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A new interface connects the ARIA oncology information system to CyberKnife machines.

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The ARIA system has been certified for use in demonstrating stage 1 “meaningful use” of an EMR.
Varian Medical Systems’ mission is to explore and develop radiotherapy technologies that protect and save lives. Our goal is to help save 100,000 more lives per year, in partnership with clinicians who treat cancer and other life-threatening conditions.

Over the past three decades, radiotherapy has evolved significantly, with robotics, image guidance, and increased precision all opening new doors and advancing the goal of saving more lives. At Varian we have begun to refer to this new era using the term Radiotherapy 2.0— to signify the fact that there has been an enormous sea change in the field. With the arrival of the Radiotherapy 2.0 era, we feel there is now a great opportunity for educating referring physicians, patients, and others in the medical community about all that radiotherapy can accomplish.

A practical example of how Radiotherapy 2.0 has opened new doors is in the area of stereotactic body radiotherapy, or SBRT. Researchers are finding that SBRT is showing great promise in the treatment of tumors that would have been difficult or impossible to treat with radiotherapy prior to the advances outlined here. A fast-growing body of peer-reviewed studies is showing that SBRT, which some are now calling stereotactic ablative radiation therapy (SABR), is a feasible, noninvasive, well-tolerated therapeutic option for some patients with lung, liver, spine, and other tumors. Since these approaches are, by definition, delivered quickly over a short course of treatment, they may prove to be important for addressing unmet medical needs, such as the worldwide prevalence of lung cancer, which in 2010 was estimated at 1,608,055 new cases.

Many innovations over the past three decades have powered the evolution to Radiotherapy 2.0. In the 1980s, the emergence of CT-based imaging and 3D conformal treatment planning brought about a new approach to delivering dose to tumors that was a major step forward from earlier methods that utilized only 2D data sets. During the 1990s, the multileaf collimator for shaping the radiotherapy beam and creating more conformal dose distributions opened new doors in treatment efficiency, giving rise to dose-sculpting techniques such as intensity-modulated radiotherapy (IMRT), which have helped us increase dose to the target while reducing exposure of healthy tissues and critical structures.

In the early 2000s, robotic image guidance for image-guided radiotherapy (IGRT) emerged as a way to confirm a target’s position prior to treatment based on images of internal anatomic structures or fiducials. This image
cally driven image-guidance system. Varian has shipped more than 1,000 of therapy 2.0 development was the introduction, in March 2004, of a roboti-
and now averages well above US$130 million per year. One important Radio-
Varian, through the years, has invested heavily in research and development,
T o ensure our product portfolio leads the way in the radiotherapy evolution,
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Varian technology: Robotic imaging, radiotherapy,
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therapy 2.0 development was the introduction, in March 2004, of a roboti-
cally driven image-guidance system. Varian has shipped more than 1,000 of
the On-Board Imager® kV imaging systems. This groundbreaking system won
a 2006 R&D 100 Award from R&D magazine—an award that salutes the 100
most technologically significant products introduced into the marketplace in
a given year. The fully automated On-Board Imager enables robotic control of
the Varian treatment delivery system from outside the treatment vault. This
technology paved the way for robotic radiotherapy and radiosurgery across
Varian’s entire linear accelerator product line: the Clinac® iX, Trilogy®, Novalis
Tx™, and the TrueBeam and TrueBeam STx systems, which were just recog-
nized with an R&D 100 Award for 2011.
What was once a futuristic vision is now a reality: clinicians can use any of
these systems to set up a patient, confirm internal tumor position prior to
treatment, make minute adjustments, initiate treatment, and monitor the
patient without having to enter the treatment vault. The Varian system has
evolved into a highly precise, robotically guided solution. What’s more, treat-
ments that took 30 to 45 minutes using earlier generations of technology can
now be completed in just minutes a day.
What’s next?
As Radiotherapy 2.0 continues to evolve there is little doubt that SBRT will be
a key driver in expanding radiotherapy use in lung, liver, spine, and other dis-
ease sites, as well as a key contributor to how these diseases are treated in
emerging markets. Additionally, radiobiology and multidisciplinary care will
emerge as important themes. We are already seeing teams of surgeons and
radiation oncologists start to leverage the robotics, image guidance, and in-
creased precision of the Radiotherapy 2.0 revolution. Varian is committed to
helping facilitate this teamwork. We are convinced that these developments
will open up even more opportunities for bringing the benefits of Radiother-
apy 2.0 to new populations of patients worldwide and contribute further to
our joint goal with clinicians to save an additional 100,000 lives per year.

