



# ASTRO *news*

SPRING 2018

## PUTTING IT ALL TOGETHER

*Radiation oncologists form partnerships in the clinic,  
lab and Washington to better serve cancer patients*

### Inside This Issue

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#### **Collaborations in the Clinic**

*How interdisciplinary collaborations have impacted patient care over the years*

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#### **Partnering for Discoveries**

*Collaborating with other groups to quickly translate research into better clinical outcomes*

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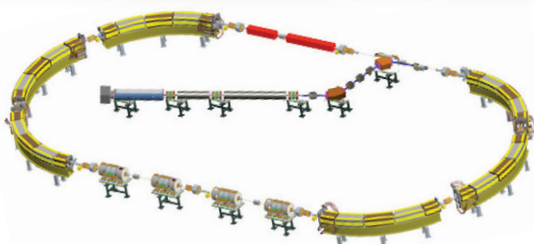
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Best 20u/25	20, 25-15	Best 15 + <sup>123</sup> I, <sup>111</sup> In, <sup>68</sup> Ge/ <sup>68</sup> Ga
Best 30u (Upgradeable)	30	Best 15 + <sup>123</sup> I, <sup>111</sup> In, <sup>68</sup> Ge/ <sup>68</sup> Ga
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Best 70	70-35	<sup>82</sup> Sr/ <sup>82</sup> Rb, <sup>123</sup> I, <sup>67</sup> Cu, <sup>81</sup> Kr + research

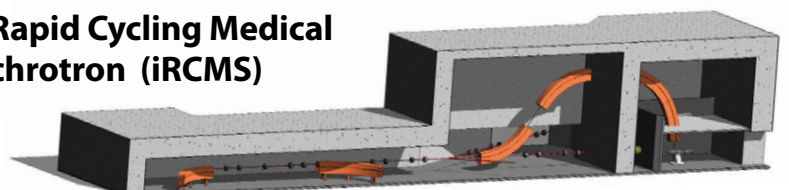


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# ASTRO news

AMERICAN SOCIETY FOR RADIATION ONCOLOGY

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# ALL FOR ONE ONE FOR ALL

**AMAZON, BERKSHIRE HATHAWAY AND JPMORGAN CHASE** have announced plans to form an independent health care company for their U.S. employees. If this venture succeeds, might it not work for the broader population? Follow that train of thought and—given the ubiquitous role that voice assistants are coming to occupy in our homes—it's not inconceivable that we could soon be asking Alexa, Siri or Cortana which doctor to see, and not just for the common cold.

On the other hand, cancer care is becoming increasingly complex, requiring inputs from various specialists and team members to ensure proper management. That's why collaborative care is the theme of this issue—partnerships in the clinic, in research, on quality and safety, on advocacy and in training the next generation of oncologists.

We have made great strides since the early days of surgeon-directed cancer care to a team-focused approach that's personalized to the unique treatment needs of each patient. This leads to a unified plan that benefits from the combined clinical and research expertise of multidisciplinary teams of medical professionals and scientists. The goal is delivering treatment that allows patients and their care teams to assess the value of various options via a transparent process founded on evidence. In this issue, experts in the major disease sites give an overview of how interdisciplinary collaborations have improved patient care in recent years.

"There are numerous examples where radiation oncologists have taken a lead to build such programs," say Jason Efstathiou, MD, and Drew Moghanaki, MD, in the story beginning on page 11. That being said, there is a perception that we are just consultants who take care of patients during an isolated episode of radiation treatment, leaving follow-up, care of toxicities, inpatient care, palliative care and so on to

other specialists. To be considered an integral part of the multidisciplinary team, we have to be engaged not just in the decision-making process, but areas beyond immediate patient care. For a thoughtful perspective on the role of the radiation oncologist in the future, do read this recent piece by Neha Vapiwala, et al<sup>1</sup>.

On page 18, Carol Hahn, MD, FASTRO, and Josh Petit, MD, give us an inside look at the collaborative work of many dedicated individuals and societies that has allowed ASTRO to develop a battery of guidelines focusing on areas of significant importance in our field. Sameer Keole, MD, offers a glimpse of the collaborative advocacy efforts that positively impact policy on behalf of our patients and members on page 27. Judy Keen's story on page 24 about research collaborations is an eye-opener, ranging from partnerships with the American Association for Cancer Research and Society for Immunotherapy of Cancer to new Early Career Development Awards in breast and prostate cancer research. I would say this is the area where there has been the most dramatic change in the last three or four years for ASTRO. Paul Wallner, DO, discusses testing multidisciplinary management knowledge in training the next generation of oncologists and we look forward to more information on the online longitudinal assessment (OLA) instrument scheduled to be launched for radiation oncology in 2020. Also in this issue, we pay tribute to Jerry Hanks, an ASTRO Gold Medalist, a global leader in quality assurance studies in radiation oncology and someone who made invaluable contributions to improving the clinical outcomes of men with prostate cancer.

Cross-specialty collaboration is becoming more important as the health care industry increasingly focuses on providing the highest quality of care at the most efficient cost point. The direct medical cost of cancer care in the United States in 2014 was pegged at \$87.6 billion. This does not include the indirect costs

of lost productivity due to cancer-related morbidity and mortality. American businesses bear a large chunk of the rapidly spiraling cost of medical treatment and indirect costs—key to the Amazon, Berkshire Hathaway and JPMorgan Chase foray into health care. Just as Amazon and others use technology to serve customers, there has been talk of an online health care dashboard connecting employees with hospitals and doctors specializing in ailments selected from a dropdown menu, ranked by quality and cost.

While this presents an ideal, companies will need access to reliable data on outcomes and cost to get it right. Such information is at best patchy because the data will show if a task has been completed, rather than looking at patient outcomes.

Considering cost alone can lead to unintended consequences. Public reporting of 30-day risk-standardized readmission rates following heart failure hospitalization and the financial penalization of those facilities with higher rates have been associated with a reduction in 30-day readmissions (and cost savings). But a report in *JAMA Cardiology*<sup>2</sup> found mortality rates increased slightly among heart failure patients as hospitals reduced 30-day and one-year readmission rates as part of the CMS's Hospital Readmissions Reduction program, clearly not what was intended.

Process measures are evidence-based best practices that represent a health system's efforts to systematize improvement efforts. Many of the measures we monitor in radiation oncology will fall under this category. It is vital to develop metrics that are meaningful and relevant to patient outcomes. It's reassuring that there is a substantial level of collaboration in this area—ASTRO works closely with the Physician Consortium for Performance Improvement (PCPI) and the National Quality Forum (NQF), as well as other

medical specialty societies.


As a physician, I am understandably worried about the unintended consequences of scorecards based on inaccurate reporting and bad data. However, public reporting is here to stay and will gain sway. In fact, the Medicare Access and CHIP Reauthorization Act (MACRA) only further cements this as payment adjustments will be based on performance categories and not just on clinical quality but also on resource use (a euphemism for cost).

Cost will be weighted at 10 percent of a clinician's final score under the Merit-based Incentive Payment System (MIPS) for the 2018 performance period and 30 percent for 2019 and beyond (this information will

all be based on the claims we submit). There's little clarity on how these specific cost categories apply to radiation oncology. Will the system rank as too expensive those who treat sicker patients, use advanced technology, more fractions, more image guidance, etc.?

Advances against cancer have not benefited everyone equally—that disparity is one of our most pressing challenges. Collaborations can help resolve this to a significant degree. However, this has to be a broad and integrated effort across disciplines and sectors that encompasses social and environmental factors that extend beyond the health care system.

As Richard D. Zane, MD, put it in his keynote at the ASTRO Annual Meeting in San Diego last October, the

health care industry is ripe for disruption due to the growing concerns of access, disparity and cost. We're a long way from asking a voice assistant to suggest treatment options and select physicians, but we need to be prepared for a future that incorporates artificial intelligence with a patient-oriented focus to provide quality health care by dealing with cross-specialty complexities at a high level of efficiency and reduced cost. So Alexa, are we ready for the future? 

“Cross-specialty collaboration is more important as health care increasingly focuses on ... the most efficient cost point.”

## References

- <sup>1</sup> Care Provider or Service Provider: What Should the Role of Radiation Oncologists Be in the Future? Neha Vapiwala, Lawrence Shulman and Charles Thomas: *J Oncol Pract.* 2018 Feb;14(2):81-83
- <sup>2</sup> Association of the Hospital Readmissions Reduction Program Implementation With Readmission and Mortality Outcomes in Heart Failure. Ankur Gupta, MD, PhD et al. *JAMA Cardiol.* 2018;3(1):44-53



# THE POWER OF THE PARALLAX

For centuries, astronomers have appreciated the value of observing an object from perspectives that are as widely separated as possible. A so-called parallax is the apparent shift in position when a celestial object is viewed from a different location. The distance of an object from earth can be estimated by geometry using the “parallax angle” within the isosceles triangle formed by the object of interest and the Earth at opposite points within its revolution around the sun<sup>1</sup>.

One of the all-time most productive “odd couples” whose work has received renewed acclaim in recent years is an unlikely pair of enormously creative thinkers named Amos Tversky and Daniel Kahneman. As told by Michael Lewis in *The Undoing Project*, the introverted, reserved Kahneman and extroverted, X Games daredevilish Tversky forged an unlikely friendship in the late 1960s that allowed their very distinct worldviews to converge on a field of common interest, namely, human nature<sup>2</sup>.

The winner of the 2017 Nobel Prize in Economics, Richard Thaler, acknowledged a special debt of gratitude for Tversky and Kahneman’s foundational studies in behavioral economics. Their thought experiments and observations reshaped our understanding of how people decide to invest money, buy cars or select health insurance plans. The Lewis book is slated to be a major motion picture starring David Palma and Jenia Vinogradskiy<sup>3</sup>.


Radiation oncology is peopled with clever mavericks of disparate backgrounds who have been known to disagree with each other. However, when observed in the wild in large packs, the species often falls into a trance of singlemindedness, harmoniously reciting a common mythology. Nevertheless, the evolution of radiation therapy has been steered to a remarkable degree by intellectual breeding with outsiders whose vantage points provide insights not initially seen by radiation oncologists. A selection of some fertile couplings:

1. *Radiation oncology and organic chemistry*. Charles Heidelberger, a chemist who designed 5-fluorouracil (5-FU) in the 1950s, deserves tremendous credit for creating the first radiosensitizer. All others that followed have aspired to the original paradigm of synergy exemplified by 5-FU-based chemoradiation.

