

ASTRO news

SUMMER 2014



Patient SAFETY

**RADIATION
ONCOLOGY PSO**

**ASTRO PRACTICE
ACCREDITATION**

ROLE OF PEER REVIEW

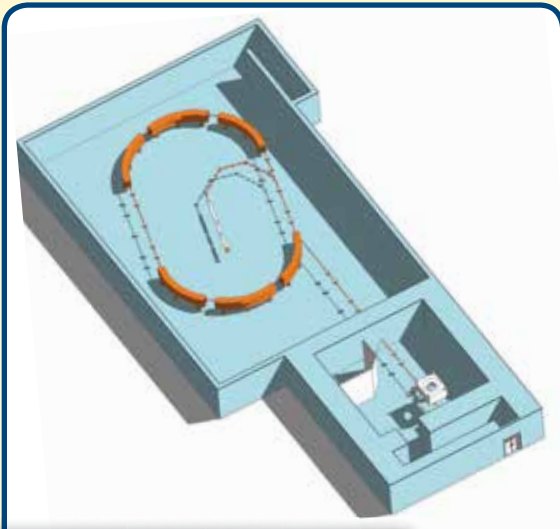
**“IT WAS TOO BIG
IT WAS TOO COMPLEX
IT WAS TOO EXPENSIVE
– NOT ANY MORE”**

The World's Only Single-Room Proton System – Now Treating.

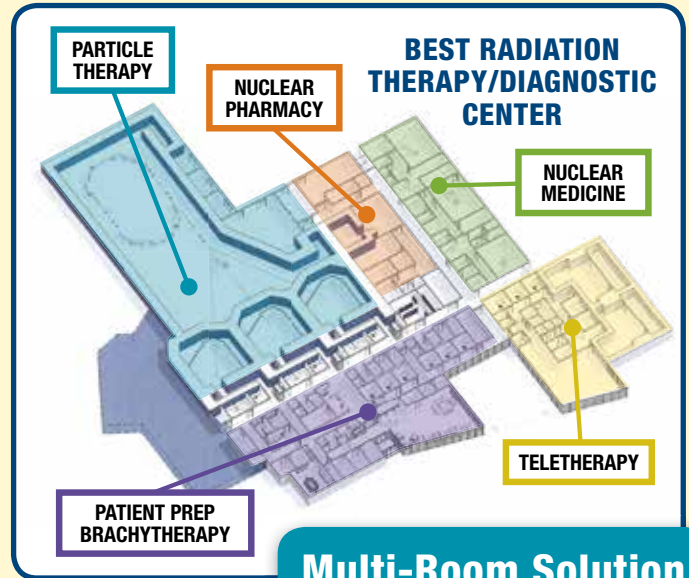


Best Particle Therapy

Introducing ... Best Medical Synchrotrons with variable energy from proton to carbon, in Single or Multi-Room Solutions, with or without Gantry!



Single Room Solution



Multi-Room Solution

Best Particle Therapy, Inc. is a new member of the TeamBest® family of companies, founded by Krishnan Suthanthiran in 1977. TeamBest® currently offers products for brachytherapy and teletherapy. Best NOMOS, a TeamBest® company, invented IMRT (intensity-modulated radiation therapy) in the early 1990s. TeamBest® continues to expand its product offerings to cover low tech to high tech with the primary goal of making these technologies affordable and accessible globally. Best Particle Therapy will utilize advanced state-of-the-art accelerator technologies and provide cost-effective solutions for particle therapy treatment and research.

“Particle Therapy” (PT) is a radiotherapy technique that utilizes hadrons and was first proposed by R.R. Wilson in 1946 after analysis of inverted depth-dose distribution measured at the Berkeley Cyclotron. This analysis resulted in the first radiological use of hadrons in 1954 by Cornelius Tobias and John Lawrence at the Radiation Laboratory (former E.O. Lawrence Berkeley National Laboratory, LBNL). This pioneering work explored the use of hadrons, i.e., protons, deuterons, helium and neon ions, for therapeutic exposure of human patients and concluded at LBNL with the shutdown of the BEVALAC in 1992. Inspired by the success of the early work in the USA, international efforts were made to develop particle therapy into a mature radiological treatment modality where more than 78,275 patients have been treated worldwide with hadron particle therapy. Currently, only protons and carbon ions are in use at particle therapy centers. There are approximately 30 proton facilities in operation, and 5 facilities, worldwide, offering carbon ion particle therapy. To date, more than 56,854 patients have been treated with protons and 7,151 patients treated with carbon ions.

(Statistics courtesy of PTCOG)

Pending regulatory approval for sale in USA.

Best Particle Therapy, Inc. © 2014

Best Particle Therapy, Inc. One Best Drive, Pittsburgh, Pennsylvania 15202 USA
412 312 6700 800 706 6667 www.bestproton.com www.teambest.com

AFRICA | ASIA | EUROPE | LATIN AMERICA | MIDDLE EAST | NORTH AMERICA



Contents

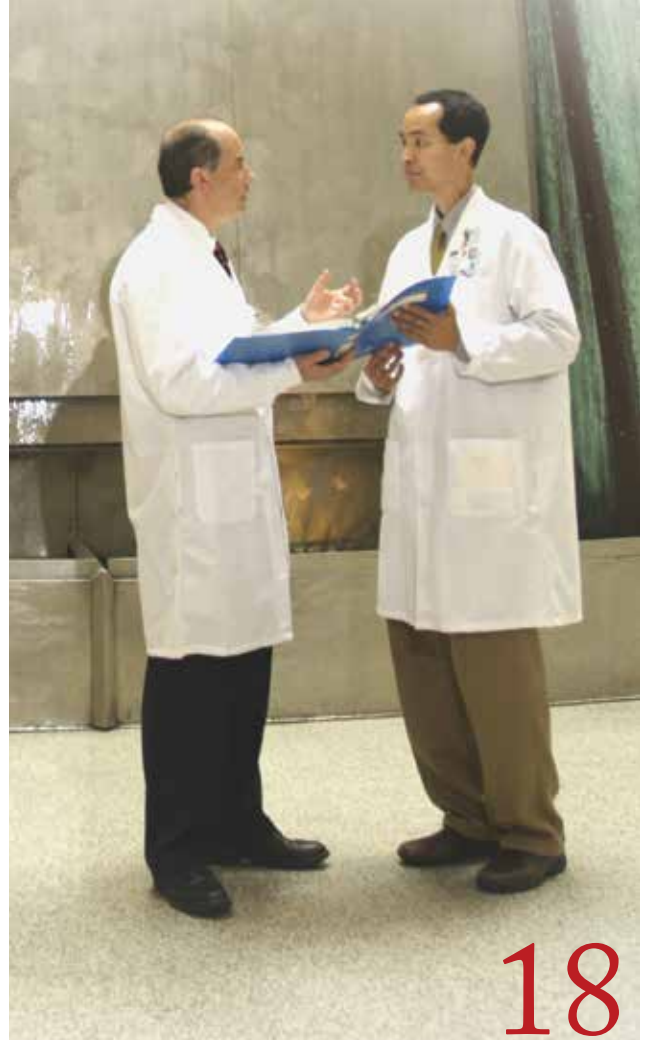
20



23



18



- 14 RO-ILS offers secure incident reporting system to track errors and near-misses
Starting in June, radiation oncology providers can start participating, free of charge, in a much-anticipated national system developed specifically for radiation oncology.
- 16 APEX promotes highest standards in radiation oncology care
ASTRO launches an independent practice accreditation program, demonstrating the Society's dedication to promoting the highest standards in radiation oncology care.

- 18 Peer review and patient safety in radiation oncology
An examination of the role of peer review in optimizing patient safety.
- 20 International standards help advance patient safety
The International Electrotechnical Commission plays an important role in developing standards for radiation oncology equipment.
- 23 News from the Old World
A look at the history, growth and development of cancer care and radiation oncology in Lithuania.



SHARPEN YOUR EDGE
AGAINST CANCER.

EDGE

Edge Radiosurgery: Making radiosurgery an option for more patients.

Deliver accurate radiosurgery treatments quickly and efficiently with the Edge™ radiosurgery system. Edge's advanced technology enables you to offer powerful, non-invasive radiosurgery treatments anywhere in the body where radiation is indicated. Expand treatment options for patients and gain a competitive edge with the system as dedicated as you are.

Visit us at AAPM 2014, Booth #415.

Learn more about Edge Radiosurgery at varian.com/Edge

VARIAN
medical systems
A partner for **life**

Radiation treatments may cause side effects that can vary depending on the part of the body being treated. The most frequent ones are typically temporary and may include, but are not limited to, irritation to the respiratory, digestive, urinary or reproductive systems, fatigue, nausea, skin irritation, and hair loss. In some patients, they can be severe. Radiation treatment is not appropriate for all cancers.

© 2014 Varian Medical Systems, Inc. Varian and Varian Medical Systems are registered trademarks and Edge is a trademark of Varian Medical Systems, Inc.

VOLUME 17 • NUMBER 2

ASTRO news

AMERICAN SOCIETY FOR RADIATION ONCOLOGY

ASTROnews (ISSN 1523-4185) is published quarterly at 8280 Willow Oaks Corporate Drive, Suite 500, Fairfax, VA 22031. Dues for individual membership in the American Society for Radiation Oncology are \$525 (U.S.), which includes \$38 for an ASTROnews subscription. Periodicals Postage Paid at Fairfax, VA 22030-9998 and at additional mailing offices.

Copyright 2014 ASTRO. All rights reserved.

POSTMASTER: Send address changes to ASTROnews, 8280 Willow Oaks Corporate Drive, Suite 500, Fairfax, VA 22031.

Telephone: 703-502-1550; Fax: 703-502-7852; Website: www.astro.org/astronews.

Printed in the U.S.A., by Quad Graphics in Midland, MI

ASTRO accepts paid advertising. Although we make every effort to accept advertising only from reputable sources, publication of such advertising does not constitute an endorsement of any product or claim.

For all of the most recent news from ASTRO, please visit www.astro.org.

Printed on 10 percent postconsumer recycled paper, with eco smart inks.

SENIOR EDITOR:	Lisa A. Kachnic, MD
PUBLISHER	Laura I. Thevenot
EDITORIAL DIRECTOR:	Anna Arnone
MANAGING EDITOR:	Brittany Ashcroft
DESIGN/PRODUCTION:	Kimberly Kerin
ONLINE:	Benjamin Reese
ADVERTISING:	Gene Conselyea Triple Threat Media 732-598-3232 gene@triplethreatmedia.com
CONTRIBUTING EDITORS:	Ksenija Kapetanovic Caroline Patton
EDITORIAL BOARD:	H. Joseph Barthold, MD Tomas Dvorak, MD Benjamin Falit, MD, JD Amato J. Giaccia, PhD Geoffrey S. Ibbott, PhD, FASTRO Simon N. Powell, MD, PhD Dirk Rades, MD George Rodrigues, MD, PhD Alexander Spektor, MD, PhD Paul E. Wallner, DO, FASTRO

Inside



8

TARGETING CANCER: TECHNOLOGY & BIOLOGY

32



5 Editor's Notes

7 Chair's Update

8 Special Report

Society News

10 PRO accepted in MEDLINE

10 Prostate cancer patient flyer

11 Ambassadors

12 Board of Directors ballot now open

12 In Memoriam

25 IHE-RO

26 Guidelines

28 MOC

29 From the ABR

30 Clinical Practice

32 History

33 Science Bytes

36 Journals

ADVOCACY DAY ONLINE EXCLUSIVE

Don't miss the Advocacy Day special edition of ASTROnews, which recaps radiation oncology's premier advocacy event. View the issue at www.astro.org/astronews.





DEMYSTIFYING MOC

OUR OVERARCHING GOAL as radiation oncologists is to provide the highest quality of patient care. One important measure of our competence and readiness to perform safe, high-quality radiation delivery is through Maintenance of Certification (MOC).

The 24 member boards of the American Board of Medical Specialties (ABMS) and the American Board of Radiology (ABR) as a member board serving diagnostic radiology, radiation oncology, medical physics and interventional radiology, have initiated this process. Participation in the ABR MOC Program demonstrates our support for continuous professional development, career-long learning and quality improvement in a field that has seen rapid technology growth. Yet, MOC has not been unanimously embraced by our community and continues to arouse strong opinions, as many radiation oncologists and medical physicists do not understand its processes and feel that MOC places an undue burden on our limited time and finances.

So this is where I may wish to keep a low profile, as I not only serve as your *ASTROnews* editor, but I am also entering my second term as your

ASTRO-nominated ABR radiation oncology trustee. As one who believes in the value of MOC, I will do my best to share with you a growing body of evidence in support of MOC and attempt to “demystify” its current practices as it pertains to radiation oncology. Honestly, it has taken me a few years (despite my ABR role) to master an understanding of the MOC requirements and easily navigate through the self-assessment offerings.

Interestingly, yet not surprisingly, a systematic review of 62 studies demonstrates that physician knowledge, skills, compliance with evidence-based processes of care and patient outcomes decline as a function of time from initial training¹. Moreover, the incidence of adverse licensure actions also increases²⁻³. As such, I believe that there is much value for an assessment process, such as MOC, which supports physician lifelong learning and quality improvement. Selected lifelong learning strategies, such as CME in live or Web-based formats, are effective in bridging the gap among best evidence and physician performance and patient outcomes⁴⁻⁷. That said, MOC is also in its infancy, and our governing boards will need to develop research strategies to measure its success and assure the continued support of our stakeholders and diplomates.

Currently, our MOC program evaluates six essential competencies as defined by the Accreditation Council on Graduate Medical Education

Continued on Page 6

Participation in the ABR MOC Program demonstrates our support for continuous professional development, career-long learning and quality improvement in a field that has seen rapid technology growth.

(ACGME) and the ABMS: medical knowledge, patient care and procedural skills, interpersonal and communication skills, professionalism, practice-based learning and improvement, and systems-based practice. Four parts are then used to evaluate these six competencies: Part 1—professional standing, Part 2—lifelong learning and self-assessment, Part 3—cognitive expertise and Part 4—practice quality improvement (PQI).