Robotic radiosurgery reimbursement
In the United States, there are specific robotic radiosurgery reimbursement codes to utilize with Varian’s robotic equipment. These codes can be billed by a provider with technology that meets the ASTRO definition of robotic, or “under computer control.” This includes being able to control the movement of the treatment couch from outside the room—an action that is supported by Varian’s current treatment delivery systems.

The robotic CPT codes for reimbursement are as follows:
• G0339—Image-guided robotic linear accelerator–based stereotactic radiosurgery, complete course of therapy in one session, or first session of fractionated treatment.
• G0340—Image-guided robotic linear accelerator–based stereotactic radiosurgery, delivery including collimator changes and custom plugging, fractionated treatment, all lesions, per session, second through fifth sessions, maximum five sessions per course of treatment.

The Hospital Outpatient Prospective Payment System (HOPPS) provides assigned payment rates when a hospital submits these codes.

The Medicare Physician Fee Schedule, which provides reimbursement for freestanding centers, does not have published payment rates for codes. Only carriers in freestanding settings in 26 U.S. states and the District of Columbia currently reimburse the above robotic G codes. They are:
• Palmetto: HI, NV, CA, OH, SC, WV
• WI Physician Services: MN, IA, KS, NE, MO, IL, MI, WI
• Cahaba: TN
• First Coast: FL
• National Government Services (NGS): NY, CT
• National Heritage Insurance: ME, MA, NH, VT
• Highmark: DE, DC, MD, NJ, PA
European hospitals introduce advanced TrueBeam capabilities

Hospitals across Europe have been among the earliest global adopters of the state-of-the-art TrueBeam™ system, which was introduced last year by Varian for fast and precise radiotherapy and radiosurgery treatments. Of the first 50 TrueBeam systems to begin treating patients clinically, 12 are in Europe.

“We have seen an unprecedented adoption for a new linear accelerator platform,” says Rolf Staehelin, head of international marketing for Varian’s Oncology Systems business unit. “We are delighted that hospitals globally are using TrueBeam to treat a greater number of patients while pushing back the boundaries of advanced radiotherapy treatments, enabling difficult-to-treat tumors, such as lung and liver, to be treated effectively with radiotherapy and radiosurgery.”

First UK TrueBeam system

Varian highlighted the rapid rollout earlier this year at the annual meeting of the European Society for Therapeutic Radiation Oncology (ESTRO) in London, where the United Kingdom’s first TrueBeam system will enter clinical use at University College Hospital this summer in a joint project between HCA NHS Ventures and the hospital.

“TrueBeam will offer patients new treatments using small, high-intensity fields of radiation to treat the tumor,” says Derek D’Souza, head of radiotherapy physics at University College Hospital. “It provides greater efficiency in the steps needed for imaging, positioning, and treating patients and offers a high degree of precision.”

“TrueBeam was selected for this project as we believe it to be the most advanced system of its kind,” adds Richard Yacob, director of medical physics at HCA NHS Ventures. “As well as being able to deliver higher doses faster than other systems, it is capable of advanced real-time imaging and gated RapidArc®. It will be a big step forward in providing higher precision in treatment delivery.”

