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NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON THE MEDICAL USES OF ISOTOPES

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TELECONFERENCE

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THURSDAY,

OCTOBER 17, 2019

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The meeting was convened telephonically at 2:00 p.m., Darlene F. Metter, M.D., ACMUI Chairman, presiding.

MEMBERS PRESENT:

DARLENE F. METTER, M.D., Chair

ROBERT SCHLEIPMAN, M.D., Vice Chair

VASKEN DILSIZIAN, M.D., Member

RONALD D. ENNIS, M.D., Member

RICHARD L. GREEN, Member

MICHAEL D. O'HARA, Ph.D., Member

ZOUBIR OUHIB, Member

MICHAEL SHEETZ, Member

MEGAN L. SHOBER, Member

NRC STAFF PRESENT:

MARYANN AYOADE, NMSS/MSST

LISA DIMMICK, NMSS/MSST, Designated Federal Official

IAN IRVIN, ESQ., OGC

SARAH LOPAS, NMSS/MSST

MEMBERS OF THE PUBLIC PRESENT*:

BETTE BLANKENSHIP, AAPM

ROGER ESTAFANOS, Novartis

MICAHEL GUASTELLA, Council on Radionuclides and Radiopharmaceuticals, Inc.

CAITLIN KUBLER, SNMMI

JAMES LOGAN, Bayer Healthcare

CAROL MARCUS, M.D., PhD,

RICHARD MARTIN, AAPM

ARIA RAZMARIA, M.D.

GLORIA ROMANELLI, American College of Radiology

BRUCE THOMADSEN, M.D., *Unaffiliated*

CINDY TOMLINSON, American Society of Radiation Oncologists

*This list is inconclusive of all teleconference participants.

AGENDA

P-R-O-C-E-E-D-I-N-G-S

2:08 p.m.

THE OPERATOR: Welcome and thank you for standing by. I'd like to inform all participants that your lines have been placed on a listen-only mode until the question and answer session of today's call.

I would now like to turn the call over to Lisa Dimmick. Thank you. You may begin.

MS. DIMMICK: Good afternoon. As the designated federal officer for this meeting, I am pleased to welcome you to this public meeting of the Advisory Committee on the Medical Uses of Isotopes, or ACMUI.

My name is Lisa Dimmick. I am the leader of the Medical Radiation Safety Team in the Medical Safety and Events Assessment Branch. And I have been designated as the federal officer for this Advisory Committee in accordance with 10 CFR Part 7.11.

This is an announced meeting of the ACMUI. It is being held in accordance with the rules and regulations of the Federal Advisory Committee Act and the Nuclear Regulatory Commission, or NRC.

This meeting is being transcribed by the NRC. It may also be transcribed or reported by others.

The meeting was announced in the September 24, 2019 edition of the Federal Register, Volume 8, Pages 50077-50078.

The purpose of this meeting is to receive the training and experience, or T&E, Subcommittee's comments and recommendations regarding the NRC staff's evaluation of T&E requirements for radiopharmaceuticals under 10 CFR 35.300.

The function of the ACMUI is to advise the NRC staff on issues and questions that arise in the medical use of byproduct materials. The ACMUI provides counsel to the staff that determine or direct the actual decisions of the staff or the Commission. The NRC solicits the views of the ACMUI and values their opinions.

I request that whenever possible we try to reach a consensus on the various issues that we will discuss today. But I recognize there may be a minority or dissenting opinions. If you have such opinions, please allow them to be read into the record.

At this point, I would like to perform a roll call of the ACMUI members participating today. Chairman, Dr. Darlene Metter, diagnostic radiologist.

CHAIRMAN METTER: Present.

MS. DIMMICK: Vice Chairman, Dr. Robert Schleipman, health care administrator. Mr. Gary Bloom, patient rights advocate. Dr. Vasken Dilsizian, nuclear cardiologist. Dr. Ronald Ennis, radiation oncologist.

MEMBER ENNIS: Here.

MS. DIMMICK: Mr. Richard Green, nuclear pharmacist.

MEMBER GREEN: Present.

MS. DIMMICK: Ms. Melissa Martin, nuclear medicine physicist. Dr. Michael O'Hara, FDA representative.

MEMBER O'HARA: Present.

MS. DIMMICK: Mr. Zoubir Ouhib, radiation therapy physicist.

MEMBER OUHIB: Present.

MS. DIMMICK: Mr. Michael Sheetz, radiation safety officer.

MEMBER SHEETZ: Present.

MS. DIMMICK: Ms. Megan Shober, state government representative.

MEMBER SHOBER: Present.

MS. DIMMICK: Dr. Harvey Wolkov, radiation oncologist. I confirm that we have a quorum of at least

six members present.

All members of the ACMUI are subject to federal ethics laws and regulations and receive annual training on these requirements.

If a member believes that he or she may have a conflict of interest as that term is broadly used within 5 CFR Part 2635 with regard to an agenda item to be addressed by the ACMUI, this member should divulge it to the Chair and the DFO as soon as possible before the ACMUI discusses it as an agenda item.

ACMUI members must recuse themselves from participating in any agenda item in which they may have a conflict of interest unless they receive a waiver or prior authorization from the appropriate NRC officials.

I would like to add that today's meeting is solely a teleconference, and we will not be utilizing a webinar. The number to access today's teleconference is 888-396-8716, and the passcode is 8162400 pound.

The handouts and agenda for this meeting are available on the NRC's ACMUI public website.

Individuals who would like to ask a question or make a comment regarding a specific issue the ACMUI has discussed should request permission to

be recognized by the ACMUI Chairman, Dr. Darlene Metter. Dr. Metter, at her option, may entertain comments or questions from members of the public who are participating today.

Comments and questions are usually addressed by the ACMUI near the end of the presentation or after the ACMUI has fully discussed the topics. We ask that one person speak at a time.

At this time, I will ask that everyone on the call who is not speaking to place their phones on mute. If you do not have the capability to mute your phone, please press star 6 to utilize the conference line mute and unmute functions.

At this point, I would like to turn the meeting over to Dr. Metter.

CHAIRMAN METTER: Thank you, Ms. Dimmick. And I'd like to thank everyone for participating on today's conference call.

I will be reviewing, in the absence of the chair of the Subcommittee, Dr. Schleipman, the Subcommittee review and comments on the draft NRC Commission paper entitled, Evaluation of Training and Experience Requirements for Administration of Radiopharmaceuticals Requiring a Written Directive.

I would like to thank the Subcommittee membership for their support in this project, Mr. Gary Bloom, Dr. Ronald Ennis, Dr. Robert Schleipman, Mr. Michael Sheetz, and Ms. Megan Shober. And our NRC staff resource is Ms. Maryann Ayoade.