The ABMS and its boards, including the ABR, recently implemented a new continuous certification process for MOC in 2012, which has replaced the 10-year MOC cycle and has likely contributed to much of MOC's mystery. Under this new policy, the total number of MOC requirements has not changed, and progress will be evaluated annually in March, using a rolling calendar-year "look-back." The first "full" annual look-back will occur in March 2016.

To meet the requirements of MOC, a diplomate needs a valid state medical license (Part 1), at least 75 Category 1 CME credits in the previous three years with 25 of these being self-assessment (Part 2). These self-assessment (SA) CMEs may be the traditional SAMs that we obtain online and live during an ASTRO meeting, or journal SA-CMEs, such as ones from the Red Journal or *Practical Radiation Oncology*. You can access the traditional SAMs or Journal CMEs on the ASTRO website, which are at a reduced cost for members, and those credits can be directly reported to the ABR. My department generally performs a monthly journal club with one of these articles, and we each take out our laptops and pull up the questions. In this fashion, the SA-CMEs have become routine, and definitely a bit of fun.

For Part 3, diplomates must have passed the ABR initial certifying exam

or MOC exam in the previous 10 years, and for Part 4, diplomates must complete one PQI project in the previous three years. This project may be individual or group-based and is intended not to be a formal research project. It does not require IRB approval or publication. For example, a diplomate may focus on one of the five radiation oncology *Choosing Wisely*[®] measures (such as don't routinely use extended fractionation schemes [>10 fractions] for palliation of bone metastases). Obtain baseline metrics of your practice over the past six to 12 months, and set achievable goals and methods to attain the *Choosing Wisely*[®] practice measures.

ASTRO has a variety of resources to help diplomates meet their MOC requirements. Many that I have already described are further detailed in the MOC update on page 28 of this issue. ASTRO has also introduced a variety of new patient safety measures that may apply towards Part 4 PQI. For example, the Radiation Oncology Incident Learning System (RO-ILS), a secure incident reporting system to track radiation oncology safety concerns, provides a forum for all participants to share information. RO-ILS has a PQI template that is a free companion to its portal. To learn more about this and other PQI projects, visit www.astro.org/PQI.

The ABR (and your *ASTROnews* editor) recommend that all diplomates participate in MOC. Those with time-limited certificates, or continuous certificates issued in 2012 and thereafter, are automatically enrolled. Those with non-time-limited ("lifetime") certificates should strongly consider MOC as a learning investment in the interest of providing the highest standard of patient care and safety. All ABR trustees and ABR radiation oncology volunteers participate in MOC, and

I urge all radiation oncology chairs to mandate that your staff participate and meet the requirements of MOC as part of annual performance reviews.

REFERENCES

1. Choudhry NK, Fletcher RH, Soumerai SB. Systematic review: the relationship between clinical experience and quality of health care. *Ann Intern Med.* 2005; 142: 260-273.
2. Khaliq AA, Dimassi H, Huang CY, Narine L, Smego RA. Disciplinary action against physicians: who is likely to get discipline? *Am J Med.* 2005; 118: 773-777.
3. Kohatsu ND, Gould D, Ross LK, Fox FJ. Characteristics associated with physician discipline: a case-control study. *Arch Intern Med.* 2004; 164: 653-658.
4. Davis DA, Thomson MA, Oxman AD, Haynes RB. Changing physician performance: a systematic review of the effect of continuing medical education strategies. *JAMA.* 1995; 274: 700-705.
5. Davis D, Galbraith R. Continuing medical education effect on practice performance: effectiveness of continuing medical education: American College of Chest Physicians evidence-based educational guidelines. *Chest.* 2009; 135(suppl):42S-48S.
6. Marinopoulos SS, Dorman T, Ratanawongsa N, et al. Effectiveness of continuing medical education. *Evid Rep Technol Assess.* 2007; (149): 1-69.
7. Forsetlund L, Bjorndal A, Rashidian A, et al. Continuing education meetings and workshops: effects on professional practice and health care outcomes. *Cochrane Database Syst Rev.* 2009(2): CD003030.

Dr. Kachnic is chair of the department of radiation oncology at Boston Medical Center and professor of radiation oncology at Boston University School of Medicine. She welcomes comments on her editorial, as well as suggestions for future ASTROnews topics, at astronews@astro.org.



THE POLITICAL VOICE OF RADIATION ONCOLOGY

of Congress to support our self-referral legislation, a permanent fix to the SGR and increased research funding for radiation oncology. Many of the attendees also contributed to ASTRO PAC's largest fundraiser of the year held during Advocacy Day. Like many of you, I did not enter the field of medicine expecting that I would be involved in politics, but unfortunately, these days simply practicing medicine is a luxury we no longer have. With Medicare payments, regulations and lagging research funding all dictated by Congress, participating in politics is as much of a necessity as keeping our medical licenses up to date.

In addition to meeting with members of Congress during Advocacy Day, a crucial part of participating in politics is often overlooked: political giving. It is through the ASTRO PAC that we are able to build positive relationships with elected officials and candidates, who make policy decisions affecting radiation oncology, by pooling resources to promote our advocacy agenda. Many candidates have great ideas that will help radiation oncology; however, they need financial support to stay in office and have their message heard. ASTRO

PAC funds help broaden the audience of candidates who are educated on our issues and know how decisions made "inside the Beltway" affect cancer patients throughout the country.

ASTRO PAC has supported ASTRO in bringing much-needed attention to our legislative issues, including introducing legislation that would end self-referral abuse and reducing drastic cuts in Medicare reimbursement proposed in 2009 and 2012. After seeing the role that the ASTRO PAC played in these key successes, I now look at my annual ASTRO PAC contribution as insurance for the future of radiation oncology.

Despite these momentous achievements and more than doubling in size over the past 10 years, the ASTRO PAC is still being outpaced by its opposition. In fact, last year the American Urologic Society's PAC (URO PAC) raised \$246,601 while the ASTRO PAC raised only \$165,293. With that much in contributions and more money in the bank, URO PAC contributed more than \$350,000 to candidates to support their issues, which includes their campaign against our efforts to

Continued on Page 35

IF YOU LIVE IN WISCONSIN LIKE I DO, supporting the 'Pac' is something that EVERYONE does since we're all Packer fans. Our Packers provide pride for us as a state and encourage us to be supportive of a team over just an individual. Supporting the ASTRO PAC is something that I hope that all radiation oncologists would do for similar reasons. The ASTRO PAC supports radiation oncology as a field of medicine that helps our cancer patients and thus gives us pride in our field. It also supports not one individual, but all of us as a team of providers who help our cancer patients.

Let's get to some specifics. In May, dozens of radiation oncologists, physicists, residents, nurses and administrators canvassed Capitol Hill during Advocacy Day to urge members

ASTRO PAC is our strongest tool to combat our opposition and to increase ASTRO's political clout in Washington to guarantee that the voice of radiation oncology, and thus our patients, is heard.

A LOOK AT ASTRO'S 56TH ANNUAL MEETING



IT IS MY PLEASURE TO INVITE YOU TO ASTRO'S 56TH ANNUAL MEETING, taking place September 14-17, 2014, at the Moscone Center in the vibrant city of San Francisco. Located in the Yerba Buena neighborhood, meeting attendees can take advantage of museums, galleries, restaurants, theaters and shops, as well as the expansive urban Yerba Buena Gardens.



The theme for this year's meeting is "Targeting Cancer: Technology and Biology." During the past few years, there have been significant advances in both biology and technology that have helped improve radiation therapy treatment for patients with cancer. Novel approaches, such as combining systemic therapy, often using molecularly targeted agents with radiation, as well as advances in stereotactic radiation techniques, hypofractionation, intensity modulated radiation therapy, proton beam therapy and image guided radiation therapy, have significantly improved our ability to target cancer.

We will bring together the latest developments in basic, translational and applied technology and clinical sciences as they relate to our multidisciplinary efforts to improve the quality of life and outcomes of our patients. These advances will be highlighted through a robust program of educational and scientific sessions, posters, discussions, eContouring workshops, panels and keynote speakers. The scientific sessions will integrate, when possible, basic, translational, technologic and clinical studies as we strive to further advance the field in the multidisciplinary care of our patients.

The meeting will begin with the Presidential Symposium, "Local-Regional Management of Breast Cancer: A Changing Paradigm," focusing on several recent developments in this area. Moderated by Jay R. Harris, MD, FASTRO, and Thomas A. Buchholz, MD, FASTRO, the symposium will highlight three major topics: local treatment of early stage breast cancer, local-regional treatment after preopera-

tive systemic therapy and regional nodal management of breast cancer. Several recent landmark studies and ongoing clinical trials will also be discussed and debated. The Presidential Address will also focus on breast cancer, highlighting how breast cancer treatment has evolved over the past 30 years and future directions in local-regional management.

Our three keynote speakers, who will continue to address the multidisciplinary care of our patients and the advances in cancer technology and biology, are Hedvig Hricak, MD, PhD, chair of the Department of Radiology and Carol and Milton Petrie Chair at Memorial Sloan Kettering Cancer Center; Frank McCormick, PhD, director of the UCSF Helen Diller Family Comprehensive Cancer Center; and Sidney Dekker, PhD, professor at Griffith University in Australia and an expert in human error and safety.

The Annual Meeting Scientific Committee chair Lynn Wilson, MD, MPH, FASTRO, and vice-chair Benjamin Movsas, MD, FASTRO, and the Annual Meeting Education Committee chair Catherine Park, MD, and vice-chair Brian Czito, MD, have developed an outstanding program with a wide range of speakers, moderators and topics in 20 panel discussions and more than 50 educational sessions.

The scientific oral and poster presentations will be engaging and insightful, as always, with a record-breaking 2,874 abstract submissions received this year. The Plenary Session will highlight the top studies submitted, offering a look at some of the latest cutting-edge science. This year, the

Continued on Page 35

Register Now!

2014 CHICAGO

MULTIDISCIPLINARY SYMPOSIUM in
THORACIC ONCOLOGY



RADIATION THERAPY | SURGERY | CHEMOTHERAPY

October 30-November 1, 2014

Chicago Marriott Downtown Magnificent Mile | Chicago

- Hear multidisciplinary speakers addressing topics relevant to everyday practice.
- View posters with significant data on recent advances in thoracic therapies.
- Participate in case-based presentations and post-session discussions on future directions for cancer treatment.
- Network with colleagues from around the world, representing all disciplines.
- **NEW IN 2014:** Tumor board sessions on early disease and metastatic disease cases submitted by attendees.

Register by July 22 for early-bird rates:
www.thoracicsymposium.org

This live activity has been approved for *AMA PRA Category 1 Credit™*.

CO-SPONSORED BY:

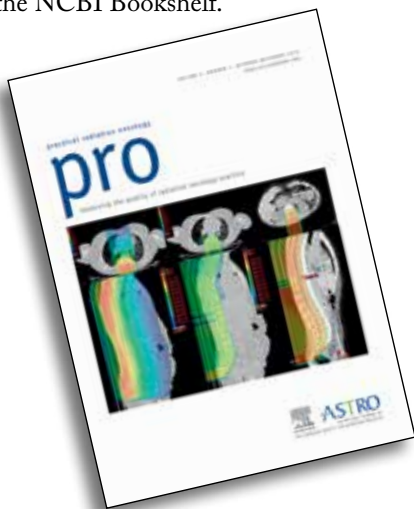


SOCIETY NEWS

PRACTICAL RADIATION ONCOLOGY ACCEPTED IN MEDLINE®

ASTRO's official clinical practice journal, *Practical Radiation Oncology* (*PRO*), has been accepted for indexing in MEDLINE®, the U.S. National Library of Medicine's (NLM) premier online bibliographic database.


MEDLINE® provides international access to the world's biomedical journal literature and contains more than 20 million references to journal articles from approximately 5,600 scholarly journals worldwide dating back to 1946. As the primary component of PubMed®, MEDLINE® utilizes the NLM-controlled vocabulary Medical Subject Headings (MeSH) to index citations. PubMed is the NLM's National Center for Biotechnology Information's (NCBI) online library of more than 23 million citations for biomedical literature including MEDLINE®, journals/manuscripts deposited in PubMed® Central and the NCBI Bookshelf.



Journal selection for MEDLINE® indexing is made by the Director of the NLM based on the recommendation of the Literature Selection Technical Review Committee (LSTRC), a National Institutes of Health-chartered advisory committee of external experts. The LSTRC assesses the journal's content based on several critical elements including scope and coverage, quality of content, quality of editorial work, production quality and audience.

PRO is fully indexed in MEDLINE® beginning with the January-February 2014 issue. Issues published prior to 2014, dating back to the first volume in January 2011, will be available through PubMed®.


"*PRO* fulfills the need for practical articles on issues of quality, safety and ethics in radiation oncology, and includes ASTRO's official practice guidelines and white papers. *PRO* has become a must-read and -reference journal for many cancer care professionals," said W. Robert Lee, MD, MS, MEd, editor-in-chief of *PRO* and a professor of radiation oncology at Duke University Medical Center in Durham, N.C. "*PRO*'s inclusion in MEDLINE®'s library is a testament to its value to physicians and researchers around the world. I am most grateful to the Editorial Board and editorial staff of *PRO*."

For more information about *PRO*, visit www.practicalradonc.org. 

ASTRO partners with Consumer Reports on prostate cancer patient flyer

As part of ASTRO's participation in the *Choosing Wisely*® campaign, an initiative of the ABIM Foundation, ASTRO recently partnered with *Consumer Reports* to produce an informational flyer for low-risk prostate cancer patients.

The flyer, "Treating Low-Risk Prostate Cancer," is based on the item from ASTRO's first *Choosing Wisely* list of "Five Things Physicians and Patients Should Question" that recommends "Don't initiate management of low-risk prostate cancer without discussing active surveillance." The new *Consumer Reports* patient flyer describes the cancer care team, outlines characteristics of low-risk prostate cancer and discusses the benefits of active surveillance, including details about which patients may benefit from active surveillance.