TrueBeam was designed from the ground up to treat tumors in a fast and precise manner, including tumors that move during treatment as the patient breathes in and out. Designed to advance the treatment of lung, breast, prostate, head and neck, and other types of cancer, TrueBeam features a multitude of technical innovations that dynamically synchronize imaging, patient positioning, motion management, and treatment delivery. With its High-Intensity Mode, TrueBeam can deliver very high doses quickly and accurately, more than twice as fast as earlier generations of technology.

European clinical experience

At Humanitas Institute in Rozzano-Milan, Italy, TrueBeam is routinely used to treat 50 patients a day. Treatments focus on hypofractionated stereotactic body radiotherapy (SBRT), in particular for liver and pancreatic cancer, non-small cell lung cancer and lymph node metastases, along with total marrow irradiation. “TrueBeam enables us to offer treatments for different kinds of pathologies than have previously been possible with radiosurgery here at Humanitas,” says Marta Scorsetti, MD, head of radiation oncology and radiosurgery at the hospital. “We are impressed by the greater precision and higher-quality imaging, the higher possible dose rate, the ability to deliver the total dose in fewer fractions, and the speed of the treatment, which allows for shorter treatment sessions for patients.” To date, Humanitas Institute has treated more than 420 patients using the TrueBeam device, with 25 new patients commencing treatment on the system each week.

Two TrueBeam devices are treating up to 100 patients a day at VU University Medical Center in Amsterdam, Netherlands, and according to department head Ben Slotman, MD, PhD, the devices have become a vital part of their SBRT program. “From a clinical perspective,” he says, “TrueBeam enables better integration between imaging and treatment delivery, much faster dose output using the flattening filter free mode, and a much shorter time is needed for pretreatment setup due to the user-friendly nature of the equipment.”

In Switzerland, Inselspital Bern and Kantonsspital Hospital Winterthur are treating cancer patients clinically with TrueBeam. “TrueBeam enables us to deliver precise image-guided treatments quickly, which may potentially lead to a greater number of cancer patients who can benefit from these advanced radiotherapy treatments,” says Daniel Aebersold, MD, of Inselspital, the university hospital of Bern. “To date we have used TrueBeam mainly for patients with large tumors, such as you often find with cervical cancer, anal cancer, and advanced head and neck cancer.”

Urs Meier, MD, head of radiation oncology at Winterthur, says, “TrueBeam enables radio-oncology departments to perform fast and precise image-guided treatments, thereby allowing for shorter treatment sessions for patients and, potentially, a greater number of patients being treated.”

In recent months, routine clinical TrueBeam treatments have also commenced at Institut Catala d’Oncologia in Barcelona, Spain; Neolife Medical Center in Istanbul, Turkey; Davidoff Center in Petah Tikva, Israel; Casa di Cura San Rossore in Pisa, Italy; Radioonkologie Amsler in Liestal, Switzerland; Strahlentherapie-Bonn-Rhein-Sieg/St. Josef Hospital in Trossdorf, Germany; and Azizia Royal Clinic/Azizia Royal Palace in Riyadh, Saudi Arabia.
Brazilian hospital delivers more than 100 RapidArc treatments

Clinicians at Hospital Israelita Albert Einstein in São Paulo, Brazil, reached a milestone earlier this year: more than 100 RapidArc radiotherapy treatments delivered since the technology was installed in 2010. RapidArc has now been used to treat prostate, head and neck, brain, thoracic, abdominal, and pelvic tumors. “RapidArc has decreased the amount of time it takes to treat at the machine, allowing us to schedule almost 30 percent more patients,” says Jose Carlos Cruz, PhD, head of medical physics. “We also got better dose distributions with our RapidArc plans, especially for difficult cases.” The hospital has also implemented the first clinical RapidArc training course in Latin America, and clinicians have traveled from as far away as Portugal to attend. The one-week course covers both theoretical and practical issues, including target definition, treatment planning, and optimization strategies for a range of disease types; RapidArc QA; and SBRT with RapidArc for lung tumors. The course takes place in a facility that is equipped with several workstations, providing a hands-on opportunity to learn how to use Varian technology for delivering IMRT, IGRT, and now RapidArc. “The goal of the training is to instill confidence so that visiting physicians and physicists can feel comfortable starting their own clinical programs,” Cruz says. For more information about training opportunities in Brazil and around the world, see the story on page 12.