2. *Radiation oncology and neurosurgery.* Would we have ever developed radiosurgery were it not for Lars Leksell? Perhaps not, because we would likely have been handcuffed by traditional thinking. Would there be intensity-modulated radiation therapy (IMRT) without Mark Carol? Probably, because others were working on it in parallel. Still, the original Peacock System was a breakthrough, and he was a worthy recipient of the ASTRO Honorary Member award.
3. *Radiation oncology and oncology nursing.* The Radiation Therapy Oncology Group (RTOG) was precocious in its inclusion of quality-of-life endpoints in studies from as far back as the 1990s, long before it was fashionable. Would the RTOG have done such a good job in this area without input into trial design from Deb Bruner? Maybe eventually, but it would have taken a lot longer.

What other field might be the next great dance partner for radiation oncology? Today's leading candidates are immunology and cardiology. There is no rock big enough for anyone to hide under to avoid knowing of the potential for immunomodulatory treatments to prolong lives—and there is hope that favorable interactions with radiotherapy might be harnessed to enhance the good effects. Likewise, it is difficult even for a radiation oncologist who is not on

Twitter to avoid awareness of the provocative results seen in a small cohort of patients treated with ablative radiotherapy for ventricular tachycardia<sup>4</sup>.

But we can't limit ourselves to just these options. We should remain as open-minded as possible to new opportunities to exploit the power of the parallax to provide fresh views on solutions to problems that we can't see with our own sometimes-limited scope. Maybe we should even look to the field of behavioral economics to see if Tversky and Kahneman can tell us something we don't know... Or did Ralph Weichselbaum already scoop us there<sup>5</sup> when he applied their now-classic concept of loss aversion to choices made by lung cancer patients? Hmm... 

---

### Notes and References

- <sup>1</sup> This principle is directly relevant to a form of image-guided radiotherapy. The technique of "stereophotogrammetry" aligns treatment beams to tumor targets by triangulating the location of fiducials within a 3-D coordinate system with low-energy X-rays aimed from different parallax angles toward the target.
- <sup>2</sup> Lewis, M. *The Undoing Project: A Friendship That Changed Our Minds*. WW Norton & Company, New York, 2017.
- <sup>3</sup> This is fake news, but David and Jenia gave outstanding talks at the 2017 ASTRO Annual Meeting. If you missed them, please check out the Virtual Meeting at <https://conference-cast.com/ASTRO/common/presentations.aspx/23/51/1238>.
- <sup>4</sup> Cuculich PS, Schill MR, Kashani R, et al. Noninvasive Cardiac Radiation for Ablation of Ventricular Tachycardia. *N Engl J Med* 2017; 377:2325-2336.
- <sup>5</sup> McNeil BJ, Weichselbaum R, Pauker SG. Fallacy of the five-year survival in lung cancer. *N Engl J Med* 1978;299(25):1397-401.

## New opportunities in radiation oncology for researchers and medical students!

ASTRO has introduced two new membership categories:

- Postdoctoral fellow
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Membership in ASTRO will help expose researchers and medical students to the field of radiation oncology, allow them to network with experts in research and showcase their research.

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# SOCIETY NEWS

## Special Tribute: GERALD E. HANKS, MD, FASTRO

BY ERIC M. HORWITZ, MD, FASTRO

**GERALD E. HANKS, MD, FASTRO, DIED ON DECEMBER 20, 2017**, at his home in California. His list of accomplishments is astoundingly long, and it isn't possible to overstate his significance to the specialty of radiation oncology specifically and oncology in general. Dr. Hanks was one of the leading contributors to clinical research and technology development in the treatment of prostate cancer and quality assurance studies in radiation oncology beginning in the 1970s. His technology advancements included the first routine use of computed tomography (CT) and magnetic resonance imaging (MRI) in planning radiation treatment in the United States and the use of ultrasound to improve the accuracy of each daily treatment.

When he arrived at Fox Chase Cancer Center, he assembled a group and developed 3-D conformal radiation therapy, the precursor to intensity-modulated radiation therapy (IMRT), stereotactic body radiation therapy (SBRT) and everything we do with high-dose precision radiation. He led the [Patterns of Care studies](#) for many years, which demonstrated the value of complex treatment planning with the use of 3-D conformal techniques that enabled the delivery of higher doses of radiation. With these advances, more people were cured of their disease and the side effects of treatment were diminished.

Dr. Hanks developed and led one of the largest prospective clinical trials through the Radiation Therapy Oncology Group (RTOG 92-02), which defined the role of hormone therapy with radiation in the treatment of advanced prostate cancer. His landmark studies included the first prostate cancer dose escalation study that began in 1989, and the integration of prostate specific antigen (PSA) into the patient treatment algorithm. Dr. Hanks was also recognized as

a national and international leader in quality assurance studies in radiation oncology. The Patterns of Care studies were the first of their kind in any oncology specialty. They surveyed patterns of care in radiation oncology in the United States, defined national standards for clinical care and reported outcome of treatment for various malignancies. These efforts prompted other specialties to undertake national quality assurance programs with the assistance of technology developed by the Patterns of Care.



Jerry Hanks was born in Ellensburg, Washington, on September 21, 1934. He graduated from Washington State College, which he attended on a basketball scholarship, and received his medical degree from Washington University in St. Louis. He completed his residency in radiation oncology

at Stanford University as one of the original three radiation oncology residents in the United States and subsequently held academic faculty appointments at Stanford, the University of North Carolina, the University of California, Davis, the University of Pennsylvania and Fox Chase Cancer Center in Philadelphia. From 1971–1985, he practiced radiation oncology at the Radiation Oncology Center in Sacramento, California, where he provided leadership for a strong private practice radiation oncology program and successfully introduced clinical research to the community setting. He returned to academic medicine in 1985 and served as chairman of the Department of Radiation Oncology at Fox Chase for 16 years until 2001, when he retired from medicine. He is credited with establishing the department's national prominence, and he was honored by Fox Chase with the creation of the Gerald E. Hanks endowed chair in radiation oncology.

*Continued on following page*

# SOCIETY NEWS



*Theodore L. Phillips and  
Gerald Hanks*




*Faculty Department  
1998*



*Bob and  
Gerald Hanks*

Dr. Hanks was the author of more than 300 scientific publications with a primary focus on prostate cancer. He held numerous important leadership positions, including president and chair of ASTRO (1983-1985), president of the American Radium Society (ARS) and other positions at the American College of Radiology (ACR) and the Radiation Therapy Oncology Group (RTOG). He was a member of the Board of Chancellors and chair of the Commission on Cancer and the Committee on Radiation Oncology Practice Accreditation of the ACR. During his service to ASTRO and the ACR, he played a critical role in preserving a single voice for radiation oncology and diagnostic radiology at a time of great change in health care practice. He received many honors, including Gold Medals from ASTRO and the ACR.

Dr. Hanks devoted his medical career to improving the clinical outcomes of men with prostate cancer. His legacy continues with the many residents and faculty he trained and mentored, and whose careers he promoted, as well as the many men who benefited from his innovative and visionary clinical research. He, himself, was a survivor of prostate cancer. He is survived by his wife Barbara Fowble, MD, four children (Stephen Hanks, MD; Michael Hanks; Kimberly Hanks; and Leslie Hanks Angelacci), 10 grandchildren and one great-grandchild. 

*Eric Horwitz, MD, FASTRO, is the holder of the Gerald E. Hanks, MD, Chair of Radiation Oncology, and Professor and Chair of the Department of Radiation Oncology at Fox Chase Cancer Center.*

## SUBMIT YOUR NEWS TO ASTRO

Periodically, ASTRO reports [People in the News](#), featuring updates about your colleagues' awards, promotions, media coverage and other announcements. We encourage ASTRO members to submit items of interest to [communications@astro.org](mailto:communications@astro.org) for inclusion in the online feature.




## Four companies elected to ASTRO's Corporate Advisory Council

**ASTRO'S CORPORATE MEMBERSHIP HAS ELECTED** the following companies to serve on the 2018 Corporate Advisory Council: Accuray, Standard Imaging, Inc., Varian Medical Systems and ViewRay, Inc. The Council is a smaller, representative group of the ASTRO Corporate Membership-at-large, with a proportional mix of large and small companies from the Corporate membership base. Seats on the Council are held by high-level decision-makers within the corporations and represent a broad cross section of the industry.

The Council allows for collaboration between ASTRO and its Corporate members by focusing on issues and initiatives of mutual concern in radiation oncology. Priorities include increasing awareness of radiation therapy and advancing the science and practice of cancer treatment and patient care. In cooperation with ASTRO leadership, the Council convenes several times a year via conference call and an in-person meeting at ASTRO's Annual Meeting.

In 2017, ASTRO leadership discussed the following topics with the Corporate Advisory Council: the Radiation Oncology Institute; ASTRO's new strategic plan, including ways to advance the field of radiation oncology and make a greater impact on science; investments in research grants and the returns they provide to the field; and quality improvement programs including ASTRO's Accreditation Program for Excellence (APEX<sup>®</sup>). ASTRO's Advocacy team also reported on the many changes in health care legislation, including coding and payment freezes.

All corporate members can nominate their companies to serve on the Council. Nominations are accepted every fall with elections conducted during the winter. For more information about the Council and/or Corporate membership, please contact Joanne DiCesare at [joanne.dicesare@astro.org](mailto:joanne.dicesare@astro.org) or 703-839-7398. 

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Accuray	Susan Thompson	2020
Standard Imaging, Inc.	Raymond Riddle	2020
Varian Medical Systems	Kolleen Kennedy	2020
ViewRay, Inc.	Chris Raanes	2020

## Focusing on the Tumor Microenvironment: *An ASTRO Research Workshop*

BY JUDY KEEN, PHD

**SAVE THE DATE!** The Targeting the Microenvironment in Radiation Oncology workshop is scheduled for July 26–27 and will take place at the FHI360 Conference Center in the Dupont Circle neighborhood of Washington, D.C.