The flyer is available to more than 50 million subscribers and partners on the Consumer Health Choices website, the health website for Consumer Reports. The flyer is currently available in English and will be available in Spanish in the coming months. To download the flyer, visit <http://consumerhealthchoices.org/catalog/treating-low-risk-prostate-cancer-astro>. 



2014 AMBASSADORS

ASTRO proudly recognizes the 2014 Corporate Ambassadors for their outstanding year-round leadership and support of radiation oncology.



ASTRO'S 2014 Board of Directors ballot is now open

The ballot is now open for eligible members to cast votes in ASTRO's 2014 Board of Directors elections. The Nominating Committee, chaired by Michael L. Steinberg, MD, FASTRO, developed a list of candidates for each open position, reviewed their service to ASTRO and participation in ASTRO activities. The Committee considered the criteria for each position and the strategic goals of the Society, as well as current and future challenges facing health care and radiation oncology. Following deliberations and committee approval, Dr. Steinberg presented the following slate of nominees to the Board of Directors.

PRESIDENT-ELECT

David C. Beyer, MD, FASTRO
Arizona Oncology Services, Scottsdale, Arizona

Najeeb Mohideen, MD
Northwest Community Hospital, Arlington Heights, Illinois

CLINICAL AFFAIRS AND QUALITY COUNCIL VICE-CHAIR

James A. Hayman, MD, MBA
University of Michigan, Ann Arbor, Michigan

EDUCATION COUNCIL VICE-CHAIR

Stephen M. Hahn, MD, FASTRO
University of Pennsylvania, Philadelphia

GOVERNMENT RELATIONS COUNCIL VICE-CHAIR

Sameer R. Keole, MD
Mayo Clinic, Phoenix

NOMINATING COMMITTEE RADIOBIOLOGIST

Kathryn D. Held, PhD
Massachusetts General Hospital, Boston

Gayle E. Woloschak, PhD
Northwestern University, Chicago

NOMINATING COMMITTEE ACADEMIC PHYSICIAN


Thomas F. DeLaney, MD
Massachusetts General Hospital, Boston

William M. Mendenhall, MD
University of Florida, Gainesville, Florida

NOMINATING COMMITTEE COMMUNITY PRACTICE PHYSICIAN

Ajay Bhatnagar, MD, MBA
Cancer Treatment Services Arizona, Casa Grande, Arizona

Patricia H. Hardenbergh, MD
Shaw Regional Cancer Center, Edwards, Colorado

Members eligible to vote include active, allied, affiliate and international. ASTRO has a Web-based electronic process of voting that ensures the authenticity and secrecy of votes. You can view biographical data and policy statements for each nominee by visiting www.astro.org/vote. The voting deadline is 5:00 p.m. Eastern time on July 1, 2014. 

In Memoriam

ASTRO has learned that the following members have passed away.
Our thoughts go out to their family and friends.

Bruce S. Horowitz, DO
Paul J. Kaminski, MD
William J. Spanos, MD

The Radiation Oncology Institute (ROI) graciously accepts gifts in memory of or in tribute to individuals. For more information, call 1-800-962-7876 or visit www.roinstitute.org.



Are you using all 6DOF for your patient positioning? You can with Protura.

The Protura™ Robotic Patient Positioning System provides sub-millimeter positioning accuracy to reduce OAR dose and improve PTV dose accuracy.

Raw Shift Values			
	SHIFT		SHIFT
Couch Vrt	0.3	Couch Pitch	2.1
Couch Lng	-0.7	Couch Roll	+1.4
Couch Lat	0.6	Couch Rtn	+1.3
		Couch Prg Rtn	

Integration automatically transfers all 6 shift values to Protura Software

Vrt	0.3 mm
Lng	0.7 mm
Lat	-0.6 mm
Pitch	-2.1 deg
Roll	1.4 deg
Rtn	1.3 deg

Compatible with:

- Varian Trilogy® and Clinac® Series
- Elekta Infinity™, Synergy® and Versa HD™
- Siemens TXT pedestals

Learn more about the benefits of Protura at civco.com



WWW.CIVCO.COM/RO | 800.842.8688 | +1 712.737.8688

COPYRIGHT © 2014, CIVCO IS A REGISTERED TRADEMARK OF CIVCO MEDICAL SOLUTIONS. PROTURA IS A TRADEMARK OF CIVCO MEDICAL SOLUTIONS. ALL OTHER TRADEMARKS ARE PROPERTY OF THEIR RESPECTIVE OWNERS. ALL PRODUCTS MAY NOT BE LICENSED IN ACCORDANCE WITH CANADIAN LAW. 2014A0906



CIVCO
MEDICAL SOLUTIONS

Radiation Oncology

RO•ILS launch offers secure incident reporting system to track errors and near-misses

BY ERIC FORD, PHD, MULTIDISCIPLINARY QUALITY ASSURANCE SUBCOMMITTEE CHAIR, AND SUZANNE EVANS, MD, MULTIDISCIPLINARY QUALITY ASSURANCE SUBCOMMITTEE VICE-CHAIR

ON JUNE 19, THE OFFICES OF REPRESENTATIVES FRANK PALLONE (D-N.J.) AND ED WHITFIELD (R-K.Y.), are sponsoring a congressional briefing to mark the national launch of RO-ILS: Radiation Oncology Incident Learning System™. Radiation oncology providers can now start participating, free of charge, in the only medical specialty society-sponsored national system developed specifically for radiation oncology. Speakers at the briefing include Reps. Pallone and Whitfield and representatives from ASTRO, the American Association of Physicists in Medicine (AAPM) and the Agency for Healthcare Research and Quality.

RO-ILS represents a major milestone in ASTRO's *Target Safely* campaign, a six-point patient protection plan to improve safety and quality for radiation oncology. With the support and partnership of AAPM, RO-ILS is a patient safety organization (PSO) that will provide shared learning in a secure and non-punitive environment. PSOs, developed under the Patient Safety and Quality Improvement Act of 2005 (PSQIA), offer shelter from legal liability and professional sanctions to U.S.-based practices for collection and analysis of patient safety events.

Through RO-ILS, participants can track and analyze incidents and near-misses in their own clinics through a secure Web interface while also receiving institution-specific benchmarking reports. RO-ILS can be used as a stand-alone incident learning system or as a complement to an institution's existing system. Lessons learned from RO-ILS will be shared with the broader radiation oncology community through reports and recommendations drawn from this national database.

"Medical practices tend to address safety concerns on a local level; for example, reacting to events or concerns by altering practice within their own center. Sharing knowledge and concerns about safety between practices can be challenging, largely due to legal concerns. RO-ILS provides the legal protections to facilitate this sharing of information on

a national level," said Lawrence B. Marks, MD, FASTRO, a member of the PSO Steering Committee. "RO-ILS will be a forum for our field to learn from our collective practices, where the aggregate experiences and insights from all of our practices can be pooled and studied, thus increasing knowledge that we can apply to make our practices safer."

ASTRO has contracted with Clarity PSO, one of the earliest groups to be federally approved as a PSO, to build RO-ILS and provide patient safety services.


RO-ILS began an initial evaluation period in September 2013 with a select group of participants who are serving as early adopters. Early adopters included a variety of practice settings located across the country: large academic centers, hospital-based practices and freestanding clinics. To ensure a comprehensive assessment of the program, early adopters went through the full process of participation, from signing a contract with Clarity PSO all the way through data submission and analysis.

USER EXPERIENCE

As the only medical specialty society-sponsored PSO for the radiation oncology community, RO-ILS presents a groundbreaking opportunity to elevate the quality and safety. Despite having a reporting system within their institution, Mayo Clinic Arizona saw the value of contributing to a national database.

"We decided to enroll in the national RO-ILS because we want to learn from others' experiences and contribute our own. We have our own system and will be entering the most interesting and generally relevant incidents into RO-ILS," said Gary Ezzell, PhD, chair of the physics division in the department of radiation oncology at Mayo Clinic Arizona and an early adopter of RO-ILS.

Provision Center for Proton Therapy, a freestanding center located in Knoxville, Tennessee, evaluated opportunities with various PSOs before participating RO-ILS. "As we were opening our new proton center, we knew that our



staff and the number of treatments would be increasing, so we needed to enhance our internal incident learning system, and much of this conversation revolved around which system would best fit our needs. We looked at several options for PSOs before ultimately moving forward with RO-ILS,” said Ben Robison, MS, a medical physicist at Provision.

As a growing practice, Provision saw the benefits of utilizing a system with a simple data entry and Web interface. “From my perspective, I was especially interested in how easy the portal was to use. The ability to easily enter and submit reports is a strong selling point for RO-ILS ... along with the fact that RO-ILS is backed by ASTRO and AAPM, as well as the protections provided as a PSO,” Robison added.

PARTICIPATION

Radiation oncology providers interested in participating in RO-ILS can start by logging on to the RO-ILS website at www.astro.org/ROILS. This page contains background information on the PSQIA and PSOs as well as information on the development of RO-ILS. Starting June 19, providers can download the Participation Guide, which includes step-by-step instructions for the contracting process, beginning with the participation form. This form initiates the contracting process between Clarity PSO and providers.

Participation in RO-ILS requires a signed contract with Clarity PSO, as this agreement conveys the critical confidentiality and privilege protections for patient safety information reported by radiation oncology providers. The contract does not have any financial obligations; ASTRO and AAPM are covering the initial costs for radiation oncology providers to participate in RO-ILS.

The Participation Guide provides supporting documents that will assist interested providers in discussing RO-ILS with their institution, including administration and/or legal departments. Submitting the participation form to Clarity PSO while having these internal discussions will enable Clarity to assist in these discussions by addressing questions and/or concerns from the institution.

Although the contracting process is different for each institution based on their internal processes for signing contracts, early adopters have commented that Clarity PSO has facilitated the process by quickly addressing concerns and/or questions.

“The contracting process for Mayo Arizona as an early


“RO-ILS will be a forum for our field to learn from our collective practices, where the aggregate experiences and insights from all of our practices can be pooled and studied, thus increasing knowledge that we can apply to make our practices safer.”

adopter for RO-ILS was easy. I passed the sample contract along to our legal department, who asked for some minor changes that Clarity incorporated quickly. The process took less than three weeks,” Dr. Ezzell said.

After the institution and Clarity PSO sign the contract, Clarity provides training to the radiation oncology team on how to navigate the RO-ILS Web portal and how to effectively enter any errors or near-misses. As soon as the training has been completed, participants may begin entering data into the RO-ILS Web portal and use the Analysis Wizard, which allows participants to monitor and track events internally, with the ability to run reports and export data.

MAINTENANCE OF CERTIFICATION

The RO-ILS Practice Quality Improvement (PQI) template is a free companion offering to the RO-ILS portal. The RO-ILS PQI template has been fully qualified by the American Board of Radiology to meet the Part IV PQI requirements of physician and physicist Maintenance of Certification. As a PQI project, radiation oncology departments participating in RO-ILS will complete two consecutive cycles of the four-part Plan-Do-Study-Act (PDSA) process for quality improvement using the electronic RO-ILS portal to submit and internally track events. The first PDSA cycle will help the department set baseline data, evaluate their performance and develop a quality improvement plan. The second PDSA cycle will remeasure their performance with regard to this quality improvement plan and assess whether the goals have been met. To learn more about how to get started on this PQI project, visit www.astro.org/ROILS.

To begin participating in RO-ILS, go to www.astro.org/ROILS, beginning June 19. For questions, contact ROILS@astro.org. 

APEX accreditation program promotes highest standards in radiation oncology care

BY BRITTANY ASHCROFT, COMMUNICATIONS MANAGER, BRITTANYA@ASTRO.ORG

ASTRO CONTINUES TO BUILD UPON and advance the Society's quality improvement initiatives with the implementation of an independent practice accreditation program. The ASTRO Accreditation Program for Excellence (APEX) demonstrates ASTRO's dedication to promoting the highest standards in radiation oncology care.

THE STANDARDS

APEX, which began development in December 2012, was created to increase accountability in radiation oncology practices. The APEX mission is to "recognize facilities by objectively assessing the radiation oncology care team, policies and procedures, and the facility." The program provides an objective review by qualified colleagues in radiation oncology of essential functions and processes of radiation oncology practices, using transparent, measurable standards that emphasize a commitment to safety and quality.

The program is organized around five pillars:

1) patient-centered care, 2) the process of care, 3) the radiation oncology team, 4) safety, and 5) quality management. These elements provide the framework for the program's standards. The program's standards of performance, which were released in January, are derived from evidence-based guidelines and consensus practice guidelines for radiation oncology and *Safety is No Accident: A Framework for Quality Radiation Oncology and Care*. APEX focuses on the radiation oncology team; for example, the Accreditation Advisory Workgroup that was charged with establishing the program's foundation had representation from all radiation oncology providers (radiation oncologist, medical physicist, etc.). Additionally, radiation therapists, mid-level providers, nurses, dosimetrists and practice administrators may serve as surveyors, provided that they meet the eligibility requirements.

"APEX is the summation of the radiation oncology knowledge base and best practices," said Prabhakar Tripuraneni, MD, FASTRO, co-chair of the Accreditation Advisory Workgroup. "It is a transparent, objective and data-driven program."

Radiation oncology practices that receive APEX accreditation will:

- Undergo an objective, external review of radiation oncology programs, policies and processes;
- Demonstrate respect for protecting the rights of patients and responsiveness to patient needs and concerns; and
- Adopt cutting-edge procedures to promote safety and quality of care.

"Accreditation promotes the creation of and adherence to processes and policies that improve quality of care and patient safety, as well as procedures that improve the efficiency and safety of the facility," said Elizabeth Brunton, MSN, RN, an Accreditation Advisory Workgroup member. "APEX challenges facilities and staff to improve quality and strive for excellence."

THE IMPACT ON QUALITY AND PATIENT CARE

Facilities that obtain practice accreditation will have the systems, personnel, policies and procedures needed to provide high-quality, safe patient care. With this in mind, the series of standards and measures used to evaluate the performance of a radiation oncology practice was developed with a focus on the quality and safety of radiation oncology services, using practices and the multidisciplinary approach to care described in *Safety is No Accident: A Framework for Quality Radiation Oncology and Care*.