Study champions single-fraction HDR brachytherapy

A major study, aimed at determining the benefits of delivering high-dose-rate (HDR) brachytherapy boosts for prostate cancer in a single fraction, has commenced in the United Kingdom. The study, coordinated by Mount Vernon Cancer Center and cofunded by Varian Medical Systems, has currently enrolled 76 patients from five UK cancer centers. According to Peter Hoskin, MD, consultant oncologist at Mount Vernon, the intention is to involve up to 500 patients over the course of the three-year study, which started on September 1 of last year. “High-dose-rate brachytherapy for prostate cancer is often perceived as complex and difficult to implement because of the need for fractioned treatment delivery,” says Hoskin. “It is seen as a major obstacle to implementation in many centers because it either requires the development of sophisticated methods of implant retention and quality assurance with additional imaging, or it is resolved by simply repeating the implant procedure, with additional hospitalization and discomfort for the patient. Both approaches use more resources and add additional burden to the patient. “It would certainly be preferable if a large single fraction could be used in place of a fractionated schedule. To take this step, we require robust data to demonstrate that such a course of action does not result in increased toxicity for the patient while achieving good biochemical control of prostate cancer.” “With this study, we are developing a multicenter database registering patients treated with a common agreed protocol using external beam radiotherapy and a single-fraction HDR boost. In this way, we intend to provide the required evidence that single-fraction boosts are feasible, safe, and effective.” Hoskin says early clinical results look promising, and he looks forward to reporting on the results of the study when it has been concluded. “This is a broad-based study that will hopefully make HDR brachytherapy more convenient and accessible for prostate cancer patients and clinical staff,” says Tim Clark, Varian’s brachytherapy product manager. “We are happy to support this important and pioneering work.”

Florida center is first to use Capri brachytherapy applicator

Earlier this year, doctors at Premiere Radiation Oncology in southwest Florida became the first in the world to perform a high-dose-rate (HDR) brachytherapy treatment for rectal cancer using Varian’s new Capri™ applicator. In early May, Nicholas Zouain, MD, treated an 89-year-old woman for rectal cancer that had recurred after a course of external beam radiotherapy. “The patient did not have any other treatment option because she had already had a course of external beam radiotherapy and was not a candidate for surgery or chemotherapy,” Zouain says. The procedure was done on an outpatient basis using only local anesthesia. The patient did not require any pain medication and was discharged to go home directly after the treatment was completed in a procedure that took about an hour. Designed with the intention of improving patient comfort, the Capri is a lightweight balloon applicator that is inflated upon insertion to adapt to the anatomy and hold it in place during treatment. Prior to the Capri applicator’s development, the principal brachytherapy option for endometrial cancer patients involved inserting rigid cylinders, which may require the fixation of the applicator to the treatment table. The Capri applicator is also compatible with CT imaging, which enables doctors to use it with 3D imaging to plan their treatments and determine exactly where they want to deposit the dose. “I have used other applicators in the past,” says Zouain. “The Capri is very easy to use. Using its multiple channels, we can design a treatment plan that gives us a dose distribution with great tumor coverage, and the balloon allows for good fixation of normal tissues.” The Capri applicator has FDA clearance for gynecological and rectal treatments in the United States and is awaiting CE approval in Europe.
Proton therapy system receives 510(k) clearance

Earlier this year, Varian received U.S. FDA 510(k) clearance for its proton therapy system, which delivers intensity-modulated proton therapy (IMPT) using pencil-beam scanning technology. The company’s Eclipse™ treatment planning system also received FDA 510(k) clearance for use with Varian’s IMPT delivery systems in the United States.

