I would like to share with you some of the recent events in the field of nuclear medicine in which ACNM participated in and voiced its opinion. The first was the proposed decision memo for PET for solid tumors by the Center for Medicare and Medicaid Services (http://www.cms.gov/medicare-coverage-database/details/nca-proposed-decision-memo.aspx?NCAId=263) that was published on March 13, 2013. The decision summary was as follows:

(A.) CMS proposes to end the coverage with evidence development (CED) requirement for 18F fluorodeoxyglucose positron emission tomography (FDG PET) for oncologic indications under §1862(a)(1)(E) of the Social Security Act (the "Act") that is contained in section 220.6.17 of the Medicare National Coverage Determinations Manual. This will remove the current requirement for prospective data collection by the National Oncologic PET Registry (NOPR).

(B.) CMS proposes that, subject to the exception in C below, one 18F fluorodeoxyglucose positron emission tomography (FDG PET) is covered under §1862(a)(1)(A) when used to guide subsequent physician management of anti-tumor treatment strategy after completion of initial anticancer therapy. Coverage of any additional FDG PET scans used to guide subsequent physician management of anti-tumor treatment strategy after completion of initial anticancer therapy will be determined by local Medicare Administrative Contractors.

(C.) CMS proposes that FDG PET for subsequent anti-tumor treatment strategy for beneficiaries with cancers of the prostate is not reasonable and necessary under §1862(a)(1)(A) and therefore is nationally non-covered by Medicare.

The ACNM partnered with the Society of Nuclear Medicine and Molecular Imaging (SNMMI), the American College of Radiology (ACR), the World Molecular Imaging Society (WMIS) and the American Society of Neuroradiology (ASNR) to draft a joint letter with the following main comments:

1. CMS should finalize the removal of coverage with evidence development requirements (Continued on page 2. See President.)
2. CMS should not finalize the proposed one-scan limit
3. CMS should finalize national coverage, subject to local frequency limits
4. CMS should reverse its proposal to non-cover prostate cancer
5. CMS should make technical corrections regarding PET/MRI
6. The effective date of the NCD should ensure continuity of coverage for beneficiaries.

We are placing the final submitted letter on the ACNM website so all members have access to this document.

The next event was the recent proposal from the Nuclear Medicine Residency Review Committee to the Accreditation Council for Graduate Medical Education (ACGME). ACNM, SNMMI and ABNM provided independent comments on the ACGME website before the deadline of May 8, 2013. I want to thank Drs. Bennett Greenspan and Patrick Colletti for their leadership in drafting this response. The BOD was involved at every step of this process, and I want to take this opportunity to acknowledge their valuable input and comments.

Finally, I would like to let everyone know that the 2013 Lifetime Achievement Award is bestowed upon our friend of many years, Dr. Jay A. Harolds. I have the privilege of presenting him the coveted award at the upcoming SNMMI Special Plenary Session on Monday, June 10, at 8:40 a.m. Please read my specific note on the ACNM Lifetime Achievement Award in a separate section included in this edition of Scanner.

In the next issue, I will summarize our efforts with the management contract. Thank you for being a part of ACNM. We need you and we hope that you feel that you need us to work for your interests. Thank you for your support.

Accolades for Cohen

The ACNM would like to congratulate the current president of the Nuclear Medicine Residents’ Organization, Erica Cohen, DO, MPH for her selection and participation in the Robert E. Henkin Government Relations Fellowship along with Marques Bradshaw, MD of South Carolina. She is currently starting her 3rd year of residency in her nuclear medicine residency at the Loyola University Medical Center in Maywood, IL. When asked about her experience, she said, “The Robert Henkin Government [Relations] Fellowship was an eye-opening, first-hand experience in understanding the complex relationships between government organizations and nuclear medicine. I would highly recommend this program to all interested and motivated young professionals.”

After her whirlwind week in DC, she plans to focus more directly on assisting in the development of appropriateness criteria and evidence based guidelines for nuclear medicine procedures.

NMRO Update

Erica Cohen, DO, MPH, CCD

First and foremost, the NMRO Board would like to express our appreciation to the ACNM Board of Directors for approving our international membership initiative! We have sent membership invitations to our colleagues in Europe, Asia, South America, and the Middle East.