"Patients will experience a multidisciplinary team approach to their safety, care coordination and communication," said Yan Yu, PhD, MBA, a member of the Accreditation Advisory Workgroup. "The patient-centered elements of APEX will promote patient education and health management, and ensure that patients and families are engaged as partners in care."

The systemic quality and safety approaches in the APEX standards build on a regulatory framework. In addition to meeting APEX standards, radiation oncology practices must also meet all applicable federal, state and local regulatory requirements, including those of the Nuclear Regulatory Commission or agreement locality.

“When it comes to quality and safety, sometimes knowing you should do something and actually doing something are two different things,” said James A. Hayman, MD, MBA, co-chair of the Accreditation Advisory Workgroup. “Going through practice accreditation provides the impetus to make changes to improve quality of care and ultimately makes treatment better for patients.”

WHY PRACTICES SHOULD APPLY

Radiation oncology practices based in the United States may apply for ASTRO accreditation, which is granted on a four-year cycle. All practice types including freestanding, single- or multi-facility organizations or those that are part of a hospital facility are encouraged to apply.

The accreditation process is divided into five phases: Phase I – Complete Application (approximately two weeks); Phase II – Assess for Readiness (approximately six to 12 weeks); Phase III – Survey Preparation (approximately eight weeks); Phase IV – On-site Facility Visit (one day); and Phase V – Disposition (approximately eight weeks after on-site facility review).

“Applying for accreditation can help practices improve some of their processes,” said Dr. Hayman. “It allows practices to examine processes as they move through the self-assessment survey and prepare for the on-site facility visit. With APEX, the program will not only accredit the practice, but will give useful feedback in a manner that practices can use to constantly improve.”

Experiencing the accreditation process can also help radiation oncology practices develop metrics to assess and continually improve patient safety and quality of care.

“APEX has the potential to elevate radiation oncology clinical practice through standardization and programmatic accreditation principles,” said Robert Adams, CMS, RT, an Accreditation Advisory Workgroup member. “Radiation oncology practices that are APEX-accredited will have demonstrated high-level processes of proactive patient safety and will have developed quality improvement tools that demonstrate metrics, continuous quality improvement and measurable outcomes.”

THE SURVEYOR ROLE


APEX surveyors are responsible for objectively evaluating a practice’s performance based on the standards. Surveyors include U.S. licensed and board certified medical physicists and radiation oncologists, certified and licensed (where applicable) radiation therapists, registered nurses and practice administrators. In addition, APEX surveyors are ASTRO members who have at least five years of U.S. radiation oncology experience post-licensing and are currently in active practice.



Surveyors are thoroughly trained through a series of interactive online courses, including an overview of the APEX program, HIPAA, surveyor roles and responsibilities and a detailed review of the program’s standards, which are organized around APEX’s five pillars.

“As a surveyor, I am able to continuously learn best practices valuable to my role as a radiation therapist and to look at my own department to review, implement and enhance processes according to the standards. This can ultimately improve our culture of safety and help assure that our patients receive the highest standard of care,” said Sandra Hayden, MA, RT(T), an Accreditation Advisory Workgroup member.

NEXT STEPS

Detailed information on the accreditation process, application, surveyor team, and accreditation reports and decisions is available in the APEX Program Guidance document on the ASTRO website at www.astro.org/APEX. For questions, email APEX@astro.org. 

Peer review and patient safety in RADIATION ONCOLOGY

BY GEORGE RODRIGUES, MD, PHD

RADIATION ONCOLOGY is a complex medical enterprise requiring the successful integration of multiple clinical and technological inputs to optimize the therapeutic ratio between positive treatment effects such as local control and survival with negative treatment side effects. This complexity is magnified by various patient/tumor-technological-team member interactions during the five operational categories (patient evaluation, treatment preparation, treatment delivery, treatment management, follow-up care) related to the radiation oncology process of care¹. Given the inherent complexity associated with the process of care, both specialty-wide and institutional-based approaches/strategies to patient safety and quality assurance/improvement are of importance to maximize patient outcome and confidence². Notwithstanding organizational interest in achieving these safety/quality goals, practicing radiation oncologists have a central and important role to play in optimizing patient safety.

Peer review has been previously defined in the radiation oncology literature as “the evaluation of creative work or performance by other people in the same field to enhance the quality of work or the performance of colleagues”³. Specific to the radiation oncology process of care, various approaches to peer review have been utilized and reported in the medical literature, including chart rounds, retrospective/prospective chart audits and error reporting systems⁴. Of these activities, chart rounds have been observed to be a standard component of the quality assurance process in a recent survey of American academic institutions⁵.

Various organizations have recently made statements with regards to various elements of radiation oncology peer review. Within the North American context, both the American College of Radiology (ACR)⁶ and the Canadian Partnership for Quality Radiotherapy (CPQR)⁷ have affirmed that radiation oncologist peer chart review of treatment plans is a vital component of high-quality care in radiation oncology. In both jurisdictions, continuous practice quality improvement (including peer review) has become an important component of physician Maintenance of Certification programs. ASTRO white papers on patient safety¹ and peer review⁴ detail some best practices and several “high-yield” targets for quality improvement.

A limited number of reports are available that provide evidence regarding outcomes and best practices associated with peer review⁸⁻¹⁰. An ASTRO white paper identified several targets of the radiation oncology process ripe for peer review⁴. These include documentation/discussion of the radiation therapy indications, the radiation therapy approach, target/organ segmentation, dose fractionation and dose/volume constraints/histogram analysis, and treatment delivery. Radiation oncologist tasks identified for particular attention were qualitative decisions related to the indication(s), timing of radiation treatment including the treatment intent, target definition (e.g., contouring consistency/accuracy), planning directives (e.g., dose fractionation, dose-volume limits) and plan quality evaluation (i.e., isodose and dose-volume histogram analyses). These four issues should form the cornerstone of radiation oncologist peer review activities during chart rounds. Ideally, peer review of cases should occur as early as possible in the radiotherapy process in order to minimize the requirement for treatment re-planning. Addition-



ally, peer review activities should prioritize the detection of errors that have high levels of potential patient harm and are not likely to be found during subsequent steps in the radiotherapy process⁴. The effective conduct of peer review chart rounds is dependent on several factors, including the fostering of a collaborative safety culture within the department and effective chart rounds management, as well as adequate allocated time and human/technological resources.

Several barriers to effective peer review quality assurance exist and have been documented in the ASTRO white paper on peer review⁴. These include but are not limited to: insufficient time/resources for peer review and/or other radiation oncology processes, poor existing review processes, increasing treatment complexity, incomplete medical/technological information and lack of guidelines for peer review documentation. Additional challenges include excessive physician workload¹¹ and peer review of brachytherapy/radiosurgery⁵. Given the heterogeneity of practice situations/size, many of these challenges will require the balancing of various trade-offs to ensure a peer review system that is both efficient and effective. Important trade-offs to consider when designing or updating radiation oncology peer review systems include global vs. site-specific rounds (i.e., a balance between full coverage of clinical cases for all staff vs. process efficiency), review of all cases versus selected cases (i.e., radical or re-treatment vs. palliative) and the depth of review per case (i.e., as depth of review increases, fewer cases are likely to be subjected to peer review).

Going forward, publication of peer review best practices, documentation and outcomes will be vital in order to improve patient care and safety both at the individual patient level and specialty-wide. This is of particular importance for small practice situations, which are common in the American practice context. Best practices for efficient and effective peer review within and among such practice(s) need to be shared with the greater radiation oncology community using existing mechanisms including (but not limited to) publication in ASTRO journals such as *Practical Radiation Oncology* and other peer-to-peer communication vehicles, such as ASTRO's *ROhub*.

To help promote communication about peer review and the sharing of best practices, ASTRO has created a "Peer Review in Radiation Oncology" open community on the *ROhub* for ASTRO members to discuss this important topic. Access the community at <http://rohub.astro.org/p/co/am/gid=194>. You will need your ASTRO user name and password to log in to the *ROhub*.

Dr. Rodrigues is a professor and clinician scientist of radiation oncology at Western University in London, Ontario.

Ideally, peer review of cases should occur as early as possible in the radiotherapy process in order to minimize the requirement for treatment re-planning.

REFERENCES

1. Zietman AL, Palta JR, Steinberg ML. In: *Safety is no accident*. American Society for Radiation Oncology (ASTRO); 2012; Available at: www.astro.org/uploadedFiles/Main_Site/Clinical_Practice/Patient_Safety/Blue_Book/SafetyisnoAccident.pdf. Accessed March 25, 2014.
2. Marks LB, Jackson M, Xie L, Chang S, Burkhardt K, Mazur L, et al. The challenge of maximizing safety in radiation oncology. *Pract Radiat Oncol*. 2011; 1: 2-14.
3. Hulick PR, Ascoli FA. Quality assurance in radiation oncology. *J Am Coll Radiol*. 2005; 2: 613-616.
4. Marks LB, Adams RD, Pawlicki T, Blumberg A, Hoopes D, Brundage M, et al. Enhancing the role of case-oriented peer review to improve quality and safety in radiation oncology: Executive summary. *Pract Radiat Oncol*. 2013; 3: 149-156.
5. Lawrence YR, Whiton MA, Symon Z, Wuthrick EJ, Doyle L, Harison AS, et al. Quality assurance peer review chart rounds in 2011: a survey of academic institutions in the United States. *Int J Radiat Oncol Biol Phys*. 2012; 84: 590-595.
6. ACR practice guideline for radiation oncology. American College of Radiology (ACR); 2009; Available at: www.acr.org/~media/ACR/Documents/PGTS/guidelines/Radiation_Oncology.pdf. Accessed March 25, 2014.
7. Quality assurance guidelines for Canadian radiation treatment programs. Canadian Partnership for Quality Radiotherapy (CPQR); 2013; Available at: www.cpqr.ca/wp-content/uploads/2013/09/QRT2013-09-02.pdf. Accessed March 25, 2014.
8. Lefresne S, Olivotto IA, Joe H, Blood PA, Olson RA. Impact of quality assurance rounds in a Canadian radiation therapy department. *Int J Radiat Oncol Biol Phys*. 2013; 85: e117-121.
9. Taghavi Bayat B, Gill S, Siva S, Hun Tai K, Lim Joon M, Foroudi F. Ten-year results of quality assurance in radiotherapy chart round. *BMC Health Serv Res*. 2013; 13: 148.
10. Boxer M, Forstner D, Kneebone A, Delaney G, Koh ES, Fuller M, et al. Impact of a real-time peer review audit on patient management in a radiation oncology department. *J Med Imaging Radiat Oncol*. 2009; 53: 405-411.
11. Mazur LM, Mosaly PR, Hoyle LM, Jones EL, Chera BS, Marks LM. Relating physician's workload with errors during radiation therapy planning. *Pract Radiat Oncol*. 2014; 4: 71-75.

International standards help advance patient safety

BY GEOFFREY S. IBBOTT, PHD, FASTRO, JAMES M. GALVIN, DSC, FASTRO, MICHAEL MOYERS, PHD, AND RAYMOND WU, PHD



CONCERNS ABOUT THE SAFETY OF RADIATION

THERAPY were highlighted by a series of articles in *The New York Times*¹. Among other issues, these articles, together with a series of meetings and symposia sponsored by ASTRO, raised awareness of the degree to which equipment performance can influence patient safety. Requirements addressing the safety and performance of medical equipment are published by the Food and Drug Administration (FDA) or the Nuclear Regulatory Commission (NRC), or are promulgated by each state's health department. In many cases, specific requirements for safety and performance originate from standards published by the International Electrotechnical Commission (IEC), a standards-setting organization of 82 member nations headquartered in Geneva, Switzerland.

THE IEC

Established in 1906, the IEC's role is to develop and promulgate consensus standards for the safety and performance of electrical devices to assure uniformity throughout the world ("global harmonization"). The standards address a wide range of consumer and commercial devices, from toasters and shavers to bullet trains and power plants. The objective of the IEC is to "promote international cooperation on all questions concerning standardization in the electrical and electronic fields." To this end and in addition to other activities, the IEC publishes International Standards, Technical Specifications and Technical Reports that contain detailed requirements for design.

The standards developed by the IEC are essentially adopted into law in many countries. In Europe, for example, the principal IEC safety standards are selected for "parallel voting" by CENELEC, the European electrical standards organization. When approved, they are assigned an "EN" number and are adopted into law as written.

In the U.S., IEC standards, or portions of them, are written into American National Standards Institute (ANSI) standards, FDA regulations or National Electrical Manufacturers Association guidelines. A notified body, such as Underwriters Laboratories (an independent not-for-profit product safety testing and certification organization), assesses the equipment and determines its compliance with the standards. Since manufacturers must comply with IEC standards to sell equipment in the European Community, radiation therapy equipment sold in the U.S. generally meets the IEC standards as well.