“IMPT requires the integration of smart treatment planning and precise pencil-beam scanning delivery,” says Moataz Karmalawy, head of Varian’s particle therapy group. “We’ve achieved that by teaming up our market-leading Eclipse treatment planning software with our ProBeam™ delivery system.”

The goal of IMPT is to shape the dose distribution so that it matches the shape of the targeted tumor in all three dimensions. An important feature of the latest Eclipse release is the ability to analyze the robustness of a treatment plan in terms of its ability to optimally cover the tumor and reduce dose to healthy tissues.

“IMPT is designed especially for complex tumor shapes, such as head and neck tumors, tumors of the lower abdomen that have a curved shape, and tumors wrapped around the spinal cord or brain stem,” says Karmalawy. Varian’s ProBeam system incorporates pencil-beam scanning technology, which is designed to optimize the dose applied to every point within the area being treated. At this year’s annual Particle Therapy Cooperative Group (PTCOG) meeting, Varian exhibited a new user interface, a more compact robotic patient positioner, and advanced imaging capabilities for precise patient setup, verification, and correction, including planar imaging and 3D kV cone-beam CT.

“With the introduction of pencil-beam scanning, the workflow of proton therapy has already become significantly more efficient,” says Karmalawy. “The introduction of the new user interface, the patient positioner, and imaging enhancements make this system easier to use for clinicians, building on our workflow expertise in conventional radiotherapy.”

UCSD launches SBRT course

The University of California San Diego (UCSD) Department of Radiation Oncology Learning Center is offering an online training course in stereotactic body radiation therapy. “Practical SBRT” provides up to 25 hours of lectures and course material targeted to the radiation oncologist. Created by Arno J. Mundt, MD, professor and department chair, and Joshua Lawson, MD, assistant professor, the practical online tutorial covers topics such as patient selection, dose prescription, target delineation, treatment planning, image-guided treatments, motion management strategies, toxicities, and outcome studies. Mundt and Lawson are also offering the material in the form of a weekend intensive on August 12–13, 2011, at UCSD.

Further information about the online tutorial is available at http://www.regonline.com/sbtr. To learn more about the weekend intensive, visit http://www.regonline.com/sbtrUCSD.

For information on other online courses available through the UCSD Radiation Oncology Learning Center, such as “Going Paperless” and “UCSD IGRT Protocols,” contact Carol Shostak at cshostak@ucsd.edu.

TrueBeam Wins R&D 100 Award

Varian Medical Systems’ TrueBeam™ system for image-guided radiotherapy and radiosurgery has been named one of the 100 most technologically significant products introduced into the marketplace over the past year by R&D magazine. An R&D 100 Award is widely recognized as a mark of excellence, demonstrating that the product is one of the most innovative of the year.

TrueBeam was selected as a 2011 R&D 100 Award winner because of the technical innovations that were introduced to dynamically synchronize imaging, patient positioning, motion management, and treatment delivery. TrueBeam can deliver treatments with a dose delivery rate that is roughly twice the maximum output of conventional systems, making it possible to offer shorter treatment times for patients, potentially enabling clinics to treat more patients each day and improve precision by leaving less time for tumor motion during dose delivery.

More than 220 TrueBeam systems have now been ordered by treatment centers around the world, and more than 65 installations are completed or in process. The R&D 100 Awards, widely known as the “Oscars of innovation,” identify and celebrate the top high-technology products of the year. Awards span industry, academia, and government-sponsored research. To learn more, visit http://www.rdmag.com.
ARIA for radiation oncology

certified for e-prescribing

ARIA® for radiation oncology has received Surescripts e-prescribing certification for new prescriptions and refill requests.

"E-prescribing allows the clinician to create a prescription and route it electronically to any pharmacy in the extensive Surescripts network," says Ken Hotz, PhD, Varian’s product manager for oncology information systems. "With certification to connect to the Surescripts network, ARIA can now offer radiation oncologists an e-prescribing process with the potential to reduce costs and improve practice efficiency and patient convenience."