We are also gearing up for the SNMMI Annual Meeting in Vancouver. Our Annual Networking Luncheon topic will be Government Relations and Politics. Our goal is to educate residents on the multitude of socioeconomic issues that nuclear medicine is currently facing, and encourage them to get involved.

Our next Virtual Journal Club will be held in the late summer; we hope to have CME credit available for attending physicians who wish to join us.

Please encourage all residents to join our organization – for FREE! – by visiting www.acnmonline.org and clicking the “Residents” tab. The NMRO has been extremely productive this past year. I am sure that our organization will continue to prosper in the year ahead!
Publishing Your Manuscript in Clinical Nuclear Medicine
Guidelines for Successful Submissions
Patrick M Colletti MD

Journals may receive 100 manuscript submissions per month. Properly prepared manuscripts are more competitive for publication.

Choose an appropriate descriptive title. The title should be descriptive of the content presented. While relatively long titles are common, a 50-character shortened title will be created in production for use in labeling the article pages. Provocative titles can create interest by asking the question that is addressed by the text.

Authors are accountable to provide substantial content focused on the proffered question.

Decide which colleagues will be coauthors. Clinical Nuclear Medicine follows ICMJE guidelines for authorship vs. contributorship: http://www.icmje.org/ethical_1author.html

Authorship is based on:

• Substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data
• Drafting or revising of the manuscript critically for important intellectual content
• Final manuscript approval for submission and publication
• Contributors who do not meet the criteria for authorship may be listed in an acknowledgments statement.
• Brief contributions such as Letters to the Editor should, under most circumstances, have no more than 3 coauthors, with 1 to 2 being the norm.
• Interesting Images, Atlas Articles, and Technical Innovations may have up to 5 authors.
• Original Research and Review Articles may have up to 7 coauthors.
• Multi-institutional manuscripts having 7 or more authors must provide in the cover letter specific information on how each author individually and significantly contributed to the research or otherwise contributed to the development of the manuscript.
• A single author should be designated as primary corresponding author.

The authors’ cover letter should document the role of each included author. Each author should carefully review the manuscript for accuracy and clarity prior to submission. Authors must sign a separate copy of the journal’s “Authorship Responsibility, Financial Disclosure, and Copyright Transfer” form and submit it online at the time of manuscript submission. http://edmgr.ovid.com/cnm/accounts/copyrightTransfer.pdf

Assure that appropriate ethics board approval has been acquired. Prospective studies require ethics board approval, with participants signing written consent in most research situations. Retrospective studies require IRB approval, generally with a waiver of informed consent.

Prepare a concise, accurate abstract. The abstract should be independently understandable, effectively summarizing the article text. The order of presentation of information in the abstract should coincide with that of the main manuscript. Numerical results should be consistent between the abstract and text. All abbreviations should be appropriately introduced in the abstract, text, tables, and figure legends.

Comply with abstract and manuscript word total guidelines. “Interesting Images” require an abstract of up to 100 words, with total legends text of up to 500 words. “Original Research” articles may be as long as 18 printed pages, (abstract 250 words and text 4500 words) including images. “Review Articles” may be as long as 15 printed pages (abstract 100 words and text 3750 words), including images. “Technical Notes,” “Opinion Papers,” and “Commentaries” are shorter articles (abstract 100 words and text 1750 words). Wherever possible, reduce your word count; be concise.

Figure images should be properly collected, windowed, cropped, aligned, and labeled.

• Authors should assure that images are optimally displayed or properly viewing. CT, MRI, and hybrid images with black backgrounds should be submitted in a manner such that anatomy can be clearly discerned.
• Color should generally be used for hybrid image display. Authors should decide if they will sponsor the expense of printing color images.
• Appropriate arrows, labels, and indicators should be added. Color alphanumeric labels, arrows, and indicators should not be used for grayscale images.
• Crop out any white or black space surrounding the image. Computer alphanumeric labels, scales, and tools should be cropped.
• Artwork should be saved as TIFF, EPS, or MS Office (DOC, PPT, XLS) files. High resolution PDF files are also acceptable.
• Photographs, radiographs and other halftone images must be saved at a resolution of at least 300 dpi.
• Photographs and radiographs with text must be saved as postscript or at a resolution of at least 600 dpi.
• Diagrams, drawings, graphs, and other line art must be vector or saved at a resolution of at least 1200 dpi. If created in an MS Office program, send the native (DOC, PPT, XLS) file.
• Each figure must be saved and submitted as a separate file. Figures should not be embedded in the manuscript text file.
• Figures should be called out in order from the text. All figures should have concise descriptive legends.