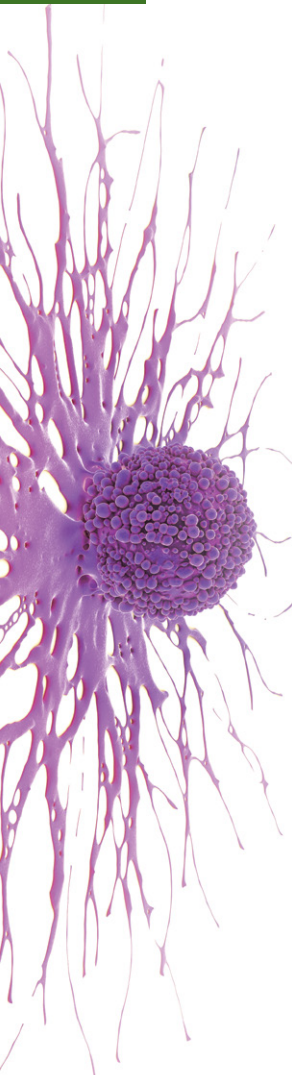
Continuing our tradition of hosting timely, cutting-edge and research-focused workshops, ASTRO, in cooperation with the American Association for Cancer Research (AACR), is gearing up for another two-day discussion on the latest hot topic in radiation oncology: the tumor microenvironment (TME).

While it's clear the cellular soup that holds the tumor itself can have a dramatic impact on growth and expansion of cancerous cells, the role that this microenvironment plays in radiation therapy is less well-known. The workshop is chaired by Wendy Woodward, MD, PhD, and Amato Giaccia, PhD, and speakers will explore such topics as:

- What factors in the TME will increase radiosensitivity or will induce radioresistance?
- How can radiation be used to alter the efficacy of other cancer drugs?
- Do the surrounding tumor stroma cells react differently to varied administration of radiation or sequencing of treatment?

Confirmed speakers include Mohamed Abazeed, MD, PhD, Ann Klopp, MD, PhD, Ruth Muschel, MD, Catherine Park, MD, Michael Spiotto, MD, PhD, and more. Additional speakers will be announced after abstracts are selected for presentation.

For more details and to register for this meeting, visit the ASTRO Research Workshop website: [www.astro.org/researchworkshop](http://www.astro.org/researchworkshop). 



## CORPORATE AMBASSADORS

ASTRO PROUDLY RECOGNIZES THE ONGOING COMMITMENT OF OUR CORPORATE AMBASSADORS FOR THEIR OUTSTANDING YEAR-ROUND LEADERSHIP AND PROMOTIONAL SPONSORSHIP OF RADIATION ONCOLOGY.



# Collaborations in the Clinic

Experts in the major disease sites give an overview of how interdisciplinary collaborations have improved patient care in recent years.

## THE MULTIDISCIPLINARY NATURE OF CANCER

**CARE** has borne countless partnerships between radiation oncologists and others in the House of Medicine. We asked leaders in each of the major disease sites—breast, head and neck, lung, genitourinary, gastrointestinal and spine—what the major collaborations have been over the past few years and how those partnerships have helped to improve patient care. Read on for their takes on why clinical collaborations are so important to the field of radiation oncology.



### BREAST

*Erin F. Gillespie, MD, and Atif J. Khan, MD, MS Memorial Sloan Kettering Cancer Center, New York*



The past 20 years have seen an evolution in the management of patients with breast cancer. With an increasing understanding of the biology of the disease, we are improving our ability to risk-stratify patients and tailor treatments to improve efficacy of upfront therapy while minimizing the risk of long-term side effects. The intensity and scope of radiation therapy is simultaneously being de-escalated (as in partial breast radiation therapy) or escalated (as in regional nodal irradiation in N1a disease) in different types of patients with breast cancer. As treatment options and decision making have become more complex, there is an increasing need for collaboration with other members of the patient's care team.

The approach to surgery has changed significantly, with important implications for radiation. Regional nodal radiation is now routinely employed as a



therapeutic substitute for axillary dissection rather than as an adjuvant therapy<sup>1-3</sup>. Patients that historically may have been treated with upfront mastectomy and axillary lymph node dissection can now often receive neoadjuvant chemotherapy followed by lumpectomy with sentinel lymph node biopsy, further underscoring the importance of adequate upfront clinical staging of the axilla. Ongoing trials will define the optimal local-regional treatment after neoadjuvant chemotherapy (based on response), and have more rigorously defined radiation treatment volumes, as in National Surgical Adjuvant Breast and Bowel Project (NSABP) B51/Alliance 11202.

For patients undergoing mastectomy, radiation therapy in the setting of reconstruction must be coordinated with plastic surgery, with increasing data from multi-center prospective studies of patient-reported outcomes to guide evidence-based discussions<sup>4,5</sup>. While neoadjuvant chemotherapy has improved access to breast conservation in locally advanced disease<sup>6</sup>, rates of mastectomy among patients with early-stage breast cancer treated in the United States are paradoxically rising, from 34 percent in 1999 to 38 percent in 2011<sup>7</sup>. The use of breast MRI, genetic testing and social media have contributed to this trend. It is important to recognize that data supports the use of tumor boards and multidisciplinary clinics to increase rates of breast conservation,<sup>8</sup> further highlighting the importance and impact of radiation

oncologist participation early in the decision-making process, both with surgeons and patients.

Earlier this year, the American Joint Committee on Cancer (AJCC) Cancer Staging Manual, 8th Edition, was published, breaking down more than 120 categories that define prognostic stage by incorporation of grade, hormonal status and HER2 status. Oncotype Dx was also incorporated for assigning a stage group to pT1-2N0M0 with Recurrence Score <11, based on results of TAILORx<sup>9</sup>, demonstrating a population in which omission of chemotherapy is safe. Meanwhile, increasing evidence supports omission of radiation in “good-risk” ductal carcinoma in situ (DCIS) and elderly patients with low-risk early-stage invasive cancer. However, both RTOG 9804 and CALGB 9343, respectively, required these patients receive hormonal therapy for ER+ disease. Omission of radiation, therefore, mandates a discussion with a patient’s medical oncologist to ensure that patients are eligible for and are likely to adhere to long-term hormonal therapy.

Meanwhile, in 2017, the National Comprehensive Cancer Network (NCCN) incorporated the addition of adjuvant capecitabine for patients with triple negative breast cancer and incomplete pathologic response to neoadjuvant chemotherapy, as well as CDK 4/6 inhibitors for recurrent or metastatic disease, creating new questions regarding the sequencing and safety of systemic therapy and adjuvant or palliative radiation therapy. These questions need to be resolved by multidisciplinary teams. In the investigational setting, there is increasing interest in oligometastatic disease based on data in breast cancer that metastases to different organs harbor different genomic alterations, therefore suggesting a potential role for stereotactic body radiation therapy (SBRT) and continuing systemic therapy for progression at a single site.

In 2017, the ten-year overall survival for all patients with breast cancer was 83 percent<sup>10</sup>, highlighting the importance of long-term toxicity and survivorship. Cardiac morbidity is significant among survivors, particularly those with underlying cardiac risk factors<sup>11</sup>. Heart avoidance in radiation treatment planning is therefore essential, especially as evidence supporting the expansion of internal mammary irradiation continues to build<sup>12-14</sup>. In addition to coordinating follow-up for recurrence and long-term side effects with other cancer specialists, patients should see a primary care provider, and ideally communication would be open with these providers, as well. Data supporting specific survivorship guidelines is expanding<sup>15</sup>.

The radiation oncologist’s role in the care of patients with breast cancer has become more complex, offering us the opportunity to play a central role in multidisciplinary decision-making by engaging in collaborative, patient-centered care.



## HEAD AND NECK

*Beth M. Beadle, MD, PhD,  
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The impact of collaboration in the treatment of patients with head and neck cancer (HNC) cannot be overstated. Although head and neck surgeons and otolaryngologists are typically the first contact point for patients with concerning symptoms in the head and neck, and as such order testing and provide the initial work-up, the involvement of radiation oncologists and medical oncologists for curative therapy; radiologists and pathologists for tumor imaging and diagnosis; and dentists, nutritionists and speech therapists for supportive care and rehabilitation is crucial for optimal outcomes.

The balance of cure and toxicity in treatment of HNC is one of the major reasons why collaborative care is so important. While surgical resection of some oropharynx cancers is feasible, multidisciplinary evaluation can suggest that many patients would have optimal outcomes with a chemoradiation approach. Similarly, while chemoradiation of some oral cavity cancers is feasible, multidisciplinary evaluation can suggest that many patients would have optimal outcomes with a primary surgical approach. Deciding on when one approach is superior to another only comes from a careful patient evaluation, discussion of the anatomy and organ function, intended treatment, likely outcomes and side effects and options for rehabilitation.

As a result, patients with newly diagnosed HNC are best-served when they are seen by a multidisciplinary clinical team. For HNC patients, the physical examination is crucial; the ability to see mucosal changes and palpate the tumor extent helps drive treatment decisions and surgical and/or radiation-based targeting. In addition, high-quality imaging is necessary to understand the extent of disease and help drive treatment decisions; the expert assessment of an experienced head and neck radiologist helps to identify subtle findings that may significantly impact the disposition of a patient’s care. All of this information

is best integrated through a dedicated HNC tumor board, in which the different specialties can discuss their findings and best ways to serve each patient. This collaboration can significantly improve the quality of care by streamlining the evaluation, expediting treatment and ensuring adherence with national guidelines.

One of the most notable examples of collaborative care in the treatment of patients with HNC is the development and completion of trials through the National Clinical Trial Network (NCTN). Decades of work through RTOG, now part of NRG Oncology and ECOG-ACRIN, have allowed patients to be treated with state-of-the-art techniques and regimens. The integration of surgeons, medical oncologists, radiation oncologists, radiation physicists, speech pathologists, radiologists and pathologists in the development of these trials have allowed them to have particular relevance. The standard of care today has been established through careful multidisciplinary clinical trials through these cooperative groups, which serve to bring investigators together. Moreover, many large national and international groups and centers have gathered to form the Head and Neck Cancer Intergroup (HNCIG), whose mission is to enhance clinical trial collaboration across the globe. The opportunities to integrate novel therapies, such as immunotherapy, and techniques, such as proton and heavy ion therapy, stem from discussions as part of these collaborative groups and have the promise of dramatically changing radiation therapy in the future.