Using ARIA, clinicians are now able to send new prescriptions directly to a computer at a participating pharmacy. Pharmacy personnel can send renewal authorization requests directly to the clinic electronically, where prescribers can review the requests and respond with a few keystrokes.

“This certification is among the U.S. government-mandated criteria for demonstrating stage 1 ‘meaningful use’ of an electronic health record and thereby qualifying for federal funding under the HITECH Act," says Hotz. "We now have ARRA HITECH certification for the ARIA medical oncology software, and will submit the ARIA radiation oncology product for the same certification later this year" (see related story on page 22).

ARIA has now received certification for use in demonstrating stage 1 meaningful use of the EHR. ARIA is now in use at more than 2,500 treatment centers around the world. It has been rated among the top three oncology IT solutions every year since 2008, and was ranked number one in 2008 and 2009 by KLAS, an independent research firm that reports on the performance of healthcare vendors (http://www.klas.com). 

CyberKnife interface developed for ARIA

Varian has developed a new interface that connects the ARIA® oncology information system to a CyberKnife machine. Earlier this year, the Phoenix CyberKnife and Radiation Oncology Center in Phoenix, Arizona, became the first treatment center in the world to install and utilize the new interface, which is based on the DICOM “unified worklist” standard. It allows users to schedule patients for treatment on the CyberKnife unit using ARIA, as well as save the treatment plan, record charges, and save treatment history records.

“There has been a big push in radiation oncology, led by ASTRO, toward having interoperable data standards so that computer systems and technology from different manufacturers can share information,” says John J. Kresl, MD, PhD, the center’s medical director. “ARIA is the first electronic medical record to interface with the CyberKnife System’s MultiPlan treatment planning system.” According to Kresl, having the EMR interface with the treatment planning system is very desirable as an industry standard. Prior to the interface, the Phoenix center’s staff had to enter treatment plan information manually into ARIA or create PDF files that were saved within the EMR system—a time-consuming process with the potential for inadvertent errors.

“With this new interface, treatment plan data can be imported into ARIA directly, in a form that is more useful when operating day-to-day and delivering treatments,” he says. “Now the staff members can bring up a plan and prepare for treatment, record the treatments delivered that day along with the quality assurance checks that are integral to our patient care process, record and verify, close the chart, and move on to the next patient. We have fewer manual steps and the integrity of the information is more secure.”

Kresl outlined several other important benefits to having an electronic interface between the two systems. “Often you want to go back to a patient’s record for information about the treatment plan and about treatments that were delivered. This allows you to do that more easily, and to share that information with other medical providers or team physicians,” he says.

“We live in a mobile society. People move and need to take information with them. We needed a better way to archive, retrieve, and use patient information. Now I can get CyberKnife and MultiPlan information from ARIA just as I can get information about treatments we planned using Eclipse™.”

ARIA for medical oncology (version 10 MR2) and ARIA for radiation oncology (version 11) have both been certified for use in demonstrating stage 1 meaningful use of an EMR to qualify for U.S. federal funding under the ARRA HITECH Act. Both versions of the ARIA system have now received complete EMR certification for ambulatory environments from the Drummond Group.

Tested under the Drummond Group’s Electronic Health Records Office of the National Coordinator Authorized Testing and Certification Body (ONC-ATCB) program, the ARIA systems were certified as 2011–2012 compliant in accordance with the criteria adopted by the U.S. Secretary of Health and Human Services.
Stereotactic radiosurgery (SRS) and stereotactic body radiotherapy (SBRT) involve delivering high doses of targeted radiation in just one to five treatments. It’s an approach that, for some forms of cancer, appears to be as effective as—and in some cases more effective than—a conventionally fractionated six- to eight-week course of radiotherapy. Advances in linear accelerator imaging, speed, and precision in recent years have made such treatments more feasible, and so they are becoming an essential part of many radiation oncology departments’ armamentaria. Here, Centerline looks at how four notable cancer centers are using linear accelerators from Varian and Brainlab to deliver advanced radiosurgical treatments for hard-to-treat tumors such as those in the lung, liver, and spine.
In the last 11 years, doctors at the Henry Ford Health System of Detroit, Michigan, treated more than 2,000 radiosurgery cases, among the largest number anywhere. In 2009, the Henry Ford installed the new Novalis Tx™ linac developed by Varian Medical Systems and Brainlab. This new system utilizes multidimensional imaging to detect movement during treatment so targeting can be precisely adjusted, as necessary, to limit damage to healthy tissues during treatment.

