

# NUCLEAR MEDICINE PRACTITIONERS EVALUATE THEIR COST-EFFECTIVENESS

**Turning tide in health care encourages nuclear medicine to emphasize the ways it streamlines diagnoses and treatments and improves patient outcome**



**F**OLLOWING PRESIDENT Clinton's September 23 address on health care reform, the close of the year was marked by increased discussions within the nuclear medicine community about its competitiveness and cost-effectiveness. Though the need for restraining medical costs was apparent before fall 1993, medical specialties have become

ready targets for excision as health care reformers sharpen their scalpels. But nuclear medicine researchers and practitioners are now proffering evidence that their procedures are not merely diagnostic but are integral to the cost-effectiveness of medicine in general. This fall, the SNM formed a three-part Commission on Health Care Policy partly to address the question.

"As health care costs become a bigger concern, cost-effective measures become more and more important," said Earl Steinberg, MD, director of the Program in Medicine, Technology and Practical Assessment at Johns Hopkins University (Baltimore, MD), speaking about medicine in general. "Cost-effectiveness becomes relevant under a constrained budget: how to get more out of your bucks." Outcomes research may reveal how to get the best results for a given expenditure. Henry D. Royal, MD, professor of radiology and associate director of the Division of Nuclear Medicine, Mallinckrodt Institute of Radiology (St. Louis, MO), and head of SNM's new Technology Assessment and Outcomes Research Committee, has been studying just how outcomes research and technology assessment may help contain costs in nuclear medicine. "The shift in medicine has been from doing all we can for a patient to providing

everything we can that gives the best value," Dr. Royal said. "It used to be, with limitless resources, we would upturn all stones. In the future, the concern will be with the best value—the most diagnostic procedures with the least amount of cost."

## Outcomes Research

As Dr. Royal pointed out, outcomes research shifts the focus of ultimate concern from the accuracy of a diagnostic test to the question of how an accurate diagnosis can best affect patient care. For nuclear medicine, outcomes research poses a special difficulty because in that field there is no direct link between a procedure and patient outcome. Thus, Dr. Royal emphasizes the physician's role in outcomes research: "It's essential for physicians to participate in these studies because they know the values [of procedures] best.... I think everyone in nuclear medicine does things whose values they question and are not helpful and that they'll have to eliminate from practice."

Dr. Royal's Technology Assessment and Outcomes Research Committee is studying how to increase the effect of nuclear medicine studies on patient outcomes. He described three areas in which procedures need to be optimized: "(1) People do nuclear medicine differently in different places. Every procedure cannot be the best. We should standardize procedures in a way we think makes optimum use of resources available. (2) Observer variability: everybody cannot be right. There must be an optimal set of interpretation criteria. (3) Indications vary from hospital to hospital. There must be an optimum set of criteria for indications."

Outcome assessment is only one—though highly significant—part of technology assessment (TA), which examines procedural efficacy at several different levels. These efficacy levels fall into a natural hierarchy: technical level, diagnostic accuracy, diagnostic certainty, patient management, patient outcome, and social benefit. Dr. Royal feels that studying patient outcome within this complete context of TA may be the best way to assess how a technology benefits a patient. To determine whether a technology is better than another at a higher efficacy level, one must at least establish it is better at a lower level—though greater efficacy at a lower level does not mean it will be greater at a higher level. Thus, at the technical level, one CT scanner may have higher spatial resolution than another scanner, but this does not necessarily mean

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it offers greater diagnostic accuracy, patient management, or social benefit.

Physicians and clinical researchers are specifically examining nuclear medicine procedures for how they may improve patient management and outcome and thus increase overall cost-effectiveness of treatment. Judy Buchanan, scientific writer at the Johns Hopkins Medical Institutions (Baltimore, MD), described a physician, who wished to remain anonymous, with a patient diagnosed *in utero* with a renal obstruction (bilateral hydronephrosis). Though postnatal examinations confirmed the earlier diagnosis, the patient was asymptomatic: a DPTA scan with lasix washout revealed good function and no evidence of obstruction. Thus, an approximately \$200 test prevented the usual very expensive surgery done on similar patients.

Several researchers are examining how PET studies can circumvent more costly oncological procedures. R. Edward Coleman, MD, professor of radiology and director of Nuclear Medicine, Duke University Medical Center (Durham, NC), has been investigating how PET can help determine whether nodules in the lung are benign or malignant. Typically, a patient gets an x-ray or CT scan, which may show a nodule with characteristics suggesting benignity—but rarely can a CT scan reveal whether the nodule is benign or malignant. A patient may undergo either surgery or biopsy; a positive biopsy for malignancy certainly calls for surgery but, because biopsy is not 100% accurate, patients with negative results usually go on to surgery anyway, even though 30–40% of nodules operated on are benign. But, Dr. Coleman said, "we've found PET is good at showing whether a nodule is benign or malignant."

#### **Multi-Center Oncological Surveys**

Based on surveys of 51 patients at Duke and 34 patients at Creighton, it was found that PET studies of nodules had, at Duke, 100% sensitivity and 89% specificity and, at Creighton, 95% sensitivity and 86% specificity. Dr. Coleman cited studies of 237 patients at 10 centers and found a sensitivity of 96% and specificity of 90%—very similar to the Duke and Creighton surveys—for PET studies of nodules. "Based on this paradigm on the accuracy of the PET scan, we can save hundreds of millions of dollars from thoracotomies," he said. He is now proceeding with a prospective study of 100 patients at several institutions to document the accuracy of this procedure. "Then we'll go through the paradigm again to document the cost savings to medicine," he said.