In addition to clinical care and clinical trials, multidisciplinary meetings are crucial forums where interested participants gather to share ideas, educate each other and design new research collaborations. The Multidisciplinary Head and Neck Cancers Symposium in Arizona is sponsored by ASTRO, the American Head and Neck Society, and the American Society for Clinical Oncology. This semi-annual meeting has become a prominent part of the HNC field, drawing participants from around the world and spurring collaborations that affect future patient care.

Present and future HNC treatments depend on thoughtful and open communication among the multidisciplinary team. Determining the best treatment

course for patients, and how to rehabilitate them from both their cancer and the effects of therapy, is uniquely related to the multidisciplinary nature of the disease and the cure.



## LUNG

*George Rodrigues, MD, PhD, FASTRO*

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The optimal management of lung cancer patients always includes substantial collaborations of many medical specialties, including diagnostic radiology/nuclear medicine, pathology, respiratory, thoracic surgery, medical and radiation oncology and palliative care. Published clinical care pathways utilize all these medical specialties to drive clinical care, and multidisciplinary lung cancer rounds can benefit from all these specialist inputs.

Clinical decision-making for this patient population has become more multidisciplinary with the evolving role and use of concurrent chemoradiation for unresectable disease and adjuvant chemotherapy (or chemoradiation) for high-risk postoperative disease over the past few decades. More recently, the increasing use of stereotactic body radiation therapy (SBRT) for both inoperable and operable early-stage non-small cell lung cancer (NSCLC) in the absence of randomized clinical trial evidence has required ongoing collaboration between thoracic surgeons and radiation oncologists in the areas of patient selection and shared decision-making.

To support this collaborative decision-making for lung cancer patients, ASTRO has published multiple clinical practice statements covering early-stage NSCLC, unresectable NSCLC, postoperative NSCLC and thoracic palliation of NSCLC (See story on page 18 for more on ASTRO's collaborative clinical practice statements). Although these documents were primarily authored by radiation oncologists, thoracic surgeons and medical oncologists were also coauthors where relevant. These clinical practice statements combined with other available documents can provide both radiation oncologists and other medical specialists information to better collaborate to provide lung cancer care.

“  
In addition to clinical care and clinical trials, multidisciplinary meetings are crucial forums to share ideas, educate each other and design new research collaborations.”

More than forty years of clinical trial experience exists to inform best practices for lung cancer care in a variety of treatment scenarios for both NSCLC and SCLC. This collective information has been acquired at least in part through the ongoing effective collaboration of multiple specialists in the design and execution of various clinical trials to inform care. Particular to lung cancer, collaborations between thoracic surgeons, medical oncologists and radiation oncologists have informed various clinical questions, including the role and timing of chemoradiation in locally advanced NSCLC and limited stage SCLC and the role of pre-operative and post-operative chemotherapy and/or radiation in resectable disease. These collaborations have occurred in the context of cooperative group clinical trial groups, as well as at the organizational level.

Another ongoing opportunity for inter-specialist collaboration is at a variety of educational venues on the topic of lung cancer. The Multidisciplinary Thoracic Cancers Symposium, taking place March 14-16, 2019, in San Diego, is one such example, co-sponsored by ASTRO, the American Society of Clinical Oncology and the Society of Thoracic Surgeons. This educational event has an established track record for facilitating collaborations. Other educational venues exist at the international, national and local levels.

## GASTROINTESTINAL

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The management of gastrointestinal (GI) malignancies is challenging since there are many subsets of GI cancers, requiring a balanced and close collaboration between numerous specialists and allied health professionals. This multidisciplinary team must work together to develop treatment and supportive care strategies with the aim of improved outcomes in our patients (e.g., survival, organ preservation and quality of life).

The delivery of radiation therapy (RT) for GI cancers is limited by the many organs at risk located within the abdomen and adjacent to GI tumors.

Technological advances, including intensity-modulated radiation therapy (IMRT) and image-guided radiation therapy (IGRT), have allowed ablative RT doses to be delivered safely to previously untreatable tumors, but reducing the risk of treatment toxicities is a priority for all patients with GI cancers, most of whom receive multimodality treatment. For example, neoadjuvant chemoradiation (CRT) can increase local control in locally advanced rectal cancer and increase overall survival in locally advanced esophageal cancer. Definitive CRT is the standard of care treatment for unresectable esophageal cancer and for organ-sparing with surgery reserved for salvage in anal canal carcinoma. An organ-sparing approach is now being studied with selected rectal carcinoma patients. More recently, the advent of stereotactic body radiation therapy (SBRT) has created new opportunities for the treatment of liver cancer, pancreatic cancer and oligometastases from many tumor sites, where collaboration with other specialists is paramount.

The management of hepatocellular carcinoma (HCC) is an excellent example of multidisciplinary collaboration between specialties, as not only medical, surgical and radiation oncologists, but also diagnostic and interventional radiologists, hepatologists and transplant surgeons play a fundamental role. It is becoming recognized that SBRT plays an important role in HCC either as an alternative ablative therapy for local HCC or as a bridge to liver transplant. RT is also showing promise in intermediate, advanced and even end-stage HCC, and randomized trials requiring multidisciplinary input are ongoing. Despite the promise of RT in the treatment of HCC, many thought leaders are not yet accepting RT as a standard treatment for these patients. Strategies that may help RT to gain acceptance are for radiation oncologists to collaborate more with other specialists in clinical practice and clinical trial design, and to regularly participate in dedicated HCC tumor boards, recognizing that other specialists have a longer track record of treating HCC, and welcoming their perspectives for these complex patients.

Advances in each specialty (e.g., immunotherapy, robotic surgery, particle radiation therapy) invite us to re-explore our approach to multidisciplinary collaboration, as the added benefit of each treatment must be weighed against benefits and unknown toxicities and outcomes. To promote and enhance such partnerships, multidisciplinary scientific meetings, such as the annual GI Symposium, co-sponsored by ASTRO and others, serve as a platform to present,



share and develop collaborative ideas, which will hopefully lead to meaningful and practice-changing results. Many exciting opportunities, such as adapting, or even omitting surgery after CRT for locally advanced rectal cancer, or combining SBRT and immunotherapy for the treatment of HCC and other cancers, will only be possible to explore through multi-institutional collaborations, allowing us to move forward and continue to deliver the best care for our patients.



## GENITOURINARY

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Radiation oncologists who treat patients with prostate cancer are increasingly facing complex clinical situations that require a multidisciplinary approach because the landscape for this malignancy has undergone a seismic shift in recent years. With declines in prostate-specific antigen (PSA) screening, prostate cancer is no longer the most common malignancy among men, and there has been a consequent decrease in lower risk disease and rise in more advanced disease. Men diagnosed with low-risk disease are increasingly preferring active surveillance, many of whom will never see a radiation oncologist. There has been an increase in upfront prostatectomy for higher risk disease and therefore more indications for postoperative radiation therapy, which in some practices constitute the majority of referrals. Meanwhile, patients who wish to avoid a prostatectomy are increasingly requesting shorter courses of hypofractionated or stereotactic body radiation therapy (SBRT), while many others are specifically requesting proton therapy. And there has been renewed interest in brachytherapy, especially when used as a boost in higher risk disease. Radiation oncologists are also increasingly considering treating sites of oligometastatic disease, and having to discuss the integration of a growing menu of systemic therapies. Meanwhile there has been an explosion in diagnostic testing (magnetic resonance imaging (MRI), positron emission tomography (PET), genomics), which is redefining risk stratification and influencing treatment selection.

Given these rapid developments and plethora of options, how can one ensure we are making optimal decisions for individual patients? To facilitate and

participate in patient-informed and shared decision-making, multidisciplinary engagement is key. Physicians who work closely with colleagues in different specialties have healthier debates about difficult clinical situations, and are more likely to recognize that there are more questions than answers regarding the superiority of any one approach over another. Collegiality helps mitigate the nuisance of individual and specialty biases that often cloud our judgments whenever counseling a patient. Seeing a urologist, radiation oncologist and medical oncologist allows a patient to be offered a more balanced perspective with opinions that can be audited in a timely manner. Ultimately, this empowers and ensures patient autonomy.

Prostate cancer multidisciplinary clinics have been studied, and the findings suggest that these clinics help to decrease time from diagnosis to treatment, shorten time to complete necessary consultations, lessen patient visits, improve adherence to guidelines, increase collaborative research and increase provider and patient satisfaction with less decisional regret. Greater than 90 percent of prostate cancer patients seen in multidisciplinary clinics have rated their experience as “good” or “very good,” up to 98 percent would recommend such clinics to others and the vast majority opt to receive their care at the institutions that provided such care.<sup>16-18</sup> Furthermore, multidisciplinary care actually changes management. This has been documented with the doubling in the use of active surveillance when patients are seen by multiple providers.<sup>19</sup> It is conceivable that such care could minimize overtreatment, allowing for potential cost savings and better utilization of limited resources.

So how does one create a multidisciplinary team? It begins with engaging clinicians in all specialties who care for these patients in one’s community. This includes physicians and nurses who can be instrumental during implementation challenges who will need to figure out solutions to common barriers, such as distance between practices, adequate clinic space, funding, support staff, time and the need to manage different physician schedules.<sup>20</sup> There are numerous examples where radiation oncologists have taken a lead to build such programs, and are even directors of their local cancer centers. Certainly, more resources are required to allow multidisciplinary evaluation to become feasible and convenient. Greater payer engagement is also needed to support such models of care. Yet we should ensure that the lack of our own enthusiasm is never limiting. We need to embrace and take ownership of such care, given that the way we portray ourselves and our modalities

of therapy to patients and colleagues is a credibility moment for our specialty.

In a rapidly shifting landscape, radiation is alive and strong in genitourinary cancers and we are armed with high-level data supporting its use. Of course, the benefits of multidisciplinary care extend well beyond prostate cancer and create the opportunity to discuss emerging strategies for other genitourinary malignancies that have had a delay in implementation, such as bladder-preserving chemoradiation as an alternative to radical cystectomy, avoiding penectomies for urethral cancer and considering SBRT for renal cancers. We need to continue to focus our efforts where we add value, and do so hand-in-hand with our colleagues in a patient-centric multidisciplinary fashion.