Much of Henry Ford’s groundbreaking work has been spearheaded by its dynamic radiosurgery director, Samuel Ryu, MD, who is also head of neuro- and spinal oncology in the Department of Radiation Oncology and Neurosurgery. Ryu has published numerous papers and speaks internationally on radiosurgery. He hopes eventually to launch a radiosurgery and radiotherapy training center.

A trailblazing effort in spine radiosurgery at Henry Ford has been to study options for reducing multiple, lower-dose fractions—30 Gy in 10 fractions is the current standard—to a single, higher-dose treatment of 16 to 20 Gy or higher. Single radiation sessions for the spine may relieve tumor pain more quickly and durably than multiple fractions of smaller doses, and thus improve patients’ quality of life faster and longer.1 However, the higher radiation dose and risk of collateral damage to the spinal cord make precise treatment planning and delivery absolutely essential.

“Sam has really defined what the volume-based tolerance doses for the spinal cord are,” says Indrin Chetty, PhD, director of Henry Ford’s physics division. “Irradiating spine tumors that are located immediately next to the spinal cord is especially challenging. Our goal is to achieve <1–2 mm accuracy in every case.”

Yi An, MD, in Henry Ford Hospital's Department of Radiation Oncology, notes, “Ryu is the principal investigator of a nationwide phase 2 and 3 randomized clinical study of spine radiosurgery for spine metastases, RTOG 0631. It is potentially a landmark study encompassing 283 patients that will assess the effectiveness of a single, 16-Gy fraction administered via radiosurgery versus a single, 8-Gy fraction administered via traditional external beam radiation therapy in relieving the back pain associated with spine metastases, which occur in 40 percent of cancer cases. Collaborators include renowned SRS experts at the University of Pittsburgh, Duke University, the University of Texas Southwestern, and elsewhere. The study’s primary goal is to achieve faster pain relief and related benefits for patients. Indeed, results from multiple studies within the last decade have suggested better overall pain control using higher radiation doses.

Ryu’s research has shown that SRS treatment for spinal metastases can lead to quick and durable pain relief, and can also be used to alleviate compression of the spinal cord caused by epidural tumors.2 He further makes the point that it preserves blood-producing bone marrow in the spine by treating only the involved spine and, as a single-fraction treatment, needn’t interfere with a patient’s ongoing chemotherapy schedule.3 Although radiosurgery rather than surgery is now the primary treatment for spine metastases at Henry Ford, the team occasionally uses radiosurgery postoperatively, too, as a pain-relieving adjuvant or to treat the residual surgical bed itself.
VU UNIVERSITY MEDICAL CENTER

The pioneering VU Medical Center in Amsterdam, Netherlands, started SRS and SBRT treatments 20 years ago using an adapted linac. Today Ben Slotman, MD, PhD, and his team use six Varian linear accelerators, including two TrueBeam™ devices and a Novalis Tx, to continue to push the boundaries of hypofractionated treatments, particularly for lung cancer patients. More than 800 stage I lung tumor patients have been treated at VU in the last eight years, and the center receives referrals from more than 70 Dutch hospitals.

“We recently published the results of a population-based study, demonstrating that the introduction of SBRT in two Dutch provinces resulted in a 16 percent absolute increase in the use of radiotherapy in patients above 75 years of age, and that this resulted in improved survival,” says Slotman.4 SBRT is now being performed in about half of the 21 Dutch radiotherapy centers.