Tables should be organized and concise. Tables should be called-out in order from the text. Abbreviations should be minimized, with appropriate definitions in the table legends. Tables should enhance the presentation of results, rather than duplicating the text. Tables should be submitted as separate files; they should not be embedded within the body of the manuscript.

Avoid statements of obvious, well-known information. Statements in the form of: “18F-FDG PET demonstrates cellular glucose metabolism” and “functional imaging is superior to anatomic imaging” rarely clarify the presentation of nuclear medicine results. Indefinite time statements of the form: “Now-a-days, cost efficient diagnostic tests have become...” (Continued on page 7. See Publishing Manuscript.)
Government Relations Update Corner

Review of Capitol Hill Day

Erin Grady, MD, CCD

Those of you who participated in this year’s Capitol Hill Day know what a wonderful experience it was for everyone. Those of you who didn’t come should truly think about it for next year. Interfacing with your colleagues in D.C. and talking about issues that affect the practice of nuclear medicine, both now and in the future, is an eye-opening experience. Additionally, the more people who participate, the more momentum we can gain and the better we educate our members of Congress. So, watch for an announcement of the next Capitol Hill Day early next year.

This year, in order to narrow our focus on our 10-15 minute meetings with congressional staffers, we concentrated on two main issues among the multitude that face our specialty:

1. A stable supply of Mo-99. The United States uses 50% of the world’s Mo-99, but all our supply comes from other reactors in various locations, primarily Canada and the Netherlands. In the last session of Congress, S. 99 was passed as part of the National Defense Authorization Act for fiscal year 2013, which laid the groundwork for domestic supply of Mo-99, created with LEU methods. Since the yield of Mo-99 created by LEU sources is lower, the cost will inevitably be more per dose. However, this is an important move with regard to nuclear nonproliferation (moving away from highly enriched uranium sources which are how most of the Mo-99 is made today). Even though S. 99 was enacted, we need to make sure the follow-through is not lost, especially since the Chalk River Reactor in Canada will be closing in 2016 (unless something goes wrong before then).

The points below were the requests we made of Congress with regard to this issue (you can feel free to email your Congressional representatives about the following):

- Please take the time to understand this problem of an unstable supply and pledge to work with the White House Office of Science and Technology Policy (OSTP) Work Group in trying to avert the crisis. Agencies involved include CMS, FDA, NNSA/DOE, NIH, NRC, and others.
- Please monitor the Administration’s progress in implementing S. 99, the American Medical Isotopes Production Act of 2011. This includes utilizing committee oversight authority over DOE and NRC efforts to bring about a domestic source of Tc-99 before the U.S. supplies are shut down due to the aging foreign reactors.
- Please let NNSA and CMS know we need adequate funding to develop domestic capability by 2016, as well as a sound reimbursement structure that will allow for appropriate reimbursement. We are not suggesting unbundling; rather, consider alternate new models for bundled radiopharmaceuticals.

2. Research funding. Research is what makes the United States healthcare system stay on the cutting edge. We have been pleased to have had funding for nuclear medicine through the Department of Energy since the dawn of nuclear medicine. As we know, this has allowed basic nuclear medicine research as well as the more sophisticated research that has led to earlier detection of cancer, therapy for cancer and other serious illnesses, and much more. In recent years, funding has been cut significantly, from $34 million in 2006 to $5 million in 2013. In this time of cinching up the belt in Washington to rein in spending, we would like to at least keep the level of funding for nuclear medicine research flat.

This is what we requested of Congress with regard to this issue (you can feel free to email your Congressional representatives about the following):

- For the Senate side: Please contact Senators Feinstein and Alexander (chair and ranking member of the Senate Appropriation Committee’s Subcommittee on Energy and Water Development) and urge them to keep this vital funding for nuclear medicine research.
- For the House side: Please contact Representatives Frelinghuysen and Kaptur (chair and ranking member of the House Appropriation Committee’s Subcommittee on Energy and Water) and urge them to keep this vital funding for nuclear medicine research.