## SPINE


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Optimal cancer treatment requires a multidisciplinary approach, and this is certainly true in the management of spinal tumors. In addition to having a highly complex structure, the spine contains critical normal structures, including the spinal cord and nerve roots. Spine tumors can be either primary—arising from structures within the vertebral column—or secondary metastases from distant sites. There, they can cause serious complications including pain, weakness and inability to walk. Radiation can be highly effective in slowing or eradicating tumors in the spine, reducing pain, preventing neurological deficits and improving quality of life. However, as systemic therapies continue to improve and patients live longer, patients may develop tumor progression at the same site or develop new tumors at adjacent sites. These situations are more difficult to treat with radiation therapy as the cumulative dose that can be safely delivered to the spinal cord and spinal nerves is limited. New radiation techniques, in particular, stereotactic body radiation therapy (SBRT), have allowed safe and precise delivery

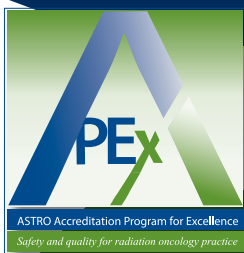
of larger doses of radiation to the spine, shaping radiation around critical structures including the spinal cord and nerve roots. SBRT enables dose escalation to the tumor, to reduce the likelihood of tumor regrowth, and can be particularly helpful when there has been prior radiation therapy that limits retreatment dose to critical normal structures.

While radiation therapy plays a critical role in the management of spine metastases, spinal tumors often require other treatments to optimize tumor control and quality of life. For example, tumors frequently weaken the bone to the point where the spine becomes unstable. Additionally, some tumors present with compression of neural structures and/or are located too close to the spinal cord to allow safe delivery of SBRT. In such cases, surgery can be employed to stabilize the spine and remove the tumor that is compressing or lies in close proximity to the spinal cord. Surgery can achieve immediate relief of pressure on neural structures, and can allow safe delivery of radiation in a post-operative setting. Other less invasive modalities can also be used, such as vertebroplasty—injection of cement to stabilize the spine, cryoablation or radiofrequency ablation of tumors and nerve blocks and other spinal noninvasive procedures to mitigate pain. Furthermore, many patients with spine metastases benefit from palliative care to optimize symptom control.

Recognizing the importance of such multidisciplinary care for these patients and the value of an oncologic perspective on the relative benefit of aggressive local control, Dana-Farber/Brigham and Women's Cancer Center started the Spinal Tumor Program. The program includes neurosurgeons, orthopedic spine surgeons, interventional radiologists, radiation oncologists and specialists in palliative care. Our spine tumor experts meet weekly to develop and review treatment plans for individual patients with spinal tumors. All aspects of patient care are considered to devise a customized treatment approach for each patient. In addition, research specialists in fields ranging from bone biology to bone mechanics join the meeting with the goal of advancing treatments for patients with spinal tumors, working closely with clinicians to develop novel treatment strategies to advance patient care. This model of multidisciplinary cancer care can improve the lives of patients with spinal tumors, allowing them to live longer and better lives. 

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# ASTRO's Collaborative Clinical Practice Statements: Then and Now

BY CAROL HAHN, MD, FASTRO



For the past decade, ASTRO has been partnering with other medical societies to create clinical guidelines to improve quality of care.

**HEALTH CARE REFORM HAS PLACED AN INCREASED FOCUS** on defining and quantifying quality and value of care. Our specialty's focus on evidence-based medicine, along with the team-based approach to care delivery inherent to radiation oncology, has placed us ahead of the curve in many ways in the arena of quality. However, as our technologies have rapidly evolved, generating the evidentiary base to demonstrate their value, as well as standards for their optimal delivery, has become increasingly complex. Given the high cost of much of our sophisticated technology, it is critical that we address this gap to demonstrate the value of our therapies for our patients as well as define quality of care for our modality.

Evidence-based clinical practice guidelines serve as a critical component of quality of care. They improve patient care by systematizing best practices, reducing undesirable variation in care and introducing new knowledge into practice. They serve an important educational value to all our practicing and trainee members and serve as a source to develop quality measures to assess performance.

Given the fundamentally important nature of guidelines to quality, a large number of groups produce them—including numerous medical societies, the National Comprehensive Cancer Network (NCCN) and various third-party payers. How then, can one evaluate guideline quality? In 2011, the Institute of Medicine, now the National Academy of Medicine, developed "[Clinical Practice Guidelines We Can Trust](#)," or as I like to refer to it, the Guideline on Guidelines. This publication specified best practices for guideline development, including maintaining transparency, managing conflict of interest, developing the group's composition, systematically reviewing evidence, rating strength of evidence and clearly articulating statements. Processes of external review and plans for updating were also specified.

### **ASTRO'S FORAY INTO GUIDELINE DEVELOPMENT**

In 2007, I took over as Chair of the ASTRO Health Services Research Committee. At that time, while a number of guidance documents had been published, ASTRO had no formal process for developing evidence-based clinical practice guidelines. I can't count the number of times I was asked, "why does ASTRO need its own guidelines?"

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“In establishing the ASTRO guideline process, it quickly became clear that effectively doing so required a collaborative effort.”

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However, review of existing oncology guidelines at that time (such as those from NCCN) revealed often limited detail regarding recommendations for radiation oncology—to the point of radiation therapy recommendations being codified as a binary decision of yes or no.

Thus, there was recognition by ASTRO’s leadership that we needed to create robust processes to base development of ASTRO’s quality programs and create quality metrics specific for our field in the quickly unfolding arena of health care reform.

In establishing the ASTRO guideline process, it quickly became clear that effectively doing so required a collaborative effort. One needs the expertise of many individuals to bring to fruition a high-quality guideline and each represents countless hours of volunteer effort. The work of guideline creation begins with the formulation of a proposed guideline, development of key questions, performance of systematic literature reviews and the critical evaluation of the available clinical trial and report data to answer the key questions. Once these many initial hours are completed, many more go into drafting statements, revising documents and evaluating and responding to public and peer review. The establishment of consensus on these, as well as in areas where evidence is weak or lacking, is also of critical importance to achieve a robust guideline. Once completed, the document is brought to the ASTRO Board of Directors for approval prior to submitting for publication, where the document is further reviewed per the publication’s standards.

Balancing the composition of a guideline panel is vital to ensure that the spectrum of opinions on the area in question are represented. Particularly for guidelines that focus around a particular technology, heavy utilizers versus nonutilizers are carefully selected for balance. Conflict of interest is also carefully vetted and managed to minimize external factors that are not evidence-based impacting guideline statements. To balance perspectives, guideline panels are also structured to include representatives from private, community practices in addition to those from academic centers. A resident member is also named to the panel and multidisciplinary members of the cancer care team are sought for inclusion.

Additionally, rounding out a panel with non-radiation oncologists is of significant benefit. In areas that focus on disease sites where combined modality therapy is used, we need the wisdom of our colleagues from medical oncology and surgical oncology to bring their knowledge to the table. Additional experts are recruited as needed to ensure expertise necessary to craft a valid, high-quality guideline.

### **COLLABORATING WITH OTHERS ON GUIDELINES**

An even stronger approach—when feasible—is that of collaborative guidelines. While these can be challenging to undertake given the potential for differing guideline processes between specialty societies, overcoming these barriers leads to much stronger and broader guidelines given agreement of collaborating societies on the recommendations. To this end, ASTRO’s guideline process specifies various requirements for collaborative development to ensure there is true representation of our society’s input and endorsement of the ultimate recommendations.

ASTRO continually seeks out collaborative guideline opportunities with other societies and endorsement of our guidelines by other societies. Furthermore, ASTRO’s Guideline subcommittee is actively involved in evaluating the NCCN guidelines when they are updated. This input ensures consistency of recommendations and promotes inclusion of a balanced radiation oncology perspective as part of overall best practices in oncologic therapy.

ASTRO staff members who are dedicated to guideline development are also instrumental to the process. They oversee the complex systematic literature reviews created as a basis for developing guideline statements, assist with vetting conflict of interest and shepherd the documents through complex layers of revision, review, approval and publication. ASTRO legal staff and leadership have diligently labored to minimize bias within our guidelines.

Our guideline statements have been paramount as we expanded ASTRO’s quality programs while we developed what once was the Health Services Research Council under the ASTRO Science Council in the



# The Future of ASTRO's Collaborative Guideline Process

BY JOSH PETIT, MD,  
CHAIR OF ASTRO'S GUIDELINE SUBCOMMITTEE

**IN RECENT YEARS**, ASTRO has substantially increased collaboration on guidelines and other clinical practice documents as this has the potential to add significant value to documents created by our society. Collaborative projects bring multiple, and frequently multidisciplinary, stakeholders together to be part of the development process and establish strong, consensus recommendations that guide practice and improve care. Multidisciplinary collaborations also afford an important opportunity for our representatives to communicate the role of radiation oncologists as central members of the oncology care team. Collaboration can make guideline development more efficient by avoiding or reducing duplication of effort between societies and, as a result, allow for the creation of more clinical practice statements. Finally, as other societies and specialties embrace and publish clinical practice documents with ASTRO, their impact is greatly increased.

ASTRO collaborates with a wide variety of other specialty societies. Strong relationships have been developed with societies such as the American Society of Clinical Oncology (ASCO), the Society of Surgical Oncology, the American Urological Association (AUA) and the American College of Radiology, all of whose areas of interest overlap substantially with those of ASTRO and who have become frequent partners on guidelines. Collaborations have also been widened to include projects with societies such as the American Dental Association, the Oncology Nursing Society, and the Heart Rhythm Society.


ASTRO's cooperation with international societies has also grown. The European Society for Radiotherapy & Oncology (ESTRO) and the Royal Australian and New Zealand College of Radiology regularly provide feedback during public comment and then endorse the final document. ASTRO is now developing a two-part collaboration with ESTRO; the first portion will be a consensus definition paper followed by a guideline on oligometastases from lung cancer.

*Continued on page 26*

early 2000s. It is now a completely separate council overseeing ASTRO's quality and safety programs—the Clinical Affairs and Quality Council. Founded in October 2012, I was honored to serve as the founding Chair of this council. The ASTRO Clinical Practice Guidelines have served a number of important functions, including developing the National Quality Forum-endorsed [External Beam Radiotherapy For Bone Metastases](#) in 2012, serving as the basis of our [Choosing Wisely Statements](#).