The Subcommittee charge is as follows. In 2016, the U.S. Nuclear Regulatory Commission ACMUI Subcommittee on Training and Experience, or T&E, for All Modalities was charged to periodically review the T&E requirements for the medical use of unsealed byproduct material under Title 10 Code of Federal Regulations Part 35 Subparts D through H and to make recommendation for changes as needed.

The current charge of the Subcommittee on T&E for All Modalities is to review the recent NRC staff draft Commission paper which presents potential changes to the T&E requirements for the administration of radiopharmaceuticals under Title 10 Code of Federal Regulations Part 35, Medical Use of Byproduct Material, Subpart E, Unsealed Byproduct Material-Written Directive Required.

The Subcommittee congratulates the NRC staff for their thoughtful and creative evaluation of this matter. We believe their consideration to be

responsive of stakeholders, the Organization of Agreement States, and the Advisory Committee on the Medical Uses of Isotopes, the ACMUI, and the ACMUI and its input and appreciate the opportunity to comment on this draft paper.

Several NRC proposed options demonstrate an evolving regulatory and radionuclide therapy landscape. Some Subcommittee members' thinking has also evolved.

Given the heterogeneity of principles, roles, and practice environments represented in the Subcommittee, we have not reached a unanimous consensus. Our report, therefore, includes a summary, recommendations, and one Subcommittee member's minority opinion.

As an introduction, the staff draft Commission paper builds on extensive public stakeholder feedback, consultation and coordination with the OAS and ACMUI, as well as the view of corresponding international regulations, review of related medical events, and consideration of how the current T&E requirements conform to a risk-informed approach and align with the NRC Medical Policy Statement.

Feedback from the OAS, NRC staff, and

others introduced uncertainty as to whether the current T&E requirements conflict with the Medical Policy Statement's affirmation that the NRC will not intrude into medical judgments affecting patients to improve, to provide the radiation safety of the workers and the general public. This informs several of the proposed options for changing the T&E regulations.

As to ongoing concerns for current or burgeoning shortage of authorized users, or AUs, affecting patient access, the draft paper concludes that the NRC staff could not determine whether the number and location of licensees are sufficient to satisfy patient demand. And importantly, the NRC cannot regulate T&E with the primary goal of increasing patient access to radiopharmaceuticals or improving geographic distribution of AUs.

In the draft report, the NRC staff also discussed that emerging radiopharmaceutical therapies are growing in volume, are increasingly patient-focused, and that administration protocols of these emerging radiopharmaceuticals will inherently become more complex.

In response to the above, the draft paper provides two regulatory approaches for Commission

consideration, number one, a performance-based approach that removes the current prescriptive T&E requirements and NRC review and approval of AUs, and number two, maintaining and/or enhancing the NRC existing regulatory framework for T&E. The first consideration has three sub-options and the second, four sub-options.

The following are Subcommittee comments on the draft options.

Approach one, removal of prescriptive T&E requirements and NRC review and approval of AUs. Option 1a, specialty board credentialing where physicians must be certified by any medical specialty board to use radiopharmaceuticals.

Credentialing is a process where medical facilities grant healthcare professionals, physicians, and non-physician mid-level providers, the ability to practice medicine in their clinical sites.

Board certification is the national gold standard of set criteria developed by an association that many boards subscribe to called the American Board of Medical Specialties, or the ABMS.

This certification guarantees that an ABMS board certified physician has met a specialty board's

minimal competency requirements, which are routinely reviewed and updated, as opposed to the non-ABMS boards which might not regularly update the requirements.

The current 24 ABMS boards and the American Osteopathic Boards of Radiology and Nuclear Medicine certify that a physician has acquired a level of knowledge and skills which mirror the specialty-specific Accreditation Council for Graduate Medical Education, or the ACGME, residency or fellowship program training requirements.

Additionally, these requirements are routinely reviewed and, as needed, revised to provide the most up-to-date content for patient care.

These boards require initial and ongoing certification for their diplomates to obtain and maintain board certifications, which are accomplished through initial diplomates, through initial board certification exams, and a recertification process which is either a maintenance of certification, continuous certification, or a continuous longitudinal assessment process through an Online Longitudinal Assessment, or OLA.

The public is then assured that any ABMS, American Osteopathic Board of Radiology or American

Osteopathic Board of Nuclear Medicine certified physician has acquired and maintained a national quality, peer-approved standard of knowledge and skills in the current practice of a particular medical specialty.

Determining AU status by specialty board certification for non-radiation related specialties requires, or correction, creates a unique set of challenges. In our view, such a certification must provide the same high level of knowledge of radiation safety and care as the current deemed-status boards.

As delineated in 10 CFR 35.390, this requires extensive T&E of appropriate topics which currently require 700 hours devoted to these topics. This would require other boards to provide and develop the expertise among their membership to develop the curriculum and create training programs for their new trainees and those already in practice within their specialty.

Option 1a, if Option 1a were to allow specialty boards to significantly dilute educational and training requirements to determine AU status as each board sees fit, we'd have significant reservations as we believe this would compromise patient and public

safety.

While addressing Option 1c, the draft report does not state whether or not an alternate pathway would continue to exist under Option 1a.

Option 1b, licensee credentialing, where licensees must develop their own procedures to determine whether their physicians are adequately trained to use radiopharmaceuticals.

There are thousands of U.S. medical licensees, thereby raising two major concerns for this option. Current T&E requirements are based on NRC regulations in 35.390. Without this national standard, thousands of AUs may be approved with varying levels of local or site-specific determined expertise resulting in a wide disparity in expert practice.

Additionally, if the AU relocates to a different hospital or medical facility, the site-specific licensee credentialing may not be equivalent, and hence, would need to be initiated as a new application with potentially disparate T&E requirements.

Furthermore, a lack of uniform national standards would present a serious potential of compromising public health and safety. With Option

1b, there would be no standard platform of AU credentialing, and local or site-specific responsibility for determining licensees' credentialing might be administratively conducted without a physician in that specific specialty or perhaps be delegated to a non-physician.

A second concern is that with thousands of individual site-specific licensees, the regulatory inspection oversight would be immense and cost prohibitive. It is also uncertain how this would be operationalized in small clinics and stand-alone practices with minimal administrative infrastructures.

Due to these concerns, Option 1b does not appear to be a viable or practical alternative in achieving an AU status that would ensure public health and safety.

Option 1c, NRC-recognized specialty board credentialing or deemed-status, where physicians must be certified by a medical specialty board recognized by the NRC.

The Subcommittee is concerned with how the NRC intends to develop and broaden its board certification criteria for the therapeutic use of radiopharmaceuticals and to align it with emerging

radiopharmaceuticals.

Any newly proposed medical specialty board certification that would be recognized by the NRC for radiopharmaceutical therapy covered under 35.390 must ensure completion of an appropriate number of hours of didactic education and hands-on training and experience to assure public health and safety.