Of course, a number of other issues face the practice of nuclear medicine: possible new restrictions that may come as a result of the inappropriate compounding practices from a compounding pharmacy that did not deal with radiopharmaceuticals; the CARE Act, which has recently been reintroduced (H.R. 1146 and S. 642); funding of graduate medical education; cuts in reimbursement; getting new radiotracers from bench to bedside; radiation safety; the determination of the sustainable growth rate (SGR)…and the list goes on. We’ll focus on some of these topics in the next issue.
For the next three issues, we are pleased to have a series by Herb A. Klein, MD, PhD, from the Division of Nuclear Medicine, Department of Radiology, University of Pittsburgh School of Medicine, Pittsburgh, Pa., discussing guidelines in nuclear medicine. In this issue, he will discuss guidelines regarding pulmonary scintigraphy.

As the second of a series on nuclear medicine guidelines, this article will discuss the SNMMI practice guideline for lung scintigraphy, which was updated in 2011 (1).

The most common indication for lung scintigraphy is the need to determine the likelihood of pulmonary embolism (PE), using ventilation and perfusion images and invoking a current chest x-ray or computed tomography (CT) scan. In ventilation imaging, the most common approach is with an aerosol, usually (in the United States) Tc-99m diethylenetriaminepentaacetic acid (DTPA), with Tc-99m macroaggregated albumin (MAA) used for perfusion.

According to the guideline, “Aerosol imaging is usually performed before perfusion imaging. Because both agents are labeled with Tc-99m, it is extremely important that the count rate of the second study is at least three to four times the count rate of the first study. There are arguments for perfusion before ventilation, but it is more difficult to deliver a larger dose of the Tc-99m aerosol than it is to deliver a larger dose of Tc-99m MAA.”

Figure 1 shows portions of two ventilation-perfusion lung scans. They are both abnormal, but the purpose in showing them is to illustrate the count rate before perfusion imaging. Because both agents are labeled with Tc-99m, it is extremely important that the count rate of the second study is at least three to four times the count rate of the first study. There are arguments for perfusion before ventilation, but it is more difficult to deliver a larger dose of the Tc-99m aerosol than it is to deliver a larger dose of Tc-99m MAA.”

Figure 1 shows portions of two ventilation-perfusion lung scans. They are both abnormal, but the purpose in showing them is to illustrate the count rate ratios. When data are presented in the manner shown, the ratios may be determined by computation from the total counts of an entire image and its acquisition time, using the following formula:

\[ r = \frac{c_p}{t_p} \div \frac{c_v}{t_v} \]

where:

- \( c_p \) = total perfusion counts
- \( t_p \) = perfusion acquisition time
- \( c_v \) = total ventilation counts
- \( t_v \) = ventilation acquisition time

The result for the case of Figure 1A, derived from the posterior images, is (800,000 counts/199 seconds) ÷ (200,000 counts/348 seconds) = 7.0, adequate. The analogous result for the case of Figure 1B is (800,000 counts/82 seconds) ÷ (200,000 counts/47 seconds) = 2.3, inadequate, rendering the case difficult to interpret. The pitfall of making this determination using the total counts acquired (here 800,000 for perfusion and 200,000 for ventilation) must be avoided. That is, our concern is with count rate, not total counts, because count rate reflects the amount of Tc-99m DTPA that is left over (subject to decay and biological disappearance), hence potentially contributing too much cross-talk to the Tc-99m MAA image. Collecting more counts in the second phase does not overcome the problem, because the cross-talk is always proportional to the length of time used for the image.

A failure to achieve a good ratio of count rates can result in inaccuracy. For example, the severity of a mismatched segmental perfusion defect may be underestimated because of counts appearing in the image from the well-ventilated segment in the earlier image.

If necessary, the computation may be done more accurately by quantifying lung regions of interest. Failure to achieve the desired ratio may be due to the doses that are chosen, the aerosol apparatus that is used, other features of technique, or the patient’s breathing pattern. Image-degrading crosstalk into the perfusion images from the heavily concentrated activity that occurs with large airways deposition of the aerosol may occur even when the count rate ratio is adequate. Anyone who has observed this effect would surely appreciate a method of minimizing it.

The guideline notes that ultrafine Tc-99m labeled carbon particles (less than a micron), used in many other countries, have more uniform distribution in the lungs than Tc-99m DTPA aerosol (0.5-2 microns) (2). Only months after the publication of the SNMMI lung guideline, the vendor announced (3) that the United States Food and Drug Administration had given approval to commence Phase 3 clinical trials in the United States, “the largest nuclear medicine market in the world,” with marketing approval possible by 2014.