ASTRO [membership surveys](#) consistently rate the guidelines as a highly important resource and their resulting publications are among the most-read articles in Practical Radiation Oncology (PRO).

This ends up with wide involvement by our membership to optimize our guidelines. When questioned, and with additional evidence development, they are stronger and we are stronger as a field in validating our modalities to our patients, other providers and payers. A critical portion of the ASTRO guideline process is public comment—so when there are open comment periods, please respond. We are anxious for the input of all and are better for greater collaboration to optimize care for our patients.

Over the past 10 years, I am proud to say that the collaborative work of many has allowed ASTRO to develop a battery of guidelines focusing on areas of significant importance in our field. (See page 22 for listing.) It has been my pleasure and privilege to collaborate in these efforts and I thank the many talented volunteers from within and external to ASTRO, as well as the tremendous efforts of the ASTRO staff, for the countless hours of effort dedicated to creating this library of documents. 

# Recent ASTRO collaborative guidelines

ASTRO has completed 12 collaborative guidelines and other clinical practice statements and has 20 presently in progress. These projects have involved 19 other societies. For more information, go to [www.astro.org/clinicalpracticestatements](http://www.astro.org/clinicalpracticestatements).

ASTRO frequently collaborates with American Society of Clinical Oncology (ASCO), American Urological Association (AUA), American College of Radiology (ACR), Society of Surgical Oncology (SSO) and Society of Urology Oncology (SUO).

## RECENTLY COMPLETED COLLABORATIONS

- Guideline on Treatment of Non-Metastatic Muscle-Invasive Bladder Cancer – with AUA, ASCO and SUO
- Guideline on Localized Prostate Cancer – with AUA and SUO
- Consensus Statement on Magnetic Resonance Imaging (MRI) and Radiation Therapy (RT) Exposure in Patients with Cardiac Implantable Electronic Devices – with Heart Rhythm Society
- Practice Parameter for Total Body Irradiation – with ACR
- Practice Parameter for Proton Therapy – with ACR
- Practice Parameter for Radiation Oncology – with ACR

## CURRENT ONGOING COLLABORATIONS

### BREAST CANCER

- Guideline on Autologous Breast Reconstruction – with American Society of Plastic Surgeons
- Guideline on Hereditary Breast Cancer – with ASCO

### GENITOURINARY CANCER

- Guideline on Hypofractionated Radiation Therapy for Localized Prostate Cancer – with ASCO and AUA (led by ASTRO) – anticipated publication in 2018
- Guideline on Optimum Imaging in Advanced Prostate Cancer – with Society of Nuclear Medicine and Molecular Imaging (SNMMI), ASCO, ACR, AUA, SUO and Society of Abdominal Radiology
- Appropriate Use Criteria on Prostate Imaging – with SNMMI, AUA, ASCO and European Association of Nuclear Medicine

- Guideline on Testicular Cancer – with AUA
- Update of Guideline on Adjuvant and Salvage RT after Prostatectomy – with AUA

### HEAD AND NECK CANCER

- Guideline on Management of Osteonecrosis of the Jaw (Including Osteoradionecrosis) – with ASCO and International Society of Oral Oncology/ Multinational Association of Supportive Care in Cancer
- Guideline on Management of the Neck in Squamous Cell Cancer – with ASCO
- Guideline on Pre-surgical Clearance of Patients with Head and Neck Cancer for Dentists – with American Dental Association

### SKIN CANCER

- Guideline on Basal and Squamous Cell Cancers of the Skin – with ASCO, SSO, American Academy of Dermatology, and the American Society of Dermatopathology (led by ASTRO)

### ACR/ASTRO PRACTICE PARAMETERS

- Practice Parameter for Communication-Radiation Oncology
- Practice Parameter for the Performance of Stereotactic Body Radiation Therapy
- Practice Parameter for Image-guided Radiation Therapy
- Practice Parameter for the Performance of Therapy with Unsealed Radiopharmaceutical Sources
- Practice Parameter for the Performance of Therapy with Radium-223
- Practice Parameter for the Performance of Therapy with Iodine-131
- Practice Parameter for Radioembolization with Microsphere Brachytherapy Device for Treatment of Liver Malignancies – also with Society of Interventional Radiology and American College of Nuclear Medicine

### OTHER

- Guideline on Radiodermatitis – with Oncology Nursing Society



# MIPS

## Merit-based Incentive Payment System

The second year of the Merit-based Incentive Payment System (MIPS) began on January 1, 2018 with major changes from 2017. ASTRO can help you avoid the 5% payment penalty and earn bonus payments. Don't wait: Create a plan and start participating today!

Learn about the 2018 MIPS program on the ASTRO website or contact ASTRO directly with your questions:

[www.astro.org/mips](http://www.astro.org/mips)  
[mips@astro.org](mailto:mips@astro.org)

## Learn about the 2018 program changes to avoid the 5% penalty!

- ▶ Increased low-volume eligibility threshold.
- ▶ Increased performance score threshold.
- ▶ Full-year Quality reporting.
- ▶ Small practice and complex patient bonus.
- ▶ New Cost performance category.
- ▶ Improvement scoring under Quality and Cost.



# PARTNERING FOR DISCOVERIES

BY JUDY KEEN, PHD, DIRECTOR OF SCIENTIFIC AFFAIRS, [JUDY.KEEN@ASTRO.ORG](mailto:JUDY.KEEN@ASTRO.ORG)

**ASTRO'S SCIENTIFIC AFFAIRS  
DEPARTMENT COLLABORATES  
WITH OTHER GROUPS TO  
QUICKLY TRANSLATE RESEARCH  
INTO BETTER CLINICAL  
OUTCOMES.**

**AT ITS FINEST, RESEARCH IS A COLLABORATIVE EFFORT.** Having partners can infuse new ideas and perspectives into a project. And when there is synergy among researchers and clinicians, key research findings get translated into clinical care and produce improved patient outcomes at a faster pace. For these reasons, ASTRO believes in collaboration to increase the knowledge of the research we do and to speed the pace of translation to clinical practice.

Over the past two years, ASTRO's Department of Scientific Affairs has been diligently working to expand existing collaborations, to build new relationships and to engage new partners. This hard work began to pay off quickly. In late 2016, ASTRO began a partnership with the San Antonio Breast Cancer Symposium (SABCS), one of the largest breast cancer-focused research and clinical meetings in the world. Through this collaboration, radiation oncologists participated in the conference program development to increase inclusion of radiation oncology topics during the four-day meeting. 2017 was the first meeting that incorporated ASTRO's input.

Due to these efforts, two plenary session talks and many poster presentations on radiation therapy were realized. We hope to continue to elevate the work of radiation oncology in that important venue through our continued collaboration with SABCS.

Another critical, new collaboration that germinated in 2016 was the ASTRO support for the American Society of Clinical Oncology and the American Association for Cancer Research Methods in Clinical Cancer Research Workshop, also known as the Vail Workshop. Beginning with the 2016 class, ASTRO's support increased the participation of radiation oncologists at Vail and helped our members learn best practices in clinical protocol development. These efforts are ongoing in 2018. We hope to have more radiation oncologists accepted to this workshop in the future.

The U.S. Food and Drug Administration (FDA) is a fundamental partner in moving new treatments to the clinic. In 2016, ASTRO leaders, under the guidance of Bruce Minsky, MD, FASTRO, met with the leadership of the FDA Oncology Center of Excellence. This dialogue sparked our efforts to increase interactions with key stakeholders in clinical trials, including the FDA, the National Cancer Institute (NCI) and pharmaceutical companies. Since this meeting, ASTRO leadership has met twice with these key stakeholders and is continuing efforts to partner with pharmaceutical companies so we can integrate radiation oncology into clinical trials and to have a voice in the conversation during clinical trial protocol design.

The dawn of 2017 brought about several new collaborations. In June, we partnered with the NCI and the Society for Immunotherapy of Cancer (SITC) and created the Immunotherapy Workshop: Integrating Radiation Oncology into Immunotherapy. This successful workshop and partnership highlighted the emerging work in combination therapy that includes radiation therapy. Importantly, it highlighted the value of radiation oncology research in the rapidly emerging field of immunotherapy.

Immunotherapy is, and will remain, a hot topic in cancer research. Inclusion of radiation oncology in discussions and research in immunotherapy is critical. This February, ASTRO partnered with the FDA and the American Association for Cancer Research (AACR) to host the FDA-AACR-ASTRO Regulatory Science and Policy Workshop: Clinical Development of Drug-radiotherapy Combinations in Bethesda, Maryland. Aimed at the regulatory scientists at the

FDA, this workshop focused on how to integrate radiation therapy into drug development and the drug approval process.

AACR is partnering with ASTRO again for the 2018 ASTRO research workshop: Targeting the Tumor Microenvironment in Radiation Oncology. This meeting, taking place July 26–27 in downtown Washington, will focus on how the exquisite nature of the environment where the tumor resides can influence responses to radiation therapy and how radiation therapy can disrupt, both positively and negatively, the tumor microenvironment.

Not all of ASTRO's new efforts are focused on disseminating our research findings. In 2017, ASTRO established two new partnerships to develop Early Career Development Awards. These are grant opportunities designed to help start a career for a radiation oncology faculty member by providing grant funding for two or three years. The aim is to provide support so the faculty member can establish their career and generate enough preliminary data for a larger federal grant. Together with the Breast Cancer Research Foundation (BCRF), ASTRO will provide one budding faculty member with \$200,000 over two years for their work in radiation oncology and breast or breast-related cancer. Similarly, ASTRO is partnering with the Prostate Cancer Foundation (PCF) to establish a three-year, \$225,000 career development award focused on radiation research in prostate cancer.

Another new collaborative early-career grant opportunity focuses on one of the goals of the ASTRO strategic plan—to retain and foster the intellectual research talent currently entering the field of radiation oncology. What better way than to develop a grant program for postdoctoral fellows and residents? While ASTRO has supported the Resident and Fellows in Radiation Oncology Research Seed Grant for many years, in addition this year we partnered with the American Association for Physicists in Medicine (AAPM) to create the ASTRO-AAPM Physics Resident/Post-doctoral Fellow Seed Grant, also known as the Physics Seed. This grant, a \$25,000, one-year award, will support one postdoctoral fellow or physics medical resident in their pursuit of additional research training prior to securing a faculty research position.