Steven M. Larson, MD, chief of the Nuclear Medicine Service, Department of Radiology, Memorial Sloan-Kettering Cancer Center (New York, NY) is studying PET scans in colorectal cancer, and Lee Adler, MD, assistant professor of radiology, Case Western University and University Hospital (Cleveland, OH) is conducting a similar study of PET scans in breast cancer. Dr. Adler described three particular applications he is examining to see if they are cost-effective. The first application is regional staging of breast cancer using PET—specifically, the determination of axillary lymph node metastases with PET (using FDG, the same agent used in Dr. Coleman's lung studies and Dr. Larson's colorectal studies). The second application concerns the staging of distant metastases—to bone, liver, brain, and lymph node chains outside the axilla. Dr. Adler feels this application has potential value, but it is more difficult to design a study for evaluation of this application than with the first. The third application is to assess primary tumors themselves—breast masses. Dr. Adler pointed out that though PET can discriminate between benign and malignant breast masses, so can other less expensive invasive techniques, making it difficult to find a niche for PET in this application.

"It's possible for PET to serve as a screening technique to determine which patients [with breast] cancer have axillary lymph node metastases and thus eliminate the need for lymph node dissections, a very expensive procedure," he said. "There is also a potential to eliminate the morbidity associated with these surgical procedures. We'll improve overall health care... and save money. So we can do both—unlike some more controversial proposals in health care which cut costs but do not improve care."

As *Newsline* goes to press, Dr. Adler has proceeded through the first phase of literature review, is now in the retrospective study of existing data from PET centers, and is preparing a prospective multi-center trial. "I'm very excited about the potential for PET to save in total health care costs," he said in summary.

#### **Improving Communication and Policy**

On other fronts, nuclear medicine practitioners are also taking steps that may improve patient outcome. With the LUNIS computer communications system—developed by Robert E. Henkin, MD, professor of radiology and director of Nuclear Medicine, Loyola University Medical Center (Maywood, IL), with his colleague James R. Halama, PhD—physicians may use the system's library to test clinical cases for electronic consul-

tation (see "Communications Among Nuclear Medicine Professionals," *Newsline*, this issue). LUNIS is multifarious, with many aspects that are not designed expressly to improve patient outcome, but in the library, users needing assistance may post a clinical case and get a free consultation from a broad range of nuclear medicine colleagues. The system "may help specialist consultation by allowing complex cases to be reviewed by someone at a distance, at virtually no cost," Dr. Henkin said. Potentially perfecting diagnoses can also make nuclear medicine more competitive in the growing health care market crunch.

On another front changes are in the works in governmental policy and insurance practices. Henry N. Wagner, Jr., MD, division chief, Nuclear Medicine, Johns Hopkins Medical Institutions (Baltimore, MD), described a proposal by the new assistant administrator in charge of planning at HCFA, Kathy Buto.

"She is promoting the concept of limited authorization for payments—limiting them to standard applications, initially for a limited period of time" (with the possibility for extension if subsequent experience is favorable), said Dr. Wagner. "I told her this approach would be great, for example, for PET.... HCFA would be more likely to authorize procedures if approved initially in a limited way." Dr. Wagner believes that a more highly planned authorization by HCFA would be analogous to Phase IV data-collecting trials and would mean less delay for getting reimbursement for a new technology. However, Ms. Buto cautioned *Newsline*, "We're just considering an approach and not yet a proposal—we're just at the thinking stage."

Some insurance companies are beginning to examine how nuclear medicine technologies may benefit them by cutting the costs of proceed-

ing with more expensive and possibly unnecessary procedures, which insurance companies usually have to pay for. Richard J. Neeson, president and CEO of Keystone Ventures (Bala Cynwyd, PA) studied a Blue Cross/Blue Shield claims payments database for the real costs of claims paid for cardiac intervention cases, then calculated what the difference in cost would have been if PET scans had been used in each case. He determined that PET would have precluded the need for many of the interventions and so decreased costs. Thus, though an insurer would have to invest a little extra up front for the PET scan, in the long run costs would be less. Elizabeth F. Brown, MD, medical director at Aetna Health Plans (Chicago, IL), encouraged the use of TA—the analysis of a technology's safety and effectiveness. Aetna uses TA in determining coverage for PET scans, though insurance companies like Aetna cannot consistently use cost-effectiveness in making reimbursement decisions because there are so few studies in the literature. Thus, she called for the development of practice guidelines which work for all the sub-specialties, and warned that PET and other high-profile diagnostic imaging would be easy targets in coming cost-cutting campaigns.

"The nuclear medicine community should not be afraid of what's going on if our tests have value," Dr. Royal said. "People always fear change, and prefer the devil they know over the one they don't know." However, "I think we'll streamline our studies, and get the most information for the least cost—no longer the maximum amount of information, but the optimum." The word "optimum" just may sum up the goals of cost-effectiveness—increasing quality while decreasing costs.

*Lantz Miller*

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## INSPECTOR GENERAL'S AUDIT: NRC'S MISMANAGEMENT OF MEDICAL MISADMINISTRATION

**IG Report concludes  
the agency has attempted  
to refine its methodology  
but lacks compatible  
databases**

**A**FTER THE *CLEVELAND PLAIN-Dealer* described medical misuse of radiation in December 1992, creating public and congressional outcry, the NRC's Inspector General's Office (IGO) investigated the agency's handling of misadministrations, issuing a report Sept. 7, 1993. Though some observers in the nuclear medicine community have labeled the report a public relations ploy of no consequence, others