There are currently three boards that have achieved certain NRC recognition or deemed-status for the use of unsealed byproduct material requiring a written directive. This NRC recognition by the American Boards of Radiology and Nuclear Medicine and the American Osteopathic Board of Radiology is conferred on a medical specialty board as a formal acknowledgment of meeting and continuing to meet NRC requirements for AU status for its certified diplomates.

That recognition is at least partially based on those boards' requirements for comprehensive training content and experiential components in radiobiology, dosimetry, and radiation protection practices.

Subcommittee members questioned if, and generally have an expectation that, new boards would

meet the same high level of T&E as current NRC recognized boards.

The draft Commission paper also indicates the alternate T&E pathway for AU status under 10 CFR 35.390 Subsection b and Subsection 1 will no longer exist under Option 1c. As currently used, the alternate pathway offers flexibility and timely certification of new authorized users.

Approach Two, Maintain or Enhance the Existing T&E Pathways.

Option 2a, Status Quo, would make no changes to the NRC's T&E requirements. The current practice of radionuclide therapy under the requirements of 10 CFR 35.390 has maintained public health and safety as evidenced by the very few reported medical events in the National Medical Events Database, or NMED, relative to the overall annual number of radionuclide therapies in the United States.

This was further supported by the public stakeholder input from the nuclear medicine and radiation oncology communities, as well as the ACMUI. Furthermore, the requirements are widely distributed and familiar to licensees, regulators, and training programs.

As practitioners in the medical radiation specialties, we do not feel the current regulatory T&E standards are in conflict with the Medical Policy Statement. The ACMUI Subcommittee continues to support this option.

Option 2b, Tailored Requirements, which would tailor and reduce the T&E to create additional AU pathways for administration of specific categories of radiopharmaceuticals.

One of the key elements of Option 2b is to reduce the training requirements in cases where the licensed material is received as a unit dose. The Subcommittee believes that handling a radiopharmaceutical in unit dose alone does not decrease the required level of safety to warrant a reduction in training.

Even in unit dose forms, licensees can spill licensed material during injection. In addition, some newer radiopharmaceuticals, including those with unit doses, have more complicated administration protocols.

Option 2b would likely be exceptionally burdensome for the NRC as a careful review of applicable T&E elements will need to be entertained time and time

again as new agents are developed. Furthermore, this variegated system would present regulatory challenges for the regulator, for the AU, and RSO in determining whether a particular AU was authorized for a particular agent.

Option 2c, Emerging Radiopharmaceuticals, would conduct individual reviews of each new radiopharmaceutical to determine drug-specific tailored T&E and other related requirements.

Individual reviews of each emerging radiopharmaceutical under 35.1000 would be time-intensive and potentially delay introduction or access to new therapies. This would also create the potential for inconsistent requirements since 35.1000 guidance has a compatibility level D, which allows for significant variation in the Agreement State regulation. It would also be burdensome to reauthorize every AU for each new emerging radiopharmaceutical.

The radiation safety differences between 35.300 radiopharmaceuticals are not significantly different enough to require radioactive drug-specific review of T&E. If for some reason there would be a unique hazard with a new radiopharmaceutical, the NRC could then classify and license that drug under 35.1000.

Determining the required training for these tailored approaches to each emerging radiopharmaceutical would be time-intensive and require multiple regulatory steps, which might be counterproductive for facile adoption of future and novel radiopharmaceuticals.

The Subcommittee believes that if the NRC classifies a radiopharmaceutical in 10 CFR 35.300 the existing training requirements under 35.300 are adequate.

Option 2d, Team-Based Requirements, would create an additional alternate pathway in which T&E requirements for AUs would be reduced based on pairing AUs with other individuals with radiation safety T&E.

Designating multiple potential authorized users in various specialties, for example authorized nuclear pharmacists, would be confusing as to when one AU responsibility ends and another begins, or there may be overlap and confusion when an unexpected complication occurs during or post-injection.

While licensees must have the Radiation Safety Officer who is knowledgeable in the applicable regulations, radiation safety requirements, and emergency procedures, the AU should also be

independently knowledgeable in these areas for the modalities in which they practice.

We are concerned that safety may be compromised when the physician is not sufficiently knowledgeable of the dangers of radioactive material in patient care.

Given the hierarchy culture in medicine, an authorized nuclear pharmacist, or ANP, or authorized administrator may not have the freedom or authority to assure safety when the physician does not fully appreciate the dangers inherent in radioactive material use or the required mitigating procedures.

Other considerations for a partnered or multiple AU team approach in its execution and its regulation are the asymmetric scopes of practice and authority and associated legal and reimbursement issues.

So, the following would be a summary of the Subcommittee review. Approach One, Removal of Prescriptive T&E Requirements and NRC Review and Approval of AUs. The Subcommittee does not support Options 1a or 1b.

Option 1c may be feasible if the appropriate level of training and experience is

required. If the NRC applies sufficient rigor in evaluating radiation safety content, radiation-related content and competency as discussed above, new boards could possibly provide an appropriate level of radiation protection regarding public health and safety.

As mentioned earlier, Option 1c does not provide an alternate pathway. The Subcommittee recognizes the value and flexibility of the alternate pathway.

Approach Two, Maintain or Enhance the Existing T&E Framework.

For any opinion, I'm sorry, for any therapy utilizing the administration of unsealed byproduct material requiring a written directive, the AU must have adequate and acquire a basic foundation of knowledge, skills, and experience to perform these radiopharmaceutical therapies safely and effectively.

This level of expertise applies to physicians in both radiation and non-radiation related specialties or subspecialties.

Currently, and with the advent of new and emerging radiopharmaceuticals, Option 2a, maintaining the current T&E or status quo for AUs under 10 35.390,

appears to be the best approach.

Option 2b, tailored T&E for single industry-specific radiopharmaceutical requiring a written directive, was reviewed. In considering this pathway, the AU applicant should acquire a fundamental base in radiation related topics, including comprehensive radiation protection training equivalent to that of an AU under 10 CFR 35.390.

Subsequently, the individual must attain the clinical experience for the requested therapy. This seems likely to create a chaotic system with significant burden on the NRC to develop T&E requirements for each agent and confusion among regulators and AUs about which agents each AU is authorized to use.

The Subcommittee does not support Option 2c. Evaluation of all emerging radiopharmaceuticals under 35.1000 guidance would be overly burdensome and time-intensive.

Lastly, Option 2d, a team-based, partnered AU approach to radionuclide therapy may be problematic for reasons stated above.

The following are three Subcommittee recommendations and a minority opinion.

Number one, the Subcommittee recommends maintaining the status quo under 10 CFR 35.390. While strongly affirming the structural superiority of the status quo over other options proposed in the draft paper, we acknowledge there is room for a comprehensive review of the specific requirements under 35.390 such as the seemingly arbitrary requirement of 700 hours.

The Subcommittee, and likely the ACMUI, would welcome the opportunity to critically assess these details.