The SNMMI guideline concentrates on planar imaging but notes that single photon emission computed tomography (SPECT) is preferred by some investigators. It is probably more common in other countries than in the United States, and the opinion has been expressed that it is best done with ultrafine Tc-99m labeled carbon particles followed by Tc-99m MAA in order to capitalize on its full advantages. The guidelines of the EANM (4) advocate both SPECT and Tc-99m-labeled carbon particles. An entire issue of Seminars in Nuclear Medicine is devoted to SPECT for ventilation-perfusion imaging (5). Schemes for interpretation are simpler, with fewer indeterminates. It may be possible to look forward to more use of SPECT lung scans in the United States in the future.

The SNMMI guideline includes an important innovation that relates to interpretation, the use of the likelihood ratio (LR). Multiple schemes have been promulgated for estimating whether PE has occurred in the setting of a given scan result, and none is set in stone. They invoke the size and character of perfusion defects and their relationship to ventilation imaging and chest x-ray. They are based on clinical studies of patients, some of whom did and some of whom did not have PE. The new guideline lists no fewer than 4 alternative sets of criteria, of which two eliminate ventilation imaging.

Customarily, result categories have been expressed not only with a qualitative expression of probability but with numerical estimates attached, e.g., “intermediate probability of PE (20-80%)” (6). Almost hidden in the guideline, without further explanation, is the change referred to above. In place of “high probability,” “intermediate probability,” etc.,
the diagnostic categories are called, "high LR," "intermediate LR," etc.

To elucidate this concept, let us review some definitions and concepts of medical decision making. The sensitivity of a given test is the number of true positive results divided by the number of patients who have the disease under consideration. The specificity is the number of true negative results divided by the number of patients who do not have the disease.

The LR (by which we shall mean the positive, not the negative LR) for a given set of findings of a lung scan means the probability that the set of findings would occur in a patient with PE divided by the probability that the same result would occur in a patient without PE. This may also be expressed as sensitivity ÷ (1 – specificity).

While such concepts are most easily applied to tests with clear-cut positive and negative results (binary situations), LR may be applied to a spectrum of possible findings, such as occurs in lung scans, for example, the indeterminate LR category, which includes the finding of 2 moderate or 1 large perfusion defect that is mismatched with ventilation (1). For the sake of the discussion, let us assume an LR of 1 for test results in this category, meaning that patients with and without pulmonary embolism are equally likely to have such findings.

Sensitivity, specificity and LR are independent of pre-test probability, which is the prevalence of the disease in a population with the characteristics of the patient under consideration. Now we shall see how pre-test probability comes into play and how it is combined with the LR to generate post-test probability.

The concept of odds, which is closely related but not the same as probability, facilitates the mathematical process. When casting a die, the probability of showing a 3 is 1/6, or 0.167. The odds of showing a three, rather than any of the 5 other possibilities, is 1/5 = 0.2. Expressing that relationship with a formula and applying it to the problem at hand, pre-test odds equal (pre-test probability) ÷ (1 – pre-test probability). Post-test odds equal LR x pre-test odds. Then, the finally desired number, post-test probability, equals (post-test odds) ÷ (1 + post-test odds).

These concepts of medical decision making are presented in more detail by Royal and Hillier (7). As a sidelight, the basic formula for the analysis that is involved is not, as one might suppose, due to a contemporary statistician, but rather to an 18th century British minister and mathematician, the Rev. Thomas Bayes, who did not live to see the publication of his now well-known theorem (8).

Schemes for quantifying pretest probability have been devised (9). Before undergoing a lung scan, a patient with clinical signs and symptoms of deep venous thrombosis, a heart rate of 120, surgery 2 weeks previously, and previous PE, differs from a previous otherwise healthy patient who has mild chest discomfort that is thought probably to be of musculoskeletal origin. The first patient has a high and the second patient a low pre-test probability of PE. For a given identical scan result, the probability of PE is higher for the second than the first patient, but we have generally not made that clear. If the LR for the results is 1 (i.e., intermediate), the post-test probabilities are the same as the pre-test probabilities, high and low, respectively. Further testing may be indicated. In contrast, LRs that are more extreme in either direction, e.g., 0.1 (a nearly normal constellation of findings) or 10 (severely abnormal findings characteristic of the disease) have profound effects on the post-test probability. For example, a patient with pre-test probability of 0.2 and with LR of 10 has a post-test probability of 0.71 (i.e., 71%), by use of the formulas described above.