The IEC consists of 178 technical committees and subcommittees that address each of the fields in which electrotechnical equipment is used. However, it is in the roughly 465 working groups, 263 project teams and 550 maintenance teams that the actual development of standards takes place. Because of the interest of manufacturers in the standards, most working groups are populated largely, if not

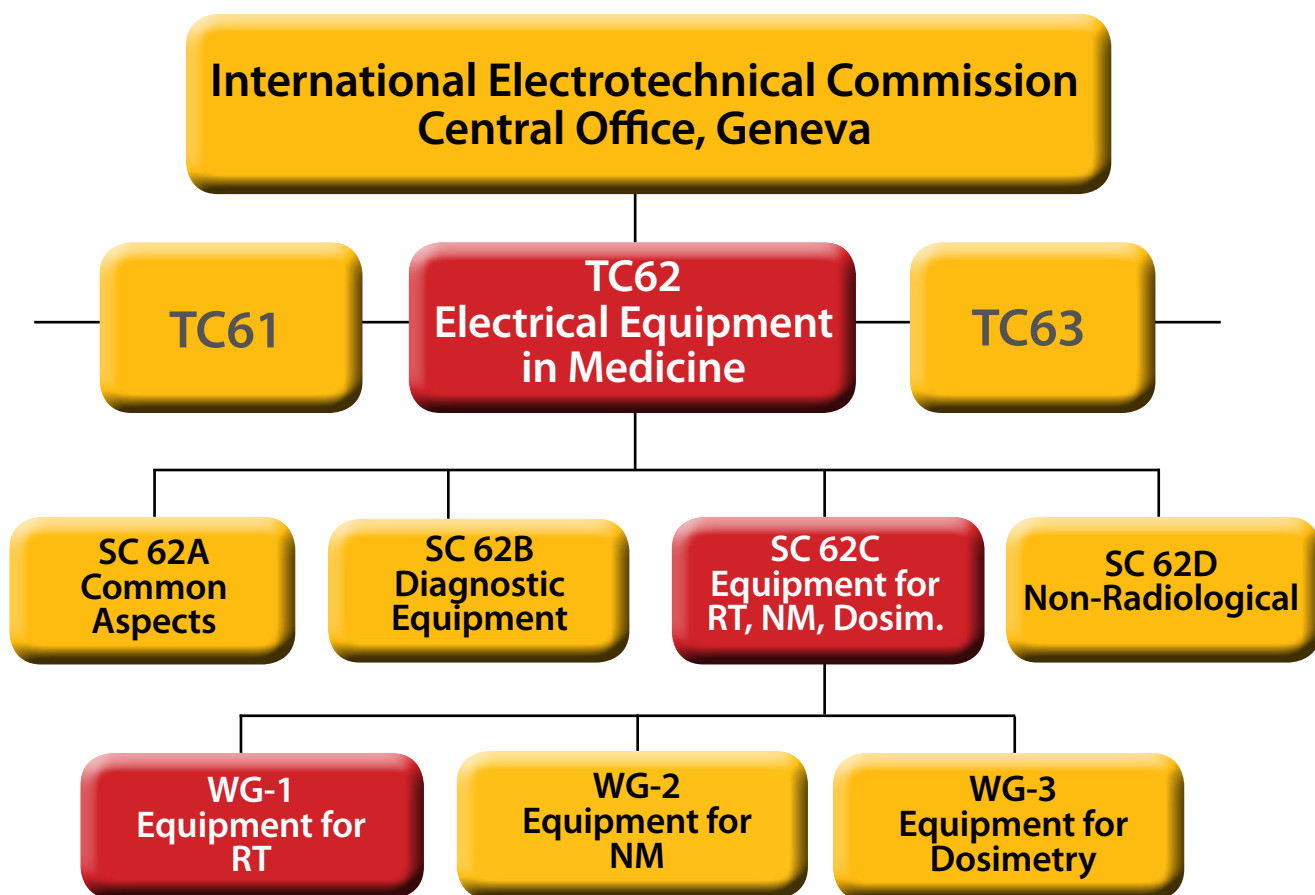


FIGURE 1
The IEC is composed of 97 technical committees (TCs), which together have 81 subcommittees. TC 62 deals with medical electrical equipment and has four subcommittees. Subcommittee 62C has three working groups that are responsible for the development of standards for equipment used in radiation therapy, nuclear medicine and radiation dosimetry.

entirely, by manufacturers' representatives. Consequently, the involvement of clinically oriented members, including medical physicists, is important to assure the relevance of IEC standards impacting radiology and radiation oncology. These individuals bring extensive experience related to patient and worker safety in clinical environments that often use a broad assortment of electronic equipment.

TECHNICAL COMMITTEE 62

Technical Committee (TC) 62 is responsible for electrical equipment in medical practice. It has four subcommittees that address different areas of medicine (see Figure 1).

Subcommittee 62C is responsible for equipment for radiation therapy, nuclear medicine and radiation dosimetry. It has three working groups (WG), of which WG-1 is responsible for radiation therapy equipment, WG-2 handles nuclear medicine equipment and WG-3 deals with radiation dosimetry measurement equipment.

A selection of the 63 standards developed and maintained by Subcommittee 62C is available at www.iec.ch. Several standards relevant to radiation therapy developed by subcommittee 62C are described on the following page.

THE U.S. NATIONAL COMMITTEE

Each member nation participates in the IEC through its national committee. The U.S. National Committee (USNC) is located at the offices of ANSI in New York. The USNC established a technical advisory group (TAG) associated with subcommittee 62C whose role is to advise the USNC. This helps to assure that the standards are scientifically and clinically meaningful.

Collaboration among ASTRO, the American Association of Physicists in Medicine and the American College of Radiology makes it possible for nine medical physicists to participate in the TAG, and for one member to participate at the working group and subcommittee level.

... The involvement of clinically oriented members, including medical physicists, is important to assure the relevance of IEC standards impacting radiology and radiation oncology.

SELECTION OF STANDARDS DEVELOPED BY WORKING GROUP 1

IEC 60601-2-1. Medical electrical equipment – Part 2-1: Particular requirements for the safety of electron accelerators in the range 1 MeV to 50 MeV

Probably the most comprehensive, far-reaching and influential recent publication of WG-1 is the third edition of IEC 60601-2-1, known as the Accelerator Safety Standard. This document dictates the design of important safety features of medical linear accelerators, including requirements for a dual-channel dosimetry system, testing of interlocks, permitted levels of radiation leakage and certain important characteristics of the radiation beams.

IEC 60601-2-64. Medical electrical equipment – Part 2-64: Particular requirements for the safety and essential performance of light ion beam equipment

The U.S. spearheaded development of a standard that addresses proton and light ion accelerators. The standard addresses aspects of beam control considered important for safety such as selection and verification of the correct beam energy (or range), range modulation, lateral beam spreading and uniformity, and correct dose delivery. It also specifies safety provisions such as collision avoidance, correct treatment couch positioning and avoidance of electrical hazards.

IEC 60601-2-68. Medical electrical equipment – Part 2-68: Particular requirements for the safety and essential performance of X-ray based image guided radiotherapy equipment for use with electron accelerators, light ion beam therapy systems and radionuclide beam therapy systems

This is a new standard currently in the final stages of development that addresses the use of equipment for image guidance of radiation therapy. Provisions specify limits on the control of movements of the equipment and allowable speeds, and controls on the delivery of radiation, among other safety aspects.

IEC 61217. Coordinates, Movements and Scales

This standard defines the so-called “IEC scales” and ensures that various pieces of radiation therapy equipment communicate gantry angles, field dimensions and other critical parameters accurately. The standard also includes matrices to enable transformation of position information to and from the DICOM coordinate system.

CONTRIBUTE TO SUBCOMMITTEE 62C

Those who wish to contribute to the publications of Subcommittee 62C can contact Geoffrey S. Ibbott, PhD, FASTRO, at gibbott@mdanderson.org. These documents are complex and are written to be both unambiguous and understood by various cultures and backgrounds. Review is not easy, but it is rewarding work, as one is aware that the result will have significant and long-lasting effects. For additional details, please refer to previous descriptions of the U.S. contributions to IEC standards².

Geoffrey S. Ibbott, PhD, FASTRO, is chair of IEC Subcommittee 62C and convener of WG-1. He is also a technical advisor to the USNC and chair of a TAG dealing with 62C standards.

James M. Galvin, DSc, FASTRO, is a member of the U.S. TAG and is well known for his work in support of the Radiation Therapy Oncology Group.

Michael F. Moyers, PhD, is a member of the U.S. TAG and of WG-1, and is the lead author of two IEC standards addressing the safety and performance of light ion accelerators.

Raymond Wu, PhD, is a member of the U.S. TAG and is active in the international medical physics community.

REFERENCES

1. Bogdanich, W. Radiation offers new cures, and ways to do harm. *New York Times*. January 23, 2010.
2. Ibbott, GS. US contributions to international standards for medical electrical equipment. *J Am Coll Radiol*. 2012; 9: 218-220.

News from the Old World

BY ERNESTAS JANULIONIS, MD, PHD, PRESIDENT OF THE LITHUANIAN SOCIETY FOR RADIATION THERAPY AND DIRK RADES, MD, HEAD OF THE DEPARTMENT OF RADIATION ONCOLOGY, UNIVERSITY-HOSPITAL SCHLESWIG-HOLSTEIN, CAMPUS LÜBECK, GERMANY

This article is part of the “News from the Old World” series, created by ASTROnews Editorial Board member Dirk Rades, MD, to help build a bridge between radiation oncologists in Europe and North America.

EVOLVING CANCER CARE IN LITHUANIA

Lithuania is one of the three Baltic states, along with Latvia and Estonia, and is situated on the eastern shores of the Baltic Sea in northeastern Europe. It is the largest country of the Baltic states with a population of 2.9 million and a geographic size of 25,174 square miles (65,300 square kilometers). The capital city is Vilnius, which has a population of 523,000.

Lithuania has two independence dates—February 16, 1918, when the Act of Independence of Lithuania was signed, which declared the establishment of the sovereign State of Lithuania, and March 11, 1990, when it became the first Soviet republic to declare independence from the Soviet Union, a year before the formal dissolution of the Soviet Union. In 2004, Lithuania became a member of the European Union and the North Atlantic Treaty Organization.

THE START OF RADIATION ONCOLOGY IN LITHUANIA

Oncology in Lithuania has a 462-year history, beginning in 1552 when the first oncological hospital opened in Vilnius. Radiation oncology has a shorter history, with the first announcements about the demonstration of X-rays appearing in 1896.

In Lithuania, radiotherapy history started in Kaunas, where 87 patients were treated in 1920 and 29 patients were treated in 1921 for skin pathology. In 1925, “bombs,” a plumbum (lead) pot with a hole in it, were used to treat patients by delivering radioactive radium through the hole to the tumor. Remaining treatment charts show the use of radiotherapy for the treatment of various malignant and non-malignant diseases. At that time, radiotherapy was usually delivered in a single fraction with dose definition in Holzkecht units. In 1931, the Vilnius Cancer Hospital opened. From 1936 to 1940, following new ideas in radiobiology, there was a shift to fractionated treatments.

DEVELOPMENTS AFTER WORLD WAR II

World War II and political changes in Lithuania ruined many of the existing medical facilities in Kaunas and also disrupted professional and scientific contacts with western Europe. After World War II, a new era in radiation oncology

THE OLD TOWN OF VILNIUS IS ONE OF THE LARGEST SURVIVING MEDIEVAL OLD TOWNS IN EUROPE.





THE INSTITUTE OF ONCOLOGY VILNIUS UNIVERSITY HELPS TRAIN ONCOLOGY SPECIALISTS AND RESEARCHERS AND FOCUSES ON FUNDAMENTAL AND APPLIED RESEARCH IN ONCOLOGY.

started. The first gamma therapy device GUT-Co60-400 was installed in 1954 in the Kaunas Clinic.

The development of radiotherapy in Kaunas after World War II continued in the Kaunas Clinic (now the Hospital of the Lithuanian University of Health Sciences) with establishment of a laboratory for radiology in 1963. In 1966, the cyclic accelerator Betatron B4 was installed, which was able to generate electron beams up to 12MeV. In 1967, the Kaunas Clinic commissioned Co60-based unit ROKUS-M, and in 1972 installed a powerful cyclic accelerator, Betatron B5. At that time this type of 25MV photon treatment was available only in a few centers of the former Soviet Union. From 1974 to 1979, the new method for portal imaging and clinical topometry, xerogammagraphy, was created and introduced in clinics.

When the new Oncology Scientific Research Center opened in 1979 (now the Institute of Oncology Vilnius University), the newest gamma therapy devices (at the time) were installed, the first office for preparing patients for radiation therapy opened and treatment with radioactive iodine and phosphorus started. Additionally, remote afterloading was implemented for gynecological cancers, and low-dose-rate manual interstitial therapy with Co60 and Cf252 started. High-dose-rate remote afterloading with Cf252 was used in the treatment for cervix and uterine, rectal, soft tissue, head and neck, and brain tumors. More than 1,500 patients were treated with this source from 1987 to 1998 at the Lithuanian Cancer Center.

With the rapid development in radiation planning and treatment delivery systems, the changes came to Lithuanian hospitals. At the Institute of Oncology Vilnius University, the linear accelerator Saturn was installed in 1997, and in

2003, the old brachytherapy device was replaced by a high-dose-rate machine.


COLLABORATING WITH COLLEAGUES

As the Iron Curtain fell, Lithuanian professionals got a new perspective and started cooperating with leading specialists from eastern and western Europe, with particularly good relationships established with ESTRO. Lithuania's Polish colleagues Prof. Andrzej Hliniak and Prof. Barbara Gwi-azdowska were a first link between Lithuania and ESTRO. In 1995, a group from Vilnius Oncology Center and Kaunas Medical University created a society representing radiation oncologists, medical physicists and radiation technologists. That was the beginning of the Lithuanian Society for Radiation Therapy (LSRT).

LSRT has helped cancer education improve significantly. The beginning of Lithuania's radiation oncology education activities was through LSRT, and the society discussed standards and improvements in technology. Now, the country is educating young physicians and medical physicists according to European Union recommendations. This is done through Vilnius University and the Lithuanian University of Health Sciences (LUHS).

PRESENT DAY

During the last 20 years, cancer care in Lithuania has improved. In 1980, the country had eight gamma external beam radiation therapy devices and no linear accelerators. In 2010, the country had 10 linear accelerators and had removed all of the cobalt machines. Additionally, treatment planning systems with the newest simulators were implemented. Currently, there are 11 linear accelerators, four brachytherapy machines and four treatment planning systems.

Today, radiotherapy in Kaunas is part of a multimodality cancer care system. LUHS successfully integrates studies, research and clinical practice. Also, the Institute of Oncology Vilnius University has improved its technical basis, replacing old devices with new ones. Research activities focus on hypofractionation for prostate cancer and for radiotherapy of high-grade gliomas. Research on prostate cancer includes two prospective randomized trials: one on hypofractionated 3-D CRT for low-risk prostate cancer and another on hypofractionated dose escalation with simultaneously integrated boost IMRT for high-risk prostate tumors. 