Number two, if the NRC proceeds to grant AU status by NRC-recognized specialty boards, the T&E should be equivalent to 35.390.

Number three, the Subcommittee recognizes the value of an alternate pathway and is willing to review and evaluate the requisite knowledge, preceptor-reviewed experience, and competency assessments.

Minority Opinion. Based on discussion with other state regulators, inspection experience, and NRC's research, I encourage the NRC to consider alternatives to the existing T&E requirements in 10 CFR 35.390.

This presents an opportunity to move to

a T&E framework that is more separated from practice of medicine issues and focuses more intently on radiation safety of workers and the public.

The choice to prescribe a radiopharmaceutical is a practice of medicine issue, not within NRC's domain. The medical community has processes in place to limit a physician's scope of care, for example, through hospital credentialing based on specialty board certification.

NRC should not require T&E for physicians who sign written directives unless the physician actually handles licensed material.

The NRC should shift its T&E regulatory framework to focus on T&E for individuals who handle or administer 10 CFR 35.300 radiopharmaceuticals because these are the individuals responsible for delivering the treatment in accordance with the physician's prescription.

To move toward this shifted framework, I support a hybrid of Option 1b and Approach 2, where authorized user physicians are not individually listed on a license but are subject to training and certification requirements in 10 CFR 35.

For comparison, the NRC regulates

high-risk industrial uses of radioactive material. And a very similar user training model has been in place for industry, industrial, excuse me, industrial radiography licensees for many years.

Radiographer T&E requirements are in regulation 10 CFR 34.43. Radiographers must pass a radiation safety exam given by an external certifying entity on a recurring basis, every five years. Radiographers are not listed on NRC licenses. And radiographer certification is verified during inspection.

This hybrid option would lessen the administrative burden on licensees and the NRC to amend licenses to track specific physician authorizations, an effort which currently consumes an enormous amount of regulatory resources but has only an indirect link to radiation safety at most medical institutions.

In addition, this option would maintain uniform, high initial training standards for individuals who handle radioactive material at medical facilities and would allow NRC to shift its regulatory focus to the individuals most directly responsible for radiation safety.

And that is the conclusion of the written

Subcommittee report. Do I have any comments or questions from the Subcommittee on T&E?

MEMBER ENNIS: Hi, this is Ron Ennis. Just a quick, I think we did a, you know, I'm happy with the report we did, but just a couple of thoughts and comments.

Just first, you know, in terms of context, so we are, have a system that has worked remarkably well in protecting the public from the risks of radiotherapy and radiation medicine in general. It's worth noting that it has worked quite well.

Radiation really is unique in medicine. Its imperceptibility makes it so hard for people to understand and appreciate. And the vast majority of people involved in medicine, from physicians to nurses, et cetera, deal with surgical and pharmacologic interventions.

This unique little niche area is really something that needs unique talents and unique education and experience. And it's to the great credit that the NRC set this system up, you know, 50 or so years ago to protect the public.

I think it's also worth noting that even nowadays when there's so much disbelief of authority,

if you will, I just think about the vaccine controversies that are going on right now. And I think it's quite remarkable that no, the public does not have any concerns about the safety of radiation despite its concerns about the safety of vaccines.

And I think that's because they have a perception that everything that is done about radiation safety is for their benefit. There are no ulterior motives or not paying attention to safety issues. So, before significant changes are made, I think we would need, in my view, a strong case to be made that there's a problem.

Everyone seems to acknowledge that we have no evidence of any shortage despite new agents coming out. That can obviously be revisited in the future. But there really is no objective evidence of that.

The issue about invading into medical practice is something. I've been on ACMUI for three and a half years. And we have discussed this with other issues many, many times.

And there's a, or has been until now, a general consensus between the NRC and staff and the ACMUI about where to draw that line. And it's somewhat ambiguous at times. But no one until now has ever

suggested that that means NRC get out of the business completely of regulating the medical uses.

I think that from my preceding comments about the unique position of radiopharmaceuticals and radiation sources in medicine and its unique knowledge base that that would be dangerous. And none of the radiation medicine physicians feel that such an extreme change is warranted or needed.

Such a change would essentially remove the whole concept of medical event from the entire Part 35. And I don't think anyone really feels that there's a good reason to do that.

CHAIRMAN METTER: Thank you, Dr. Ennis. I believe Dr. Schleipman is on the call now.

VICE CHAIR SCHLEIPMAN: Yes. Can you hear me?

CHAIRMAN METTER: Yes. Thank you, Dr. Schleipman.

VICE CHAIR SCHLEIPMAN: I've been on since 2:00. I guess there was some trouble with the line. I apologize for that. And I'd like to thank you for reading the report. Thank you.

CHAIRMAN METTER: Do you want to ask any other Subcommittee members, since you are the chair

of the Subcommittee, if there's other comments?

VICE CHAIR SCHLEIPMAN: First, just once again, wanted to thank all of the Subcommittee members for their work. We had several teleconferences, as you know, and a lot of draft revisions and good comments. So, I'd like to thank them all, as well as the NRC staff, Ms. Ayoade and Ms. Jamerson as well.

I guess there's a minority opinion. I don't know if Megan wants to speak any further on that or not.

MEMBER SHOBER: This is Megan. Yeah, I am grateful for being able to include that minority opinion at the conclusion of the report.

I think over the past few weeks we've had a lot of really good discussion. And so, I guess that while we disagree about the means to accomplish some of this oversight, I think overall there's a lot of common ground between my minority opinion and the rest of the Subcommittee.

As far as regulatory oversight, I do feel strongly that what's currently in place for authorized users is, requires far more effort than there is value. And so, I think there's a lot of ways that the Commission could direct staff to make some changes that

would better align with radiation safety. And I would, of course, support anything that would head in that direction.

But overall, I am definitely in agreement with the rest of the Subcommittee that there do need to be some clearly defined training and experience requirements and that to a large degree that structural training and experience framework belongs in the rule. So, I do support the Subcommittee with having training and experience requirements in the rule.

VICE CHAIR SCHLEIPMAN: Thank you.

CHAIRMAN METTER: Is there any other Subcommittee comments or questions?

MEMBER SHEETZ: Yeah, this is Mike Sheetz.

CHAIRMAN METTER: Yes.

MEMBER SHEETZ: I would like to just comment that the current requirements in 35.390 for the training and experience requirements and the whole process in which the licensing occurs does contain the elements in Option 2d, team-based requirements, and also contains the elements, some elements of the minority opinion in that there is an oversight of other individuals that are members of a team in the radiopharmaceutical administration process and

licensing.

And institutions have a license, a materials license. Part of that is they must have a radiation safety officer who's qualified training and experience-wise to oversee that modality of use in the hospital setting for radiopharmaceutical therapy.

There are nuclear medicine technologists who are also required to be certified and/or licensed by the state in order to handle the material.