Royal and Hillier state, “To make a management recommendation based solely on test results without accounting for pre-test probability is wrong. At our institution we have tried to emphasize the importance of incorporating the pre-test probability with the test results in order to calculate the post-test probability by reporting the ventilation/perfusion imaging results as likelihood ratios rather than probabilities which are easily confused with post-test probabilities.” (10)

In an ideal world, the referring clinician, if not the nuclear medicine physician, has a sufficient knowledge of the patient’s circumstances to estimate the pre-test probability. Even so, one may need to work with pre-test probabilities and LR’s that are at best semi-quantitative, e.g., low, intermediate and high, rather than with concrete numbers that are fed into the formulas and yield a numerical result.

One hopes that the concepts of likelihood ratios and pre-test probabilities as applied to lung scans (as well as other tests) will be further elaborated, understood and applied. Pending those developments, the author, (Continued on page 8. See Nuclear Medicine.)
more important…” should be deleted as unnecessarily wordy.

Avoid overreaching conclusions and primacy statements. Conclusions should be supported by methodology and results. Statements in the form: “To our knowledge” … … “this is the first report of…” are generally inappropriate.

Assure that all copyrighted images, tables and text are acknowledged and referenced and permission is obtained. With the availability of specialized programs such as CrossCheck (by iThenticate), editors are discovering plagiarism and self-plagiarism at a greater rate. Authors must disclose prior presentation or publication of all submitted content. Verbatim text reproduction of 50 words or greater requires written permission from the copyright holder.

References should be presented in Clinical Nuclear Medicine style. References should be called-out in order from the text. The Clinical Nuclear Medicine reference style presents up to three authors (last name and initials), et al. Full page references are listed and no issue numbers are used. All submissions should have at least 8 references. http://edmgr.ovid.com/cnm/accounts/ifauth.htm

Calendar of Events

• Viva Las Vegas - 2013
  Las Vegas, Nevada

• World Molecular Imaging Congress 2013
  Savannah, Georgia
  Sep 18, 2013 - Sep 21, 2013

• ASNC 2013 The 18th Annual Scientific Session of the American Society of Nuclear Cardiology
  Chicago, Illinois
  Sep 26, 2013 - Sep 29, 2013

• International Conference on Integrated Medical Imaging in Cardiovascular Diseases (IMIC 2013)
  Vienna, Austria

• SNMMI Southeastern Chapter - 2013 Annual Meeting
  Charlotte, North Carolina

• XV ISCORN meeting
  Varese, Italy

• 38th Annual Western Regional Meeting
  Pasadena, California

• Northeast Regional Meeting, SNMMI
  Mystic, Connecticut

• SNMMI Central Chapter - 2013 Fall Educational Symposium
  Bloomington, Minnesota

• 2013 IEEE Nuclear Science Symposium and Medical Imaging Conference
  Seoul 135-731, Korea

• Advanced Molecular Imaging and its Clinical Translation Course
  Boston, Massachusetts

• RSNA 99th Scientific Assembly and Annual Meeting
  Chicago, Illinois
  December 1-6

• Mickey Williams Memorial Meeting - Back to Basics 2013
  Duarte, California
  Dec 7, 2013

SAVE THE DATE

ACNM Annual Meeting/SNMMI Mid-Winter Meeting
February 6–9, 2014
Palm Springs, California
www.acnmonline.org
while agreeing in principle with Royal and Hillier, has adopted the practice of dictating impressions such as, “Intermediate probability of pulmonary embolism, 20–80%, subject to consideration of pre-test probability.”

References

(Lifetime Achievement Award. Continued from page 1.)

from the Buffalo Medical School in 1971. He completed his internship in internal medicine and residency in diagnostic radiology at Georgetown University, Washington, D.C., which was then followed by a fellowship in nuclear medicine at Vanderbilt University in Nashville, Tennessee. He has worked both in the private practice as well as in academia and since 2010 has been a professor of radiology and director of the Radiology Residency Program at Michigan State University.

Individuals like Jay are rare in any field. We are very fortunate to have such an accomplished, caring physician in nuclear medicine. Dr. Harolds received this award at the SNMMI Special Plenary Session on Monday, June 10.