COLLABORATION BETWEEN HEALTH CARE PROFESSIONALS AND INDUSTRY REPRESENTATIVES HELPS IMPROVE PATIENT SAFETY

INTEGRATING THE HEALTHCARE ENTERPRISE-RADIATION ONCOLOGY (IHE-RO) is an ASTRO-sponsored initiative dedicated to improving the integration of equipment used in radiation therapy treatment to increase patient safety.

Created in 2004, IHE-RO is a key element of ASTRO's *Target Safely* campaign, a six-point patient protection plan to improve safety and quality in radiation oncology. IHE-RO promotes discussion and connection of protocols for data communications to improve the reliability and safety of data exchange in a radiation oncology setting, and it also provides the opportunity for inter-manufacturer testing of radiation oncology products prior to delivery to market.

IHE-RO represents the radiation oncology domain of IHE (Integrating the Healthcare Enterprise), one of 12 domains within IHE. Within each domain of IHE, users with clinical and operational experience identify integration and information sharing priorities. From those priorities, vendors help develop consensus- and standards-based solutions to address the issues.

IHE-RO is comprised of members of the radiation oncology treatment team, administrators and industry representatives that collaborate to help ensure patient safety and quality in the radiation oncology clinic. IHE-RO members focus on solving interoperability issues within radiation oncology, which include information sharing, workflow and patient care.

An important part of IHE-RO is the Connectathon, which provides vendors with the opportunity to test and prove that their systems meet the requirements of IHE-RO. Six vendors participated in the most recent Connectathon, held at ASTRO headquarters in Fairfax, Virginia, April 28-May 2. The event, which has been held annually since 2007, will become a biannual event this year, with a second event planned in Europe this fall.


During the most recent week-long event, treatment planning systems were the primary devices tested. These systems are a main focus of the Connectathon because of the vital role the systems play in the complex treatment planning process necessary in radiation oncology, which involves multiple members of the radiation oncology team and numerous computer systems and applications. All of these systems must work together in a well-coordinated effort to facilitate optimal planning and efficiency.

IHE-RO, specifically through the Connectathon, has worked and will continue to work to improve the treatment planning process in a safe and



effective manner by making the requirements for sharing and transferring data between systems more robust, thereby reducing the need to re-input information that could not previously be shared between systems.

Once a vendor's product or system has passed the tests, the product is considered "IHE-RO compliant." After that, the vendor releases Integration Statements that demonstrate how the product or system is IHE compatible. IHE-RO is currently in the process of developing clinical impact statements that will identify and explain the issue, the rationale for creation of the IHE-RO profile and the clinical impact of the specific profile.

To apply for membership in IHE-RO or to submit your clinical challenge to IHE-RO, visit www.astro.org/IHERO. 

Created in 2004, IHE-RO is a key element of ASTRO's *Target Safely* campaign, a six-point patient protection plan to improve safety and quality in radiation oncology.

NEW GUIDELINE EXAMINES ROLE OF POSTOPERATIVE RADIATION THERAPY FOR ENDOMETRIAL CANCER

ASTRO HAS ISSUED an evidence-based guideline, “The Role of Postoperative Radiation Therapy for Endometrial Cancer: An ASTRO Evidence-based Guideline,” developed by a panel of experts in endometrial cancer, including radiation oncologists, gynecologic oncologists, medical oncologists, a resident in radiation oncology, and radiation physicists from academic settings and private practices. The guideline panel members were selected by the Guidelines Subcommittee of ASTRO’s Clinical Affairs and Quality Council.

The guideline’s recommendations were based on 330 studies from MEDLINE®, EMBASE and the Specialized Register of the Cochrane Gynaecological Cancer Review Group published from 1980 to 2011. The population was defined as women of all races, age 18 or older, with stage I-IV endometrial cancer of any histologic type or grade. The studies included patients treated with no adjuvant therapy, or pelvic and/or vaginal brachytherapy with or without systemic chemotherapy. Trials of preoperative radiation therapy, patients with distant metasta-

sis and patients with unresected gross residual disease after hysterectomy were not included.

The panel developed a series of guidelines addressing key questions regarding the role of adjuvant therapy in endometrial cancer (see table on following page). Each of the guideline recommendations was then assigned a score for the strength of the recommendation based on consensus among panel members and the quality of the evidence supporting each recommendation. Panel members scored each statement from strongly disagree to strongly agree. Strong recommendation was given when ≥75 percent of the panel members agreed or strongly agreed with the recommendations statement and the evidence was of at least moderate quality.

“Several trials on the role of radiation therapy in endometrial cancer have been reported in the past five years, seeking to clarify this topic; however these trials have been interpreted in different ways, leading to inconsistent treatment recommendations,” said Ann Klopp, MD, PhD, and Akila N. Viswanathan, MD, MPH, co-chairs



of the guideline panel. “This guideline provides recommendations to help ensure patients receive the best possible care and to help patients and doctors make informed decisions about treatment options.”

The guideline was approved by ASTRO’s Board of Directors in September 2013. The guideline panel members were: Dr. Klopp (co-chair), Dr. Viswanathan (co-chair), Benjamin D. Smith, MD, Kaled Alektiar, MD, Alvin Cabrera, MD, Antonio L. Damato, PhD, Beth Erickson, MD, FASTRO, Gini Fleming, MD, David Gaffney, MD, PhD, Kathryn Greven, MD, FASTRO, Karen Lu, MD, David Miller, MD, David Moore, MD, Daniel Petereit, MD, Tracey Schefter, MD, William Small Jr., MD, FASTRO, and Catheryn Yashar, MD.

The executive summary is available in the May-June issue of *Practical Radiation Oncology (PRO)*, and the executive summary and supplemental material are available on the *PRO* website as open-access articles at www.practicalradonc.org.

This guideline provides recommendations to help ensure patients receive the best possible care and to help patients and doctors make informed decisions about treatment options.

GRADING OF EVIDENCE, RECOMMENDATIONS AND CONSENSUS METHODOLOGY

GUIDELINE RECOMMENDATION	STRENGTH OF RECOMMENDATION	STRENGTH OF EVIDENCE
Following total abdominal hysterectomy with or without node dissection, no radiation therapy is a reasonable option for patients without residual disease in the hysterectomy specimen despite positive biopsy.	Strong	Low
Following total abdominal hysterectomy with or without node dissection, no radiation therapy is a reasonable option for patients with grade 1 or 2 cancers with either or no invasion or <50 percent myometrial invasion.	Strong	High
Vaginal cuff brachytherapy may be considered in patients with negative node dissection with grade 3 tumor without myometrial invasion.	Strong	Low
Vaginal cuff brachytherapy may be considered in patients with negative node dissection with grade 1 or 2 tumors with <50 percent myometrial invasion and higher-risk features, such as age >60 and/or LVSI.	Strong	Moderate
Vaginal cuff brachytherapy is as effective as pelvic radiation therapy at preventing vaginal recurrence for patients with: (1) grade 1 or 2 tumors with ≥50 percent myometrial invasion or (2) grade 3 tumors with <50 percent myometrial invasion.	Strong	Moderate
Vaginal cuff brachytherapy is preferred to pelvic radiation in patients with the above risk factors particularly in patients who have had comprehensive nodal assessment.	Strong	Low
Patients with grade 3 cancer with ≥50 percent myometrial invasion or cervical stroma invasion may benefit from pelvic radiation to reduce the risk of pelvic recurrence.	Strong	High
Patients with grade 1 or 2 tumors with ≥50 percent myometrial invasion may also benefit from pelvic radiation to reduce pelvic recurrence if other risk factors are present, such as age >60 years and/or LVSI.	Strong	High
The best available evidence at this time suggests that reasonable options for adjuvant treatment of patients with positive nodes or involved uterine serosa, ovaries/fallopian tubes, vagina, bladder or rectum includes external beam radiation therapy, as well as adjuvant chemotherapy.	Strong	Moderate
Chemotherapy without external beam radiation may be considered for some patients with positive nodes or involved uterine serosa, ovaries/fallopian tubes, vagina, bladder or rectum based on pathologic risk factors for pelvic recurrence.	Weak	Moderate
Radiation therapy without chemotherapy may be considered for some patients with positive nodes or involved uterine serosa, ovaries/fallopian tubes, vagina, bladder or rectum based on pathologic risk factors for pelvic recurrence.	Weak	Low
Prospective data is lacking to validate the use of vaginal brachytherapy after pelvic radiation and most retrospective studies show no evidence of a benefit, albeit with small patient numbers. Use of vaginal brachytherapy in patients also undergoing pelvic external beam radiation is not generally warranted, unless risk factors for vaginal recurrence are present.	Weak	Low
The best available evidence suggests that concurrent chemoradiation followed by adjuvant chemotherapy is indicated for patients with positive nodes or involved uterine serosa, ovaries/fallopian tubes, vagina, bladder or rectum.	Strong	Moderate
Alternative sequencing strategies with external beam radiation and chemotherapy are also acceptable.	Weak	Low

LET ASTRO HELP YOU MAINTAIN YOUR CERTIFICATION

ASTRO offers numerous opportunities for physicians and physicists to satisfy their Maintenance of Certification (MOC) requirements through in-person meetings and online educational offerings. A full activity list and links to each of these offerings can be accessed from ASTRO's newly overhauled MOC Web page at www.astro.org/moc.

MOC PART 2: CONTINUING MEDICAL EDUCATION (CME)

ASTRO offers multiple ways for members to earn CME, including:

Live Meetings

- Credit is offered at the ASTRO Annual Meeting and specialty meetings.
- Meeting attendees must complete the event evaluation to earn credit.
- The number of credits available varies by meeting.

Journal SA-CME Courses

- Offered for select articles from *Practical Radiation Oncology (PRO)* and the Red Journal.
- 1 *AMA PRA Category 1 Credit*[™] is available for each course.

Online Self-Assessment Modules (SAMs)

- Participants taking Online SAMs can earn CME credit in addition to their SA-CME credit.
- The amount of CME and SA-CME credit varies based on course length.

Webinar CME

- Registered webinar participants can earn CME for attending most webinars.

- The number of credits available varies by webinar.

MOC PART 2: SELF-ASSESSMENT CME (SA-CME)

ASTRO offers multiple ways for members to earn SA-CME, including:

Online SAMs

- ASTRO offers more than 50 online SAMs in a variety of specialty areas.
- The amount of SA-CME credit varies based on course length.

Live SAMs

- ASTRO offers Live SA-CME at the Annual Meeting, Spring Refresher Course and State of the Art Radiation Therapy Symposium.
- The amount of SA-CME credit varies based on session length.

Journal SA-CME Courses

- Offered for select articles from *PRO* and the Red Journal.
- 1 SA-CME Credit is available for each course.

MOC PART 4: PRACTICE QUALITY IMPROVEMENT (PQI)

ASTRO currently offers members two PQI templates:

PQRS Oncology Measure Group

- Available to participants in the ASTRO PQRS*wizard*.
- Complimentary for ASTRO members.

RO-ILS

- Available to participants in the ASTRO PQRS*wizard*.
- Complimentary for ASTRO members.


ARE YOU CURRENT WITH YOUR MAINTENANCE OF CERTIFICATION REQUIREMENTS?

Under the new rolling certification process that was implemented by the American Board of Radiology (ABR) in 2012, there will be an annual look-back that will evaluate a diplomate's participation in the three previous calendar years. To help diplomate's adjust to the new process, the first three look-back years (2013, 2014 and 2015) will only check that a diplomate is meeting the licensure and exam requirements. The first full look-back will occur in 2016 and will review a diplomate's participation in all four parts of MOC.

At the time of each annual look-back, you must have:

- An active, current, valid and unrestricted license relevant to all of your locations of practice.
- Completed 75 CME (at least 25 of which are SA-CME) within the three previous calendar years.
- Passed the exam within the 10 previous calendar years.
- Completed one PQI project within the three previous calendar years.

DR. ZIETMAN ADDRESSES MOC IN NEW VIDEO

The MOC Made Simple video, available at www.astro.org/moc, was developed in collaboration with ASTRO and the ABR. In the video, Anthony L. Zietman, MD, FASTRO, addresses the specifics of the MOC program and gives examples of the MOC Part 2 and Part 4 requirements. Additionally, a high-level overview of the 2012 MOC program changes is addressed. 

From the ABR

PATIENT SAFETY INITIATIVES AND CERTIFICATION EXAMINATIONS

Note: As part of its continuing efforts to better inform and educate candidates for initial certification and diplomates holding certificates, the American Board of Radiology (ABR) is providing a series of brief updates about new or existing programs, changes or points of confusion. For additional questions or thoughts about new topics, email abr@theabr.org.


IN THE PAST DECADE, high-profile incidents leading to patient injury and/or death, as well as published reports from a variety of agencies and organizations, have focused a spotlight on issues related to patient safety and a perceived lack of systems to protect patients from iatrogenic harm. State and federal agencies are increasingly mandating various efforts at greater awareness of these issues among providers and greater identification and use of “best practices” in daily health care delivery.

To assist in these goals, the American Board of Medical Specialties (ABMS) and its Member Boards, including the American Board of Radiology (ABR), have begun to integrate questions related to non-clinical skills (NCS) into initial certification (IC) and Maintenance of Certification (MOC)

cognitive examinations to test candidate and diplomate knowledge in these areas. Specialty societies that provide educational content in support of MOC, such as ASTRO, are also developing programs to better educate their constituents about these important topics.

Beginning with examinations in 2014, the ABR qualifying (computer-based) IC and Part 3 MOC cognitive examinations will include questions related to a group of topics collectively called NCS. This general category will include biostatistics, bioethics, quality assurance and patient safety. Questions regarding patient safety and the closely associated quality assurance (QA) might include issues such as:

- Frequency and/or necessity of image guidance in particular clinical scenarios.
- Frequency and/or necessity of repeat calculations.
- “Independent” postgraduate trainee decision making.
- Human factors related to errors.
- Communication of errors.
- Elements of appropriate QA.
- Routine versus exceptional QA.
- QA following linac service.
- Value of peer review.
- Root cause analysis following misadministration or other error.