So there is oversight in evaluation of training and experience requirements for the other individual team members, you know, that are currently practicing in this environment and modality. Thank you.

CHAIRMAN METTER: Robert, do you want to -- any other comments from your Subcommittee?

VICE CHAIR SCHLEIPMAN: I think everyone has spoken. So the report is there. I think you can proceed with your next part --

CHAIRMAN METTER: Okay.

VICE CHAIR SCHLEIPMAN: -- of the conversation if you like, the whole ACMUI perhaps.

CHAIRMAN METTER: Yes. Thank you, Dr. Schleipman and the Subcommittee for their work on this

and a very, I think a very thorough report and review of the NRC staff's comments on their manuscript or their document.

Do I have any comments or questions from the ACMUI committee? Okay. Hearing none, do I have -- I will open it up to the public to comment.

MS. DIMMICK: So, if you're on the phone line, you want to press star 1 to make a comment, star 1 to make a comment. And you can do so now. And our operator, Amanda, will help you unmute your line.

CHAIRMAN METTER: So one other thing I would like to, any member of the public that is going to make a comment, please introduce yourself before speaking.

MS. DIMMICK: And, Amanda, just let us know if you get any star 1s. And, Dr. Metter, we'll just wait a little bit to give people a chance to press star 1 and to kind of get through the system. So --

THE OPERATOR: Of course. We did have a few come through. One moment. Dr. Carol Marcus, your line is open.

DR. MARCUS: Thank you. I wanted to make a comment about the letter from Spectrum and Bayer alleging that there aren't enough AUs, and therefore,

their products are not being used as much as they think is appropriate.

I'm affiliated with UCLA. We have a very large nuclear medicine department. Everyone's board certified in nuclear medicine with an internal medicine background. We do a lot of therapy, including clinical trials of research radiopharmaceuticals.

We haven't done Zevalin in about 15 years. It isn't because there's no one there to do it. All of us can do it. It's because the drug isn't any use anymore. There are far better non-radioactive drugs for the treatment of lymphoma than Zevalin.

And I don't think the Spectrum company either understands that, or maybe it hopes that the NRC doesn't understand that. But the reason we don't use Zevalin is because the drug is passe.

As far as Bayer's claim that, you know, not enough Xofigo is being used because there aren't enough authorized users, I don't think that's the case at all.

In the first place, the drug was approved for a very, very narrow indication, which I think was inappropriate. And I think the Bayer company should have contested the very limited approval.

Of course, CMS will not reimburse for it unless you use it only for that very, very limited use. It costs about $69,000 for a Xofigo treatment. And no institution is going to risk not being reimbursed for a drug that's that expensive.

So I think part of the fault is the FDA's for its very narrow indication. And part of the fault is Bayer's for not contesting the narrow indication.

We do have a similar drug called Quadramet. It's a Samarium-153 EDTMP. It is approved generally for the treatment of bone mets at any stage from any primary cancer, unlike Xofigo. And it only costs around $6,000. It's a very effective drug and much, much cheaper by a factor of about ten than Xofigo. And I think that it's perfectly reasonable if people use Quadramet instead.

So I don't think that this letter from Spectrum and Bayer should be respected, because I think it's misleading and incorrect. Thank you.

CHAIRMAN METTER: Thank you, Dr. Marcus. Is there any other comment from the public?

THE OPERATOR: We do. Our next comment is from Dr. Dilsizian. Your line is open.

MEMBER DILSIZIAN: Yeah, hi. Thank you,

Darlene. Congratulations to the Subcommittee. It's an outstanding report. It's comprehensive, really discussing the pros and cons of every option, which again, is very well done.

I agree with the Subcommittee recommendations strongly affirming the structural superiority of the status quo option.

I also like the comment which says we acknowledge that there is room for comprehensive review of the specific requirements that are, the seemingly arbitrary requirement of 700 hours.

In my opinion, that was the original question, which we have still not addressed. We do -- I congratulate the Subcommittee that you acknowledge that there is an arbitrary requirement of 700 hours. But the original question was to actually identify, based on the current curriculum, where the 700 hours came from.

So, I recommend the Subcommittee to really address that very simple question. Otherwise, I agree with everything you said.

CHAIRMAN METTER: Thank you. Dr. Schleipman, I believe you and Dr. Palestro had gone back and looked and tried to identify the rationale

for the 700 hours. And I'm thinking there was, that was not easily obtained.

VICE CHAIR SCHLEIPMAN: That's correct. We had various language for this setting.

I know that, I think the NRC document says this was from 2002. But certainly, years before that, there were some flux in the number of hours. And an earlier draft said that this was of uncertain providence.

And I think that we recognize that. And this is not something that is new from this report, but that's been a subtext of the discussions with the ACMUI for a while now.

And so, this particular report was to comment on the draft paper and not explore the 700 or other hours in detail. That certainly is something that we said we would welcome the opportunity to do so. But again, that's really a separate endeavor I think.

CHAIRMAN METTER: Thank you. Any other public comments?

THE OPERATOR: Yes, our last comment is from Cindy Tomlinson. Your line is open.

MS. TOMLINSON: Thank you. This is Cindy

Tomlinson from the American Society for Radiation Oncology.

And on behalf of ASTRO, I'd like to thank the ACMUI Subcommittee for its thorough review of and response to the NRC staff draft evaluation of training and experience requirements for administration of radiopharmaceuticals requiring a written directive.

We recognize that policymakers, including members of Congress, are interested in seeing the NRC thoroughly assessing the current regulations. And we believe the Subcommittee has helped accomplish that goal.

We agree with and support the Subcommittee's conclusions, including its recommendation that the NRC maintain the status quo under 10 CFR 35.390.

As we have stated previously, ASTRO believes that maintaining the status quo is appropriate, protects the safety of patients, the public, and practitioners and should not be changed.

Relaxing the requirements will put patients at unnecessary risk. And we continue to believe that the excellent safety record for radiopharmaceuticals can be attributed to the required

training and experience for authorized users. Thank you.

CHAIRMAN METTER: Thank you, Ms. Tomlinson. Is there anybody else on the public line?

THE OPERATOR: We did just have one more come through. One moment. Aria Razmaria, your line is open.

DR. RAZMARIA: Hi, this is Aria Razmaria. I'm just kind of calling and bringing the perspective of trainees. As a recent trainee in a nuclear medicine program, I kind of go to conferences and international conferences and see people from different countries.

And when we discuss the training and experience requirements and I mention the regulation that we have in the U.S. a lot of people look at me very astonished, because what we know that there are residency programs that provide all the clinical context and the hours and the experience requirements that accomplish and encompass all the needed training and experience and patient exposure and caseload.

And the question that comes up, why NRC as a regulatory body doesn't kind of retrieve those experiences and those existing structures that basically accommodate all the needs and all the

necessary training structure that is, that encompasses a kind of well-trained, experienced physician that can safely and appropriately administer and follow up patients that are receiving radionuclide therapies.