Our latest collaboration is not a new, but rather an expansion of an ongoing one. As part of his listening tour, the newly appointed Director of the NCI, Ned


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Kevin Camphausen, MD, Paul Harari, MD, Ned Sharpless, MD, Judy Keen, PhD, Daniel Low, PhD, and Catherine Park, MD.

Sharpless, MD, spent time this February with ASTRO leadership including Paul Harari, MD, Daniel Low, PhD, and Catherine Park, MD, discussing radiation oncology. It was a welcome opening to the dialogue when Dr. Sharpless noted the indisputable importance of radiation oncology and its role in multidisciplinary care. The conversation was broad ranging, however, and touched on many topics pertinent in the field including research funding, workforce development, opportunities in genomics and personalized medicine, and finally ending with an in-depth discussion on proton therapy.

Clearly, Dr. Sharpless understands the obstacles that need to be addressed and opportunities that can be embraced to continue to solidify our role in oncology. Since being appointed, Dr. Sharpless has been refining his priorities and goals as Director. Some early goals that he has begun to champion include modernizing clinical trials, improving clinical trial data aggregation, and integrating big data. These are all part of the ASTRO 2018 research agenda, so clearly radiation oncology can play a significant role in defining how these will look in the future.


ASTRO's Scientific Affairs department continues to work with others in the oncology field to promote radiation oncology and extend our reach into the research world. Collaborations and partnerships are critical to our success. Much like the clinical team is a partnership assembled to treat a patient, the research team is increasingly a partnership to drive new treatment and new cures forward. 

## THE FUTURE OF ASTRO'S COLLABORATIVE GUIDELINE PROCESS

*Continued from page 21*

Collaborative projects can take a range of forms. The upcoming guideline on hypofractionated radiation therapy in localized prostate cancer represents an example of a joint guideline from ASTRO, ASCO and AUA, with ASTRO leading the effort and all three societies providing task force members and approving and publishing the final guideline. For many other clinical practice statements, ASTRO requests representatives from other societies or provides representatives to participate in development of guidelines headed by other organizations. In this type of collaboration, the final document can then be endorsed by all involved societies. Recent examples include the newly initiated ASTRO-led guideline on basal and squamous cell skin cancers and the practice parameters on proton therapy and radiation oncology, which were led by ACR with representation from ASTRO.

To underpin these efforts, ASTRO updated its policy for collaborative projects in 2016. ASTRO requires collaborations use a development process that aligns with the National Academy of Medicine (formerly Institute of Medicine) standards for guidelines and includes ratings of the strength of evidence and recommendations and formal external review such as peer review and/or public comment.

In 2018, ASTRO has more guideline collaborations underway than ever before and continues to pursue new opportunities and ways to work with other societies to provide recommendations to support high quality care. 

“Collaboration can make guideline development more efficient by avoiding or reducing duplication of effort between societies...”

# Amplifying Advocacy Efforts Through Collaboration



ASTRO's Advocacy division forms partnerships to effectively advocate on behalf of its members in Washington.

BY SAMEER KEOLE, MD,  
ASTRO GOVERNMENT RELATIONS CHAIR

**SMALL, NICHE, TECHNICAL, MISUNDERSTOOD, UNKNOWN.** Unfortunately, these words and other negative characterizations too often are used to describe radiation oncology. Every day, we work to change this lexicon among our patients, their families and other providers so they can better understand how radiation oncology will help them overcome cancer. But this language can also permeate the thinking of policymakers, necessitating action on a wider scale to support radiation oncology's advocacy goals.

ASTRO's advocacy arm is acutely aware of how image can directly shape policy, and therefore devotes extensive resources to project a positive view of radiation oncology to Washington and beyond. Through numerous approaches, ASTRO directly educates policymakers at federal agencies, on Capitol Hill and, when needed, on a local level, about the impressive benefits, safety and effectiveness of radiation oncology. For ASTRO, collaboration is one of the most important and effective approaches to communicate a positive image of the specialty, which in turn increases our ability to influence policy.

One of many examples of ASTRO's collaborative advocacy occurred in December 2016, when ASTRO

cohosted a Capitol Hill congressional briefing to educate House and Senate staff on radiation oncology and emerging innovations and advances in the field. ASTRO partnered on the briefing with the Advanced Medical Technology Association (AdvaMed), which represents many radiation therapy manufacturers that are valued corporate members of ASTRO and frequent partners on critical advocacy initiatives.

The hearing also featured Kimberly Beer, then director of public policy for Susan G. Komen, an organization ASTRO frequently collaborates with on policy issues involving access to breast cancer screening and treatments. After reviewing highlights showing how radiation oncology is contributing to significant treatment advances but getting little of the credit compared with other innovations, Beer told Hill staff in attendance, "Radiation oncology is the underdog of cancer care."

This simple, honest comment coming directly from ASTRO might seem immodest and self-serving. But coming from a trusted partner with credibility among policymakers, the remark is powerful and amplifies a

*Continued on following page*

positive message in a way ASTRO could never do on its own.

Susan G. Komen is just one of many patient advocacy groups that ASTRO collaborates with on a regular basis through a partnership called the Cancer Leadership Council (CLC). The approximately 30 groups of the CLC frequently align advocacy goals and discuss public policy matters that relate to cancer care and cancer research and therapy development. CLC is a trusted resource in Washington and weighs in on a broad range of issues, including insurance coverage, innovation, Medicare payments and payment reform, survivorship, quality and many other policy issues. Countless times, ASTRO's participation has helped CLC achieve its broad policy goals and vice versa; making CLC one of ASTRO's most treasured collaborations.

"Patient advocates in the CLC have responded positively to presentations and informal advice from ASTRO related to payment reform and other policy matters, and ASTRO enjoys the benefits of interactions with advocates who can provide firsthand advice about cancer care and in-depth policy advice from a patient perspective," said CLC Executive Director Elizabeth Goss.

ASTRO also works with many of its CLC partners as part of another critical coalition, called the One Voice Against Cancer (OVAC). Led by the American Cancer Society Cancer Action Network, OVAC boasts 50 organizational members representing millions of cancer patients and providers, who are all committed to increasing cancer research funding at the National Institutes of Health and National Cancer Institute.

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"Radiation oncology is the underdog of cancer care."

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Since forming in 2000, OVAC has helped drive billions of dollars to cancer research. It's undeniable that radiation oncology and cancer patients have directly benefited from this strong collaboration.

While ASTRO purposefully looks to build new relationships and collaborate with groups across the cancer space and beyond, radiation oncology always has a strong home in the physician community. Whether it's working with close friends on common issues facing oncology (American Society for Clinical Oncology and others) or imaging (American College of Radiology), ASTRO often counts on these organizations for a helping hand on health care access and payment threats. Likewise, many policy issues, such as the now-repealed Medicare sustainable growth rate formula, required a concerted effort from the entire House of

Medicine, the American Medical Association (AMA) and ASTRO to defeat. ASTRO will continue working closely with medical specialties to improve the new Medicare physician

payment system, known as the Quality Payment Program, as well as actively participating in the AMA's critical process for developing and valuing new codes and services, among other common initiatives.

As safety and quality increasingly draws scrutiny from policymakers, our partnerships with American Association of Physicists in Medicine (AAPM) and other groups representing radiation oncology team members have never been more important. We frequently collaborate with AAPM and others on initiatives that support access to radioactive materials used in medicine, as well as opposing threats that would lessen the critical requirements for those supervising and handling radiation technologies.

The health policy world generally, and radiation oncology specifically, is fraught with a seemingly never-ending set of policy challenges and opportunities. It would be foolish for ASTRO to face these issues alone, and therefore it's incumbent upon ASTRO to strengthen existing relationships and forge new partnerships to advance ASTRO's policy agenda for the benefit of its members and patients. ASTRO members must play a key role by leveraging local relationships with regulators, legislators, patients and others to elevate the image and profile of the field and positively influence policy. 



Josh Levine, AdvaMed Radiation Therapy Sector Chair and CEO of Accuray; Kimberly Beer, with Susan G. Komen; and ASTRO Chair David Beyer, MD, at a Hill briefing.

## ASSESSMENT OF COLLABORATIVE CARE KNOWLEDGE AND SKILLS BY THE AMERICAN BOARD OF RADIOLOGY

### THE MISSION OF THE ACCREDITATION COUNCIL FOR GRADUATE MEDICAL EDUCATION (ACGME)

is “to improve health care and population health by assessing and advancing the quality of resident physicians' education through accreditation”<sup>1</sup>, and the mission of the American Board of Radiology (ABR) is “to certify that our diplomates demonstrate the requisite knowledge, skill and understanding of their disciplines to the benefit of patients”<sup>2</sup>. The respective goals of both organizations are focused on a framework of adherence to six mutually adopted core competencies felt to be the essence of high-quality medical care in the modern era<sup>3</sup>. Perhaps more so than in any other branch of medicine, development of the various diagnostic and therapeutic oncologic disciplines in the post-World War II era has witnessed a progressive transition from competitiveness to a clear recognition that improvement in patient outcomes requires close collaboration in decision-making and interventions throughout the natural history of the disease process.

The following six core competencies were developed and adopted by the ACGME and all 24 American Board of Medical Specialties (ABMS) member boards to codify a standardized framework for education and assessment in all medical specialties:

1. Patient Care and Procedural Skills
2. Medical Knowledge
3. Practice-based Learning and Improvement
4. Interpersonal and Communication Skills
5. Professionalism
6. Systems-based Practice


Each of the core competencies either directly or indirectly includes elements of collaborative practice within and across disciplines that must be assessed as part of the path to initial certification (IC) and maintenance of certification (MOC).

Among the elements of *patient care and procedural skills* are requirements that “residents must be able to competently perform all medical, diagnostic and surgical procedures considered essential for the area of practice,” requiring direct collaborative relationships with other health care providers. Within the core competency of *practice-based learning and improvement* is the element that residents are able to “appraise and assimilate scientific evidence, and to continuously improve patient care based on constant self-evaluation and lifelong learning,” and to “participate in the education of patients, families, students, residents and other health professionals.” This element is also directly collaborative.