As clinical practice and technologies evolve, these examination items will be updated. The ABR examination study guides, which can be accessed at www.theabr.org, have been revised to include NCS material to assist candidates and diplomates in examination preparation. 



RO-ILS

RADIATION ONCOLOGY™
INCIDENT LEARNING SYSTEM

Sponsored by ASTRO and AAPM

RO-ILS IS THE ONLY MEDICAL SPECIALTY SOCIETY-SPONSORED RADIATION ONCOLOGY PSO.

MOC Part 4: PQI: This activity is qualified for physicians and physicists by the American Board of Radiology in meeting the criteria for practice quality improvement (PQI), toward the purpose of fulfilling requirements in the ABR Maintenance of Certification Program.

The RO-ILS mission is to facilitate safer and higher quality care in radiation oncology by providing a mechanism for shared learning in a secure and non-punitive environment.

Visit www.astro.org/ROILS to enroll beginning June 19, 2014, and become a **CHAMPION OF SAFETY!**

CLINICAL PRACTICE STATEMENTS AND MODEL POLICIES: WHAT'S THE DIFFERENCE?

AMONG THE GOALS in ASTRO's Strategic Plan are production of a robust set of Clinical Practice Statements to facilitate high-quality care and creation of Model Policies to ensure all suitable patients have access to necessary radiotherapy treatments. While the target audience of Clinical Practice Statements is largely providers, Model Policies are aimed primarily at payers. These two initiatives are related yet serve distinct purposes.

Providing guidance to practicing radiation oncologists (*Clinical Practice Statements*)

ASTRO's Clinical Practice Statements are designed to offer guidance to physicians in making treatment decisions for their patients. They include:

- Clinical Practice Guidelines, which focus on key clinical questions with recommendations based on evidence from available randomized controlled trials¹, and
- Best Practice Statements, which use a formal consensus method to address topics for which high-level evidence is lacking².

Topics for all of ASTRO's Clinical Practice Statements are initially approved by the Board of Directors and concentrate on a particular cancer site and patient group. The Statements are

Clinical Practice Statements and Model Policies represent two facets of ASTRO's efforts to support patients' access to high-quality care.

primarily developed by radiation oncologists specializing in the disease site, along with representatives from other relevant specialties. The first step in creating a Clinical Practice Statement is a comprehensive and rigorous literature review. For Clinical Practice Guidelines, the resulting studies are used to draft recommendations and write the guideline document. Consensus is evaluated for each recommendation, and the strength of the recommendations and supporting evidence are graded. For Best Practice Statements, a panel develops a series of scenarios representing different types of patients and potential treatments, which are rated for appropriateness by a separate multidisciplinary expert panel based on the literature. The Best Practice Statement is written using these ratings.

Clinical Practice Statements undergo numerous internal and external reviews and guidelines are also posted online for public comment. They are approved by ASTRO's Clinical Affairs and Quality Committee and ASTRO's Board of Directors and then published

primarily in *Practical Radiation Oncology*. Guidelines may be subsequently used in the production of quality measures and for other ASTRO programs. Guidelines are assessed annually beginning two years post-publication to determine if new high-quality evidence is available and whether the guideline should remain as is or if it should be revised or retired. ASTRO has not yet developed a process to update Best Practice Statements. ASTRO's current library of Clinical Practice Statements is available at www.astro.org/Clinical-Practice/Index.aspx.

Providing guidance to insurers and third-party payers (*Model Policies*)

In contrast to Clinical Practice Statements, the primary purpose of Model Policies is to provide guidance to payers on appropriate coverage. As is the standard in the payer community, policies are divided on the basis of technology and the diagnosis for which that treatment approach may be reasonable. After a topic has been approved by ASTRO's Health Policy Committee, a

1 Institute of Medicine. *Clinical Practice Guidelines We Can Trust*. Washington, DC: The National Academies Press; 2011.


2 Fitch K, Bernstein S, Aguilar M, et al. *The RAND/UCLA Appropriateness Method User's Manual*. Santa Monica, CA: RAND; 2001.

workgroup within the Payer Relations Subcommittee is developed to provide support in writing the policy. A high-level literature search is completed to determine which evidence, within set inclusion criteria, supports coverage indications for a modality. Draft policies undergo rigorous review at different levels within ASTRO's Health Policy Council. In addition, supplementary support and review may be requested of external experts,

ASTRO's resource panels and other resources as needed.

Model Policies are reviewed on an annual basis to ensure coding information is in compliance with any coding updates. In addition, as new high-quality literature is published altering the state of the technology or clinical indications, policies will be updated to reflect appropriate coverage and may be revised without notice. Model Policies utilize Clinical

Practice Statements and other high-level evidence in making a determination of coverage. Current Model Policies are available online at www.astro.org/Practice-Management/Reimbursement/Model-Policies.aspx.

With the different processes and purposes, Clinical Practice Statements and Model Policies represent two facets of ASTRO's efforts to support patients' access to high-quality care. 

DIFFERENT PROCESSES AND PURPOSES AT-A-GLANCE

	CLINICAL PRACTICE STATEMENT	MODEL POLICY
Purpose	To provide clinical guidance on appropriate use of radiation in different populations so patients receive the best possible care.	To efficiently communicate what ASTRO believes to be correct coverage policies for radiation oncology services.
Topics	<ul style="list-style-type: none"> • Focus on a disease-site and patient population. • Focused on disease sites that are common, exhibit substantial variation, consume significant resources and/or show uncertainty or controversy. 	<ul style="list-style-type: none"> • Topics are based on technologies. • Priority depends on the existence of variation in coverage.
Participants in workgroups and panels responsible for development	<ul style="list-style-type: none"> • Radiation oncologists specializing in disease site being addressed. • Other specialists, such as medical oncologists or surgeons. 	<ul style="list-style-type: none"> • Primarily radiation oncologists serving on ASTRO's Payer Relations Subcommittee. • Support is requested as needed from other subcommittees within ASTRO's Health Policy Council and from ASTRO's Resource Panels.
Audience	<ul style="list-style-type: none"> • Primarily physicians. • May also be used by payers and/or patients. 	<ul style="list-style-type: none"> • Primarily payers. • May also be used by practice administrators in dealing with insurers.
Timeline	Approximately 18 to 24 months.	Approximately 12 months.
Information Included	<ul style="list-style-type: none"> • Recommendations about appropriate patient care. • Discussion of available literature and ongoing studies. • Assessment of benefits and harms of treatment options. 	<ul style="list-style-type: none"> • Recommendation for appropriate coverage, including ICD-9-CM and ICD-10-CM diagnosis codes. • Applicable CPT codes and coding information. • General information about the technology and process of care.
Publication	<ul style="list-style-type: none"> • Currently in <i>Practical Radiation Oncology</i>. • Previously in the <i>International Journal of Radiation Oncology • Biology • Physics</i>. • Also available on ASTRO's website. 	ASTRO's website.

ASTRO GOLD MEDALISTS PLAY VITAL ROLE IN ADVANCING HEAD AND NECK RADIATION THERAPY

HEAD AND NECK CANCER and its treatment have been closely tied to the development of all of radiation therapy. Many ASTRO Gold Medalists contributed to the advancement of head and neck radiation therapy.

Early on, head and neck radiation therapy was limited by the poor penetration, high skin doses and high dose to bone delivered by kilovoltage X-rays. High-energy X-ray machines were developed in part by Franz Buschke, MD*. Gilbert Fletcher, MD*, stated that it was the availability of super voltage X-rays that made it possible to develop combined radiation therapy and surgery.

Dr. Fletcher's method of treating head and neck cancer had a major influence on the development of techniques for the treatment of this disease. His concept of shrinking fields with higher and higher doses delivered to smaller and smaller volumes containing



Gilbert Fletcher, MD*, conducts a head and neck exam on a patient at MD Anderson Cancer Center.

gross tumor was seminal in improving the results of head and neck radiation therapy. Higher doses were often delivered through peroral treatment, initially espoused by Isadore Lampe, MD*. Through his textbooks and the numerous trainees from MD Anderson Cancer Center, including Carlos Perez, MD, FASTRO*, K. Kian Ang, MD, PhD, FASTRO*, H. Rodney Withers, MD, FASTRO*, Luis Delclos, MD, FASTRO*, and Rod Million, MD, FASTRO*, these methods spread throughout North America and the rest of the world.

Surgery combined with radiation therapy created a major debate as to whether radiation should be given preoperatively or postoperatively. The Radiation Therapy Oncology Group (RTOG), founded by Simon Kramer, MD* and other ASTRO pioneers including Victor Marcial, MD, FASTRO*, conducted a trial that demonstrated that postoperative irradiation was superior.

The next major advance concerned the definition of the treatment volume. The development of custom cut and poured Cerrobend blocks by William Powers, MD*, made it possible to conform opposed ports to the target volume. Imaging, improved by the work of George Chen, PhD, FASTRO*, initially done with diagnostic films transferred by hand was replaced by dedicated radiotherapy simulators (Dr. Kramer, Malcolm Bagshaw, MD, FASTRO*, and Henry Kaplan, MD*) and subsequently by dedicated CT scanners (Eli Glatstein, MD, FASTRO*).

Beginning with small phase I studies and then a positive phase III study with bleomycin by Karen Fu, MD, FASTRO*, it became evident that combining simultaneous chemotherapy with radiation therapy in head and neck cancer could provide a major advantage.

Other chemical methods of improving the treatment results in head and neck cancer were explored. Dr. Bagshaw evaluated the use of halogenated pyrimidine analogs. Based on hyperbaric oxygen trials, drugs to mimic oxygen or kill hypoxic cells were developed under the leadership of Martin Brown, PhD, FASTRO*, Norm Coleman, MD, FASTRO*, and Lester Peters, MD, FASTRO*. The use of sulfhydryl protectors was championed by Mort Kligerman, MD*.

A phase III RTOG trial conducted by Dr. Fu, based on concepts from Dr. Withers, Chiu-Chen Wang, MD*, and Dr. Peters, indicated that shortening overall time either by hyperfractionation or concomitant boost did improve the outcome.

In recent years 3-D conformal radiation therapy, first introduced in the U.S. by Dr. Glatstein and Allen Lichter, MD, FASTRO*, and subsequently IMRT, perfected by Dr. Fu, Steve Leibel, MD*, and Clif Ling, PhD, FASTRO*, have further improved the results in head and neck cancer treatment. These techniques, codified by Jim Purdy, PhD, FASTRO*, allow a further application of Dr. Fletcher's principles.

This article was submitted on behalf of the ASTRO History Committee.

**ASTRO Gold Medalist*

POTENTIAL OPPORTUNITIES FOR INTEGRATING MOLECULAR SIGNATURES AND GENOMIC CLASSIFIERS IN RADIATION ONCOLOGY



ASSESSMENT OF RISK when considering multimodality therapy as currently conducted is based on individual clinicopathologic (clinical) variables and/or through use of nomograms in many disease settings. However, the ability of these clinical variables to identify patients at substantially higher risk of metastasis and local recurrence is limited. Genomic features in the primary tumor reflect the true biological potential for disease progression and metastasis. Novel risk prediction tools that use such features can therefore provide the direct measure of risk that is needed. Patient-specific tumor molecular profiling data with leading-edge knowledge on diagnostic technologies and therapeutic options to identify relevant clinical strategies for each patient's unique cancer has the potential for significant clinical benefit.

An example of how genomics is being prospectively tested at the Mayo Clinic is The Breast Cancer Genome-Guided Therapy study, or BEAUTY study, which helps physicians tailor chemotherapy to breast cancer patients based on their individual genomes and the genomes of

their tumors. Physicians obtain three whole-genome sequences: one from the patient's normal tissue (blood) before treatment, one tumor genome before chemotherapy and one tumor genome after. BEAUTY combines three components of cancer care and research: 1) Chemotherapy before surgery (neoadjuvant therapy)—Treating the tumor with chemotherapy prior to surgery allows the patient and physician to evaluate the response of the tumor to the chemotherapy delivered. The response information guides further management decisions. This is considered a standard of care for most breast cancers in which the oncologist would recommend chemotherapy; 2) Genomic sequencing—Genomic tools analyze blood cells and tumor cells, identifying genetic markers and vulnerabilities that may be targeted with drugs; and 3) Creation of mouse avatars—Xenografting patients' breast cancers in laboratory mice allows for the immortalization of the breast cancer. The goal is to use patients' living breast cancer tissue to test the effectiveness of new drugs without exposing patients to the side effects of investigational drugs.

Although the highest level of support will come from randomized controlled clinical trials (RCTs), in many instances, there may be no RCTs that are feasible for assessing the clinical utility of potentially valuable genomic biomarkers, or the natural history of certain disease sites may preclude such studies (e.g., early-/intermediate-risk prostate cancer). A potential solution is

The concept of personalized medicine is not new to the 21st century. Since its inception, the field of radiation oncology has tailored treatment to specific patient and tumor characteristics.

to conduct well-designed cohort studies for comparative effectiveness research (CER) that relate clinical information to tumor biology and genomic data. CER also uses systematic reviews, evidence-quality appraisal and health outcomes research to provide a methodologic framework for assessing biologic patient subgroups. Some organizations are developing rapid learning models in which diverse data are made available, ideally in a robust and real-time fashion, potentially facilitating CER and personalized medicine. The tools to actualize the full potential of precision care using such models will require advances in CER and biostatistics methodology and the development of informatics systems, which has the ease of use as an Amazon or Google search¹.

Can signatures developed for one purpose be utilized for patients being considered for radiation therapy? In the field of prostate cancer, one example is using signatures such as Decipher™ (GenomeDx), a validated genomic classifier (GC) that provides a direct measure of the biological risk of metastatic prostate cancer independent of PSA, tumor pathology and other risk factors. This prognostic test classifies an individual patient's risk of clinical metastasis after radical prostatectomy. A number of academic groups are validating the utility of such a signature to ascertain the benefit of radiation therapy in a group of men at high risk of recurrence. The GC was able to predict biochemical failure and distant metastasis following radiation therapy with significant differences in outcomes noted for patients with high GC scores who received early rather than late radiation therapy, but not in patients with low GC scores².