So, again, this is kind of the confusion among the community. There are so many pathways that you need, you're in dire need of standardization.

And I think the NRC is best advised to kind of to rely on the knowledge and experience and resources that the boards in nuclear medicine and also radiology programs already established to provide that experience that is needed.

Again, this is kind of an international standard. And this is what will kind of prepare the future of like radiopharmaceutical therapies in the U.S. as well, because right now the U.S. unfortunately lagging behind international comparison because in other countries there is already existing structure of who is eligible and basically based on board certification in nuclear medicine at the international level.

And this is kind of what's been needed in the U.S. to have, to become more competitive, to become in par of training that other countries provide already.

Thank you.

CHAIRMAN METTER: Thank you, Dr. Razmaria. At this --

THE OPERATOR: And there are no further comments.

CHAIRMAN METTER: Thank you. Do I have any other final comments for the ACMUI Committee?

VICE CHAIR SCHLEIPMAN: I have a question. This is Robert Schleipman again.

CHAIRMAN METTER: Yes.

VICE CHAIR SCHLEIPMAN: So we've reported here to the staff for their excellent report. And I was just curious what the next steps are for NRC staff vis-a-vis this report and their draft.

MS. LOPAS: Hi, Dr. Schleipman. This is Sarah Lopas.

So, we are waiting for comments from the Agreement States and the Organization of Agreement States, which we will get tomorrow. We're going to need some time to review those comments.

We also have to incorporate the conclusions from today's meeting into our paper as well, so what comes out of this meeting.

We're going to revise the paper a little

bit. And then it will start going through our concurrence process here. So we will just keep everybody posted on the status of when the paper should be going up to the Commission.

VICE CHAIR SCHLEIPMAN: Thank you.

CHAIRMAN METTER: Thank you, Sarah. Are there any other comments on what was discussed today before the full Committee votes on the Subcommittee report?

MEMBER OUHIB: This is Zoubir Ouhib. I think Dr. Ennis summarized it very well, and I fully agree on everything he mentioned.

It's just happened that sometimes people refer to the status quo as something old or something not up-to-date per se and all that. But we have to caution everybody that sometimes perhaps the status quo is the best venue to avoid anything that could potentially make the headlines.

And I think in reference to some of the comments, I think the ultimate goal here is really not the 700 hours or anything else. But it's really maintaining the patient safety as a priority.

And I think without proper training, as one of the callers says, you know, some physician could

probably administer this safely. Well, we want to avoid the probably and we want to make sure that it's done and done in a safe manner basically. Thank you.

CHAIRMAN METTER: Thank you, Mr. Ouhib. Any other comments on the, from the ACMUI Committee? Okay. Hearing none, do I have a motion to approve the Subcommittee report as written?

VICE CHAIR SCHLEIPMAN: So moved. Robert Schleipman.

MEMBER OUHIB: Second. This is Zoubir Ouhib.

CHAIRMAN METTER: Thank you. Any discussion? Okay. Sarah, what's the best way to go ahead and vote on this? Do we just have a verbal or do we have individuals?

MS. LOPAS: I think verbal is fine.

MS. DIMMICK: Yes, verbal --

CHAIRMAN METTER: Okay.

MS. LOPAS: Yes.

CHAIRMAN METTER: Okay. All in favor of approving the Subcommittee report as written say aye.

(Chorus of aye.)

CHAIRMAN METTER: Any opposed? Any abstained? So, at this point, we have the Subcommittee

approval by the entire ACMUI Committee as written. And that would be -- any further agenda items, Sarah?

MS. LOPAS: Nope. I believe that closes it out for us. So that would, unless anybody has anything else to add, that would end today's call.

CHAIRMAN METTER: Well, thank you --

MEMBER GREEN: Dr. Metter?

CHAIRMAN METTER: Yeah, yeah.

MEMBER GREEN: This is Richard Green. Have we officially put on the parking lot list of things to plan for the spring meeting assessment of not just where the 700 hours came from but is it really relevant today with new modern teaching technologies and formats, if that number is outdated, what should it be? Is that on our calendar for the spring?

CHAIRMAN METTER: We can look into it. And you can certainly, you can suggest that as a topic for the T&E Committee to look at.

MEMBER GREEN: Okay. Thank you.

CHAIRMAN METTER: Yeah, thank you, Mr. Green. Any other final comments before we close for today? Okay. Do I have a motion to adjourn, please?

PARTICIPANT: So moved.

CHAIRMAN METTER: Okay. Second.

PARTICIPANT: Seconded.

CHAIRMAN METTER: Thank you. All that are not in favor, they can stay. But I really appreciate --

(Laughter.)

CHAIRMAN METTER: -- and attention and support. And you all have a good weekend.

(Whereupon, the above-entitled matter went off the record at 3:02 p.m.)

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Comments of United Pharmacy Partners, Inc. ("UPPI")

for ACMUI Public Teleconference to Consider

Changes to the Training and Experience Requirements

Thursday, October 17, 2019

I am writing on behalf of United Pharmacy Partners, ("UPPI"), a consortium of independent nuclear pharmacies that draws approximately 25% of all nuclear pharmacy doses in the U.S., to provide additional comments and feedback regarding proposed changes to the Training and Experience ("T&E") requirements to administer certain radiopharmaceuticals.

We sincerely appreciate the time and consideration that the NRC staff and the ACMUI have given to this topic. The NRC's staff careful evaluation of the need for changes to the T&E requirements and in-depth investigation of the options available for accomplishing that goal are to be commended.

We continue to believe that changes are needed to the current T&E requirements, and applaud the ACMUI for (belatedly) recognizing that some changes are necessary.

Therefore, as the ACMUI, NRC staff and the Commission continue to evaluate what changes may be necessary to the T&E requirements, we urge you to consider two important points:

1) Changes to T&E requirements are necessary.

2) While some changes that are suggested by the NRC staff may be achievable to alleviate the demand that new radionuclidic therapies will create, the ONLY approach that is ensured to increase access and maintain patient and environmental safety sufficient to keep up with new breakthroughs and patient demand while utilizing the long-standing NRC T&E requirements is the teaming approach discussed in the NRC's Option 2d.

As UPPI and others have been suggesting for several years, the exciting break-through radiopharmaceutical therapies that are in the pipeline will require an increase in the number of licensed individuals to administer these therapies. For example, many of these break-through therapies specifically target challenging diseases that predominate medical oncology, and others support medical conditions that have the potential to treat a significant number of patients. It would be an incredible tragedy if patients could not access these treatments simply because there

were not enough licensed individuals that are adequately geographically dispersed to administer the radiotherapies.

