utility in neurological disorders. PET can give information about neurological functions like metabolism and blood flow, as MRI and CT cannot, and so may reveal the abnormalities of dementia, or biparietal hypometabolism of Alzheimer's disease, when anatomical imaging studies are normal. Though no one contended that PET should or could displace other imaging modalities, as Heikki Minn, MD, senior physician at the University of Michigan Medical Center, pointed out with head and neck cancer and lymphoma, the complementarity of PET studies with MRI and CT can sometimes be critical in a diagnosis. This might best sum up the conference's theme of PET in the medical marketplace: as a modality that will not displace others but should serve an ever more vital function in diagnostics to cut costs, forego unnecessary procedures, and increase the quality of care. ■

**PET would have curtailed many cardiac interventions and saved money**

#### COMMENTARY

## LINES FROM THE PRESIDENT



**Richard C. Reba, MD**

**O**NE WOULD NEED TO have been living in a very remote province not to be aware that health care reform, in some still-to-be-determined form, is upon us.

When President Clinton delivered his administration's Health Security Act of 1993 to Congress on October 17, a process began which will affect all of our personal and professional lives. Like

any of the precedent-shattering events we've witnessed over

the past four years, this legislation brings with it hope, uncertainty, even fear. In a sense, health care reform is medicine's Berlin Wall: it sometimes seems as if medical practice will be dismantled, stone by carefully laid stone, until nothing recognizable is left of the way most of us have practiced medicine throughout our careers.

And what will the future look like after the wall has fallen between past tradition and future reform? One thing is certain: No one can with confidence describe the detailed outlines of healthcare in the twenty-first century.

What we can do, however, is first analyze the Administration's complex program with the detailed care it deserves. Then, we must come to the national and state bargaining tables pre-