At the normal tissue level, efforts to create world consortia consisting of Gene-PARE (U.S.), GENEPI (European/ESTRO), RAPPER (UK), RadGenomics (Japan) and the German Radiogenomics group are currently conducting genome-wide association studies. A series of genome-wide association studies are being performed to identify single nucleotide polymorphisms and copy number variants associated with the development of normal tissue toxicities resulting from radiotherapy. It is anticipated that identification of these genetic markers will form the basis of an assay to predict which patients are at risk for development of complications arising from cancer treatment with radiation. Thus, the results of such a predictive assay will help to personalize and optimize cancer radiation therapy. These studies preceded the explosion of technological advances in next generation sequencing, and although such technology may appear "outdated," it can lend significant information to our knowledge of genomics and the association of long-term sequelae³.

The concept of personalized medicine is not new to the 21st century. Since its inception, the field of radiation oncology has tailored treatment to specific patient and tumor characteristics. However, today most practicing oncologists are uncomfortable, with a limited understanding how cancer genomics and the development of genomic classifiers are influencing treatment paradigms today.

Jeffery Ward recently pointed out, "There are things that big data cannot do, things that are inherent in personalized medicine. It cannot replace the caring health care professionals who interpret the data, simplify it, and inform the patient in the context of the patient's education level, culture, social support system, and personal goals. Personalized medicine will not

simplify care. The complexity and multidisciplinary nature of oncology will increase, and the role of the oncologist as team leader and coordinator needs to be inherent in the process. Neither can big data ever be 100 percent accurate. Clinicians will need to be cognizant of the concept of garbage in and garbage out, and maintaining the integrity of the data will be their responsibility."⁴

For the radiation oncologist an additional challenge is how to incorporate current and developing genomic classifiers into daily practice while incorporating knowledge of dose, fraction size, DVH and other physical parameters.

We as a specialty are at a point where we can be part of the discussion and get involved in defining how genomics and the precision oncology hypothesis will impact patient care. In the words of Theodore Roosevelt, "In any moment of decision, the best thing you can do is the right thing, the next best thing is the wrong thing, and the worst thing you can do is nothing."

REFERENCES

1. Ginsburg GS, Kuderer NM. Comparative effectiveness research, genomics-enabled personalized medicine, and rapid learning health care: a common bond. *J Clin Oncol*. 2012; 30: 4233-4242.
2. Karnes RJ, Bergstralh EJ, Davicioni E, Ghadessi M, Buerki C, Mitra AP, et al. Validation of a Genomic Classifier that Predicts Metastasis Following Radical Prostatectomy in an At Risk Patient Population. *J Urol*. 2013; 190(6): 2047-2053.
3. Kerns, SL, Ostrer, H, Rosenstein, BS. Radiogenomics: using genetics to identify cancer patients at risk for development of adverse effects following radiotherapy. *Cancer Discov*. 2014; 4: 155-165.
4. Ward, JC. Oncology reimbursement in the era of personalized medicine and big data. *J Oncol Pract*. 2014; 10: 83-86.

This article was submitted on behalf of the Clinical, Translational and Basic Science Advisory Committee.

Continued from Page 7

CHAIR'S Update

close the self-referral loophole for radiation therapy. Unfortunately, URO PAC is only one of many PACs who directly fight and compete against our advocacy efforts.

ASTRO PAC is our strongest tool to combat our opposition and to increase ASTRO's political clout in Washington to guarantee that the voice of radiation oncology, and thus our patients, is heard. As chair of the ASTRO Board of Directors, I am dedicated to strengthening our grassroots efforts, increasing PAC fundraising and broadening the influence of ASTRO on Capitol Hill; however, I cannot do it alone. ASTRO's advocacy efforts have resulted in numerous successes for radiation oncology over the years, and we need everyone's help to ensure that we are equal players on the political field.

If you have not been part of the ASTRO PAC team, then please consider making a donation. You will not be disappointed. If you are already a donor, thank you on behalf of all radiation oncologists, but especially on behalf of our cancer patients. Understanding what the ASTRO PAC can do for our field and particularly our patients, we all need to be saying "GO PAC!"

Dr. Lawton is professor, program director and vice-chairman of radiation oncology at the Medical College of Wisconsin in Milwaukee. She welcomes comments on her editorial at astronews@astro.org.

ASTRO PAC Disclosure

Contributions to ASTRO PAC are not deductible for federal tax purposes. Contributions to ASTRO PAC are entirely voluntary. You have the right to refuse to contribute to ASTRO PAC without reprisal. Any suggested contribution levels are merely suggestions: you may contribute more or less than the suggested amounts or not at all. The American Society for Radiation Oncology will not favor or disadvantage anyone by reason of the amount of their contribution or decision not to contribute.

Continued from Page 8

SPECIAL report

We will bring together the latest developments in basic, translational and applied technology and clinical sciences as they relate to our multidisciplinary efforts to improve the quality of life and outcomes of our patients.

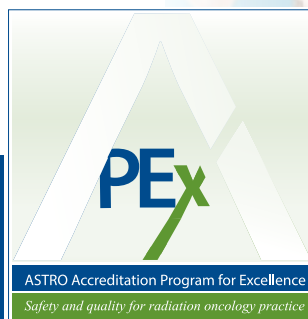
popular Clinical Trials Session, which also features important highly rated, clinically related studies, will run unopposed. Two guidelines sessions will also run unopposed. In addition to the scientific and educational program, I encourage you to take advantage of time in between sessions to network with colleagues and friends and to visit the Exhibit Hall to explore the latest radiation oncology techniques, services and publications available to you and your practice.

Registration is currently open. We look forward to your participation in ASTRO's 56th Annual Meeting. See you in San Francisco!

Dr. Haffty is professor and chair of the Department of Radiation Oncology at Rutgers-Robert Wood Johnson Medical School and New Jersey Medical School and associate director of the Rutgers Cancer Institute of New Jersey. He welcomes comments on this column at astronews@astro.org.

ASTRO ACCREDITATION PROGRAM FOR EXCELLENCE

Join the
APEX team
as a surveyor.



ASTRO is recruiting qualified medical physicists, radiation oncologists, medical dosimetrists, radiation therapists, nurses and practice administrators to become APEX surveyors.

For more information on APEX, including the surveyor qualifications and application and the Program Standards, visit www.astro.org/apex.

JOURNALS

HIGHLIGHTS FROM ASTRO'S JOURNALS

FROM THE MARCH-APRIL 2014 ISSUE OF *PRACTICAL RADIATION ONCOLOGY (PRO)*

A Review of Safety, Quality Management and Practice Guidelines for High-Dose-Rate Brachytherapy: Executive Summary

by *Thomadsen et al*

Given the maturity of HDR brachytherapy technology, this white paper considers, from a safety point of view, the adequacy of general physics and quality assurance guidance. It also looks at clinical guidance documents available for the most common treatment sites.

RTOG 0631 Phase 2/3 Study of Image Guided Stereotactic Radiosurgery (SRS) for Localized (1-3) Spine Metastases: Phase 2 Results

by *Ryu et al*

Phase II results demonstrate the feasibility and accurate use of SRS to treat spinal metastases, with rigorous quality control, in a cooperative group setting.

HIGHLIGHTS FROM THE *INTERNATIONAL JOURNAL OF RADIATION ONCOLOGY • BIOLOGY • PHYSICS (RED JOURNAL)*

MARCH 1, 2014

SSO-ASTRO Consensus Guideline on Margins for Breast-conserving Surgery with Whole-Breast Irradiation in Stages I and II Invasive Breast Cancer

by *Moran et al*

Changes in the management of breast cancer over time have led to decreased rates of in-breast tumor recurrence, and new guidance on the management of positive margins is needed. An accompanying editorial from Jaggi

et al interprets these recommendations for the practicing radiation oncologist.

Phase 3 Trial of Domiciliary Humidification to Mitigate Acute Mucosal Toxicity during Radiation Therapy for Head and Neck Cancer: First Report of TROG 07.03 RadioHUM Study

by *Macann et al*

In this randomized phase III, multisite study, the value of respiratory humidification to reduce the symptoms of mucositis was assessed and potential benefit was seen. However, the influence of patient compliance leads the authors to moderate their recommendations.

Review of the Clinical and Biologic Aspects of HPV-positive Squamous Cell Carcinoma of the Head and Neck

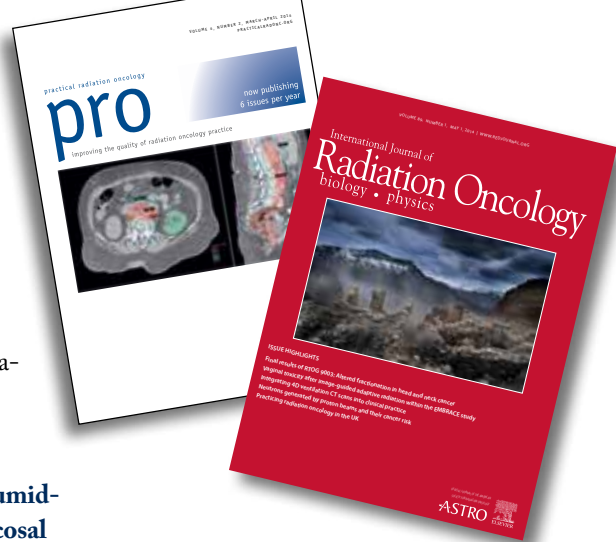
by *Blitzer et al*

This comprehensive review article looks at the biology, detection and treatment of HPV-positive head and neck cancers. It evaluates the role of HPV onco-proteins in tumor development, the natural history of HPV infection and the risk factors for and prevention of transmission of oral HPV.

A Population-based Comparative Effectiveness Study of Radiation Therapy Techniques in Stage III Non-Small Cell Lung Cancer

by *Harris et al*

From 2002 to 2009, the use of 2-D radiation therapy declined while the adoption of 3-D conformal radiation therapy and IMRT increased. Multivariate adjusted and propensity score matching analysis demonstrated similar overall and cancer specific survival and overall toxicity profile when compared with 3-D CRT.



APRIL 1, 2014

Risk of Late Toxicity in Men Receiving Dose-escalated Hypofractionated IMRT for Prostate Cancer: Results from a Randomized Trial


by *Hoffman et al*

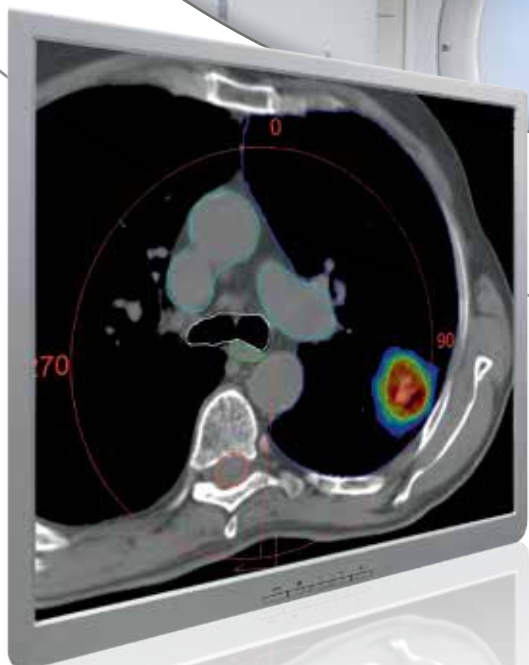
The authors study late toxicity in men with localized prostate cancer treated in a randomized trial comparing conventional IMRT (75.6 Gy in 1.8 Gy fractions) with dose-escalated hypofractionated IMRT (72 Gy in 2.4 Gy fractions). There was only limited grade 2 or 3 toxicity; however, men treated with hypofractionation had a non-significant numeric increase in gastrointestinal toxicity.

MAY 1, 2014

Final Results of Local-Regional Control and Late Toxicity of RTOG 9003: A Randomized Trial of Altered Fractionation Radiation for Locally Advanced Head and Neck Cancer

by *Beitler et al*

RTOG 9003 was the largest study of fractionation ever conducted in head and neck cancer, and this is the final report of locoregional control and toxicity. More than 1,000 patients with stage III/IV squamous cell cancer were randomized to four treatment arms: standard fractionation, hyperfractionation (HFX), accelerated fractionation with split and accelerated fractionation, continuous. At five years, only HFX improved control and overall survival. 



Deliver Lung SBRT in 43% Less Time

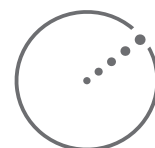
Sophisticated respiratory motion management
without compromised treatment times

4513 371 1229 11:13

One Solution. Unlimited Possibilities.

www.VersaHD.com

As compared to previous generation Elekta digital linear accelerators. Stielor F, Steil V, Wenz F, Lohr F, Department of Radiation Oncology, University Medical Center Mannheim, University of Heidelberg, Germany.
Versa HD is not available for sale or distribution in all markets. Please contact your Elekta representative for details.



ELEKTA



ASTRO 56TH ANNUAL MEETING TARGETING CANCER: TECHNOLOGY & BIOLOGY



Meeting Dates: September 14 -17, 2014
Exhibit Dates: September 14 -16, 2014
Moscone Center • San Francisco

Join us in San Francisco

The 2014 Annual Meeting will include the latest developments in basic, translational and applied technology and clinical sciences. Gain a multidisciplinary perspective on efforts to improve the quality of life and outcomes for our patients.

This year's outstanding keynote speakers:



- **Hedvig Hricak, MD, PhD**, Chair, Department of Radiology, Memorial Sloan Kettering Cancer Center
- **Frank McCormick, PhD**, Director, University of California San Francisco, Helen Diller Family Comprehensive Cancer Center
- **Sidney Dekker, PhD**, Professor, Safety Science Innovation Lab, Griffith University, Brisbane, Australia



This live activity has been approved for *AMA PRA Category 1 credit*™.

REGISTER NOW!

www.astro.org/annualmeeting



#ASTRO14

ASTRO

TARGETING CANCER CARE