Additionally, as described in the attached Appendix, there are a significant number of academic and other studies that have examined the future number of AUs and other nuclear medical physicians that have determined that there will be fewer practitioners than there are today. While this conclusion is different than the one reached by the ACMUI, we urge the NRC to consider the myriad of sources that we consulted, as opposed to the single source relied upon by the ACMUI.

We are pleased that the NRC staff has recognized this need and has persisted in seeking to find ways to increase treatment opportunities for all modalities. We applaud the members of the ACMUI who have recognized this reality.[1]While the proposals considered by the NRC staff and ACMUI have potential benefits and would increase access to alpha and beta radiopharmaceuticals, the UPPI "Teaming" proposal is the best way to expand access to these therapies in a way that is efficient, effective and ensures maximum access and minimizes risks to public safety while ensuring radiation safety and protection of patients, personnel and the public.

For example, among ALL of the other proposals, the teaming approach is the ONLY one that will increase the number of physicians able to administer radiopharmaceuticals while maintaining the current 700 hours-of-training format. In other words, if the Commission does not want to scrap the whole hours-of-training criteria, and the clear understanding of what that entails and the type of training that is necessary to attain that level required currently, the teaming approach is the only one that will expand access to radiopharmaceuticals.

Specifically, the proposal under Option 1, "Removal of Prescriptive T&E Requirements and NRC Review and Approval of AUs," removes the hours-of-training experience and expertise that the NRC has established and relied upon to ensure that the disbursement of radiopharmaceuticals has minimal safety and training requirements. This proposal, if adopted, would expand the ability of physicians to administer radiopharmaceuticals, but would require each medical specialty to establish their own training regimen. That would require a revamping of the current training criteria, along with a significant investment of time and resources to establish, test and approve these new training requirements. This approach could also short-change the radiation safety requirements, particularly if the NRC has little or no role in the establishment or approval of these training requirements.

In other words, while this approach may have long-term viability to expand access, it would take several years to implement, and would do nothing to expand access to patients in the meantime. Further, it would also require extensive and duplicative investigations by each specialty to create their own specialized training regimen, resulting in waste and delay.

[1] "Some Subcommittee members' thinking has also evolved…" https://www.nrc.gov/docs/ML1928/ML19280D612.pdf, P. 2

Option 2b, "Tailored Requirements," would reduce or eliminate training on overall radiation safety and other larger issues, as physicians would instead focus on the administration of particular therapies.

Further, as new therapies are developed, those that seek to administer them would have to undergo specific training for each new therapy. This would tend, in the long-run, to discourage the use of new and break-through therapies as physicians would have to undergo extensive new training for each new therapy.

Which brings us to the "teaming" proposal.

This proposal has a number of advantages over those discussed above:

- It maintains a significant level of overall safety and radiation risk training, requiring the physician that would actually be administering the therapy to obtain a least 400 hours of training, and the Authorized Nuclear Pharmacist (ANP) to receive the full 700 hours of experience and training. In the medical setting, the ANP would also access a medical physicist as part of the team to follow safety protocols if a safety concern arises.
- It maintains the well-established and successful "hours-of-training" model. With the ANP this teaming group minimizes the revisions to the current training that would be necessary to implement the program.
- It expands the number of physicians that could administer radiation therapies, ensuring adequate patient access to new and high-demand therapies.

Further, while the ACMUI and NRC have expressed concerns that this model would result in "confusion" because there is uncertainty as to when one person's responsibility ends and another's begins, this could just as easily be characterized as a STRENGTH to this approach – multiple members of the team have been trained in over-lapping responsibilities, ensuring that ALL aspects of patient and radiation safety are addressed. There are many options to address the question of over-lapping responsibility. For example, timeouts, a practice used extensively in Y90 microsphere procedures, require all parties who will participate to review the procedural steps and responsibilities prior to administration; this is one model that could successfully be employed in alpha and beta radiotherapies.

Another concern was that "the T&E for ANPs does not address patient care nor does it fully cover radiation safety aspects of administration."

However, the ANP T&E and licensure requirements could be updated to address patient care and administration. This is not to say the ANP would administer the radiotherapy, but would be appraised of and trained on the administration protocol that the physician team member would follow. Therefore, these do not appear to be concerns that cannot be overcome, but simply help to demonstrate areas where T&E training for ANPs can be fortified to compliment the radiation safety functionality of the ANP.

The NRC also raises concerns that some aspects of implementing this proposal "may fall outside the purview of the NRC." However, as discussed above, because the NRC's T&E training would

remain an integral part of this plan, the NRC would continue to be heavily engaged. (As opposed to some of the other proposals that would abdicate NRC responsibility altogether.)

Further, we envision that the NRC could assist the medical community in writing guidances in radiotherapeutic uses. This is not unlike the FDA and the US Pharmacopeia working with expert panels in the derivation of a new USP Chapter <825>. Such could be the case for the teaming approach we propose.

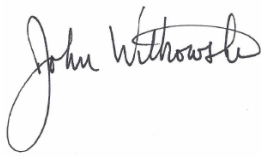
Finally, the NRC indicated that this proposal would be "very complex to inspect and license." We disagree, because it would still require the physician to receive at least 400 hours of T&E created and administered by the NRC, and the ANP would still be required to complete the current 700 hours of T&E. We believe the construct of guidances related to radionuclidic therapies would help to define the inspection and review processes. As an example, the introduction of Y90 microsphere injections in the interventional radiology suite, when first conducted, also posed inspection and licensing questions for the administration of a high energy beta emitting microsphere, but has become a safe procedure helping the severely ill cancer patient.

Conclusion:

Again, we sincerely thank the Commission and the staff for continuing to assess possible ways to expand the access to radiopharmaceutical therapies, and we appreciate their efforts to ensure that both the positive and negative aspects of these proposals are fully vetted to ensure patient and radiation safety. We would certainly encourage the NRC to continue to engage in thoughtful outreach and discussions to thoroughly examine a teaming solution to radiotherapies as the horizon expands for these medical applications and care of the patient.

As always, thank you very much for your time and consideration, and we are available for any additional questions and follow-up.

Sincerely,



John Witkowski

President

APPENDIX: Reductions in the Number of Nuclear Medicine Physicians

While many commenters, including the Professional Societies and ACMUI, indicate that there is no shortage of AUs, and that the number in the pipeline will keep the number of licensed and certified AUs steady, recent publications suggest to the contrary that radiology and nuclear medicine do expect to lose practitioners in the coming years. While UPPI is skeptical that a simple evaluation of the number of anticipated AUs is sufficient to determine whether or not the number will keep up with demand, we believe that there is ample evidence to suggest that the number of AUs is likely to decrease. Assuming that that is indeed the case bolster's the argument that the status quo is unacceptable, and that the NRC staff is correct in continuing to pursue ways to increase the number of AUs by looking at ways to enable more licensed professionals to become Authorized Users.