The core competency of *interpersonal and communication skills* requires that “residents must demonstrate interpersonal and communication skills that result in the effective exchange of information and collaboration with patients, their families and health professionals,” an unequivocal statement on the importance of collaborative skills. The core competencies of *professionalism* and *systems-based practice* are less directly collaborative, but they do require the ability to interact in a positive manner with a broad spectrum of colleagues, health care providers, administrators, patients and patient caregivers<sup>3</sup>.

To aid in its development of appropriate assessment tools to test abilities in these core competencies, the ABR carries out triennial clinical practice analyses (CPAs) to determine the state of current practice and tailors its assessment instruments to reflect those practices<sup>4</sup>. Collaborative skills and knowledge are clearly demonstrated by an understanding of all diagnostic and therapeutic oncology-related disciplines and their interrelationships, as well as an ability to interpret results reported in current medical literature and research and their impact on clinical practice. These skills and knowledge, in addition to the ability to communicate that knowledge, are assessed during

the IC certifying (oral) examination. Career-long maintenance of the skills and knowledge were assessed in the now-retired maintenance of certification (MOC) Part 3 cognitive examination, and they will be continuously assessed in its replacement, the ABR online longitudinal assessment (OLA) instrument scheduled to be launched for radiation oncology in 2020.

Radiation oncology is a uniquely collaborative clinical discipline, involving literally dozens of health care providers, patients and patient caregivers on a daily basis. The ABR is committed to ensuring that candidates for IC in radiation oncology, as well as diplomates active in MOC, appreciate and understand these collaborative principles; therefore, the ABR will continue to stress these issues in its assessment instruments. 

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- <sup>1</sup> Accreditation Council for Graduate Medical Education Mission Statement. <http://www.acgme.org/About-Us/Overview> Availability verified Nov. 6, 2017
- <sup>2</sup> American Board of Radiology mission statement <https://www.theabr.org/about> Availability verified Oct. 7, 2017
- <sup>3</sup> Accreditation Council for Graduate Medical Education core competencies. [http://www.acgme.org/Portals/0/PFAssets/ProgramRequirements/430\\_radiation\\_oncology\\_2017-07-01.pdf?ver=2017-04-27-135329-993](http://www.acgme.org/Portals/0/PFAssets/ProgramRequirements/430_radiation_oncology_2017-07-01.pdf?ver=2017-04-27-135329-993) Availability verified Oct. 7, 2017
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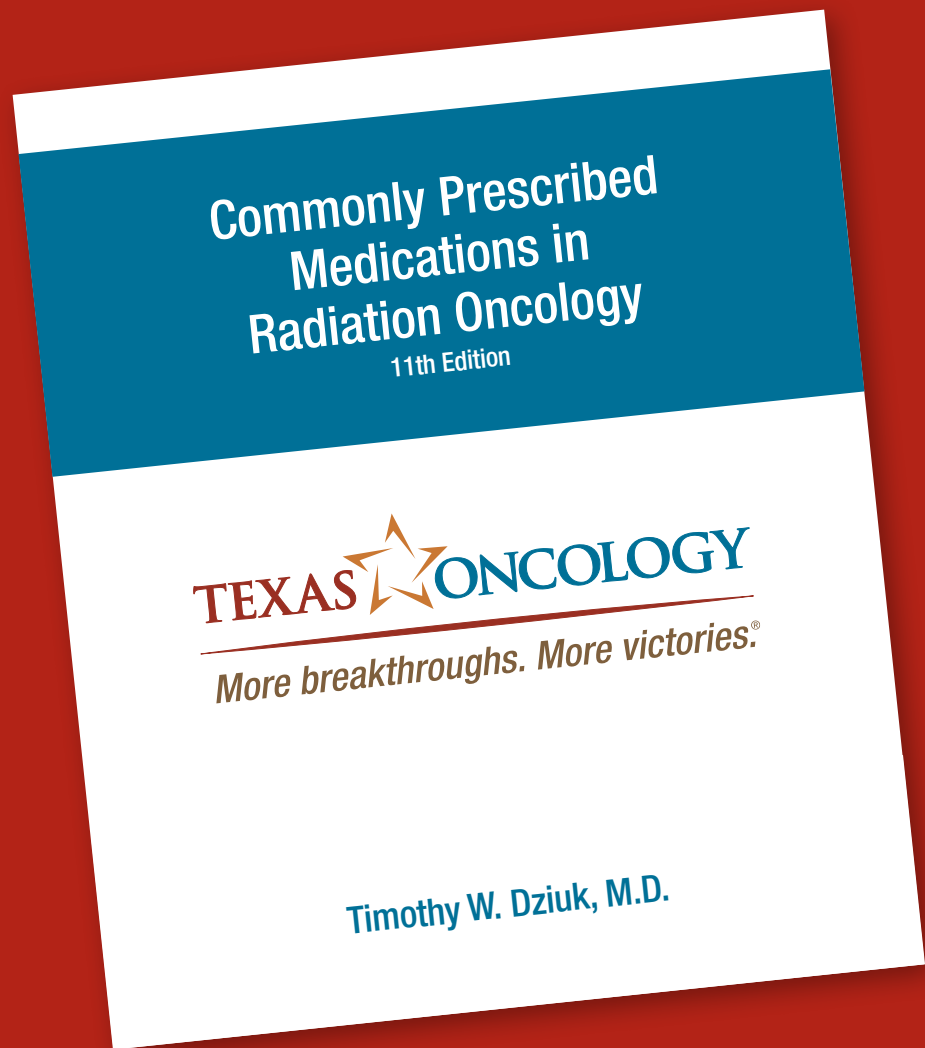
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## **MECHANISMS AND CONSEQUENCES OF RADIORESISTANCE IN TUMORS: ASTRO'S 2017 JUNIOR FACULTY AWARD WINNER, ERINA VLASHI, PHD**

**AFTER LEAVING COMMUNIST ALBANIA** to study in the United States, Erina Vlashi, PhD, the recipient of the 2017 ASTRO Junior Faculty Award (JFA), was enthralled by the complexity of cancer as a field of study.

Dr. Vlashi completed her doctoral training while studying high affinity ligand-targeted drugs for cancer therapy. During her post-doctoral training, she decided to learn more about tumor heterogeneity and cancer stem cells in the laboratory of Frank Pajonk, MD, PhD, at University of California, Los Angeles (UCLA).

Dr. Vlashi contributed significantly to the growing research field of cancer stem cells (CSCs) by developing a fluorescent protein reporter system that reports for proteasome activity in living cells. Using this reporter system, she showed that CSCs in glioblastoma multiforme (GBM) and breast cancer have low proteasome activity, a characteristic that allowed for identification, tracking and targeting of CSCs in vitro and in vivo. The reliability of low proteasome activity as a surrogate marker for CSCs has now been confirmed by many independent laboratories around the world in many solid tumor types, and continues to be a valuable tool for further characterization of CSCs and their responses to treatment.


During her postdoctoral training in the lab of Dr. Pajonk, Dr. Vlashi was encouraged to pursue new projects of interest to her, and became interested in cancer metabolism. Dr. Pajonk had previously shown that radiation therapy can reprogram surviving cancer cells into cancer stem cells, contributing to treatment resistance, recurrence and metastasis. Using the unique fluorescent reporter system she had developed for CSCs, Dr. Vlashi was the first to report that CSCs

differ in their metabolic state from their differentiated progeny, adding another layer to tumor heterogeneity.

She is currently an Assistant Professor in the Department of Radiation Oncology at UCLA, where her main areas of expertise include cancer stem cells, radiation biology and tumor metabolism. She is currently interested in investigating how radiation-induced changes in different metabolic pathways of cancer cells lead to radiation-induced cell reprogramming and ultimately to therapy resistance.

In addition to her mentorship by Dr. Pajonk, Dr. Vlashi was mentored by David Gius, MD, PhD, in the Department of Radiation Oncology and Pharmacology at Northwestern University's Feinberg School of Medicine, on improving her proposal submitted for the ASTRO JFA. Dr. Gius was very generous with advice on how to identify aspects of a basic science project that can translate into the clinic.

The work supported by this grant has demonstrated that there exists a strong link between metabolic changes within a cell to that cell's ability to adapt to changes in oxidative stress. Based on these results, Dr. Vlashi hypothesizes that breast cancer cells that survive radiation-induced damage undergo metabolic reprogramming and the subsequent re-expression of developmental stem cell proteins that ultimately trigger a radioresistant tumor phenotype.

Dr. Vlashi's main goal is to fully understand the metabolic-stemness loop that seems to be fueled by radiation, with the long-term goal of identifying druggable targets to improve the efficacy of radiation therapy for breast cancer, as well as other cancers treated with radiation. 



ASTRO RESEARCH WORKSHOP

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**Abstract**  
RNA-binding protein HuR binds U- or AU-rich sequences in the 3'-untranslated regions of target mRNAs, stabilizing them and/or modulating their translation. Given the links of HuR with cancer, we studied the consequences of modulating HuR levels in pancreatic cancer cells. HuR-overexpressing cancer cells, in some instances, are roughly up to 30-fold more sensitive to treatment with gemcitabine. In a cohort of treatment regimens for pancreatic ductal adenocarcinoma (PDA), HuR-overexpressing cancer cells, HuR associates with deoxycytidine kinase (dCK) mRNA, which encodes the enzyme that metabolizes and thereby activates gemcitabine. Gemcitabine exposure to pancreatic cancer cells increases cytoplasmic HuR levels. Accordingly, HuR overexpression in pancreatic cancer cells, in a clinical correlates study of gemcitabine treatment, we found a significant increase in rate of mortality in PDA patients with low cytoplasmic HuR levels compared with patients with high HuR levels, after adjusting for other treatments and demographic variables. These data support the notion that HuR is a key mediator of gemcitabine efficacy in cancer cells, at least in part through its ability to regulate dCK levels posttranscriptionally. We propose that HuR levels in PDA modulate the therapeutic efficacy of gemcitabine, thus serving as a marker of the clinical utility of this common chemotherapeutic agent and a potential target for intervention in pancreatic cancer. [Cancer Res 2009;69(11):4567–72]

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