For example:

- The September 2019 issue of the Journal of Nuclear Medicine and Molecular Imaging contained an article, The Future of Nuclear Medicine as an Independent Specialty by Johannes Czernin, et. al., which describes the decline in nuclear medicine practitioners in light of the specialty's brighter future, including imaging and radiotheranostic product development.[2]

  "Nuclear medicine has seen a decline of greater than 50% in Accreditation Council for Graduate Medical Education –accredited U.S. residency programs since 1990 and a 25% decrease compared with 2007-2008. There is also a striking difference in "on-duty residents" in these specialties, with diagnostic radiology counting 4,697 trainees, radiation oncology containing 775 trainees, and nuclear medicine containing only 79 residents in 2017."

Further, this article highlights that "this declining trend over the past 20 y was unexpected," highlighting the difficulty with attempting to predict the number of future AUs, particularly when such a prediction, if incorrect, could lead to significant adverse patient outcomes. [3]

- The decline of physicians within the specialty mirrors the experience of other radiology groups. For example, the American College of Radiology in a September 2019 press release announced its efforts to address a national shortage of certified B-readers: "The ACR Education Center will address a national shortage via outreach, training and certification opportunities to add 80 additional B Readers in the United States."[4] The number of B Readers has decreased from nearly 400 in the mid-2000s, to 165 today. The

1. The Future of Nuclear Medicine as an Independent Specialty, Johannes Czernin, Ida Sonni, Aria Razmaria and Jeremie Calais. Supplement 2 Journal of Nuclear Medicine, Vol.60, September 2019, Reston, VA., pages 3S-12S. (Citations omitted).

2. Ibid, page 3S. (Emphasis added.)

3. https://www.acr.org/Media-Center/ACR-News-Releases/2019/American-College-of-Radiology-Education-Center-Selected-to-Train-Next-Generation-of-B-Readers

average age of the remaining B Readers has also progressively increased to an average of more than 60 years old."[5]

One final consideration we believe is that there is an over-counting of Authorized Users. This is presented in the ADAMS documents of an amendment to a mobile nuclear imaging radioactive materials license. The lists of Authorized Users on the license (document 612584A in response to the letter ML19058A152) includes 216 MDs, DOs and others. The listed AUs can be found on other radioactive materials licenses where they also are employed. This is a common practice when the mobile group covers a large geographic area. Any conclusions to the number of current AUs needs to cross reference the AU to other radioactive materials licenses to ensure accuracy of the metric.

4. https://www.cardiovascularbusiness.com/topics/vascular-endovascular/interventional-cardiologists-acute-stroke-care

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Oct. 24, 2019

Dear Ms. Lopas and Ms. Jamerson

On behalf of United Pharmacy Partners, Inc., I'd like to briefly follow-up on the ACMUI meeting held last week, and highlight some areas where we agree with their recommendations, and point out some shortcomings in their recommendations to the Commission.

First, in introducing the Subcommittee Report to the full ACMUI, Dr. Ennis focused extensively on the continued need for the NRC to rely upon the well-established T&E framework.

For example, Dr. Ennis stated that the "system has worked quite well to protect the public," and it would be "dangerous" for the NRC to "get out of the way."

"No one," he said, "believes that such an extreme change is needed."

UPPI agrees that the NRC should continue to rely upon the T&E framework. It has proven to be an effective method to ensure that everyone involved in the creation, distribution and administering of radiopharmaceuticals has been trained on their safe handling, administration to the patient and what to do to ensure the protection of the patient, public and the environment.

The T&E model also ensures that the NRC continues to play an important role in this area.

However, we continue to believe that the ACMUI is incorrect in its assertion that there is "no evidence" of the need for additional AUs, and believe that the Commission needs to create an alternative way to increase the number of licensed physicians who can administer radiopharmaceuticals. These physicians

might be experts in medical oncology or hematologic oncology or other specialties in radiotheranostic product development beyond oncology, as some of the ACMUI speakers said during the discussion[1].

Specifically, as we have stated before, the data that the ACMUI relied upon is incomplete, and we believe that making such an important decision on the basis of parochial interest and incomplete data is short-changing the value of the ACMUI's advice to the staff and ultimately to the Commission.

However, even if the data is accurate and the number of AUs is not decreasing, that still does not adequately demonstrate if the current number of AUs is sufficient to meet future demand, particularly given the extraordinary break-through treatments that are in the pipeline, of which a number will achieve approval for patient treatments.

For example, the Medical Events Subcommittee Report (FY 2018), released on Sept. 10, 2019 by Dr. Ennis, states that "One potential new issue is emerging – There is an increasing use of radiopharmaceuticals of high activity and high volume." It is difficult to reconcile that one arm of the ACMUI believes that there is an increase in the use of radiopharmaceuticals while another arm states that there is no need to increase the number of physicians that can administer these radiopharmaceuticals.

Finally, given the amount of time that this process has taken, we believe that the NRC should at the very least open the process up so that if challenges in the number of AUs do emerge in the future, the Commission will already have a path forward to address that shortage. In other words, the Commission should err on the side of caution, and assume that the demand for radiopharmaceuticals will increase, and if it does there should be a path forward already in place. Such a precaution does not require that such an alternative path be opened, but we believe that ignoring that potential growth could end up being very harmful to patients.

Given these two positions – the need to follow the current T&E model and the need to at least start a path forward to increase the number of AUs if a shortage does develop – we believe that the only model that supports both of these goals is the "teaming" model contained in option 2d. It is flexible, can be implemented relatively quickly, and continues to ensure a strong role for the NRC in overseeing the training of those involved in administering radiopharmaceuticals and radiation safety.

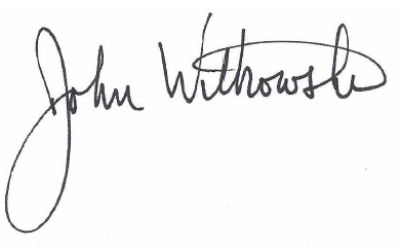
In addition, it appears from the conclusion of the ACMUI call that revising the T&E requirements may be on tap for the ACMUI starting in the spring. If that is indeed the case, it is the perfect opportunity for the ACMUI to also look at what T&E requirements might look like for oncologists, hematologists and other physicians who might be interested in obtaining the less-than-700 hours of training necessary to participate in the "teaming" process. It could also use that to start the process of examining what the requirements might look like for ANPs, and how T&E could be changed to accommodate the new requirements under the teaming model – a process that UPPI welcomes the opportunity to participate in.

In other words, this could be the perfect confluence of timing and opportunity that is necessary to begin the process of updating the T&E requirements and expanding the number of AUs.

[1] Once the transcript is available, we will follow-up and provide more detail and specifics regarding these statements.

Again, we sincerely appreciate the time and effort that everyone has put into this, and we look forward to continuing to work with you to ensure that patient care is safe, effective and as broadly available as possible.

Sincerely,



President