Since 2008, all lung SBRT plans at VU have been delivered using Varian’s RapidArc® technology. According to Slotman, the main benefit of RapidArc treatments for lung patients is the shorter treatment time with less risk of motion. “This is especially important in SBRT where high fraction doses are delivered,” he says. “The delivery of the highest dose for lung tumors was reduced from 30 minutes to just six minutes. With the introduction of TrueBeam technology, the integration between imaging and treatment delivery has been improved. In the very near future, by using the High-Intensity Mode, we hope to reduce the treatment time to less than three minutes.”

RONALD REAGAN UCLA MEDICAL CENTER

Thirty years have passed since the University of California–Los Angeles joined other pioneers of stereotactic radiosurgery in pushing the envelope on this cutting-edge approach to minimally invasive neurosurgical therapy. And UCLA is still pushing. Beginning with its acquisition of a Gamma Knife from Sweden back in 1980—the first one in the United States—to the use in later years of increasingly sophisticated and effective linac technologies like the LINAC Scalpel, XKnife, classic Novalis®, and, in 2009, the Novalis Tx platform for image-guided radiosurgery, UCLA has been instrumental in determining which frontiers to explore in search of further improvements.

The radiosurgical procedures performed at the Ronald Reagan UCLA Medical Center focus primarily on benign, malignant, and metastatic tumors and other disorders in the central nervous system, ranging from trigeminal neuralgia, acoustic neuromas, arteriovenous malformations to spinal lesions. The team treats roughly 400 patients annually, about six to eight percent of them for trigeminal neuralgia.

“Given the location of these radiation targets, highly accurate delivery of therapy is essential,” says Antonio A.F. De Salles, MD, PhD, a neurosurgeon who has been director of the university’s stereotactic surgery program since 1990. About half of treatments entail a single high-dose, very rapid treatment. The other half involve smaller-dose treatments in multiple fractions over time—for tumors larger than 3 cm (when high radiation doses might be too risky) or to prevent damage to adjacent critical structures or areas, such as the optic nerve, brain stem, pituitary gland, or speech area in the brain.
In treatment planning, computed tomography, magnetic resonance, and angiogram imaging scans provide a 3D profile of the tumor or lesion. Image-guidance technology has evolved to the point that bolted headframe immobilization of the patient is no longer necessary for some stereotactic radiosurgery procedures.

UCLA also uses the Novalis Tx system for stereotactic body radiotherapy—that is, to treat lung, liver, kidney, and other structures beyond the brain and spine. Nearly 400 patients come to the medical center each year for SBRT. When treating tumors in the body, rather than in the head, the problem of tumor motion during and between treatments becomes more challenging. These challenges are addressed at UCLA through the use of the three imaging systems on Novalis Tx that enable continuous imaging, motion detection, and robotic adjustments of the patient’s position in six dimensions during treatment to keep the radiation beams focused on the target.

De Salles estimates that roughly 30 percent of his SRS cases involve metastatic tumors, 20 to 25 percent benign tumors, and 14 percent arteriovenous malformations—abnormal connections between veins and arteries—followed in fewer numbers by gliomas/glioblastomas and rare tumors like acoustic neuromas. After therapy, “we follow all of the patients for years to come,” De Salles says. “There are patients I’ve been following now for 20 years.”

Decades of experience, research, and technological development have paid off at UCLA, for both the radiosurgery staff and the patients who benefit from SRS.

At the University of Maryland Marlene and Stewart Greenebaum Cancer Center in Baltimore, Maryland, appropriate and consistent application of increasingly sophisticated and powerful SRS and SBRT technologies is in the hands of a broad range of clinical professionals who come together as a multidisciplinary team. In addition to radiation and medical oncologists, medical physicists, dosimetrists, and therapists, the team includes interventional radiologists and neuro-, thoracic, orthopedic, and transplant surgeons.

So far, nearly 2,500 patients have received SRS or SBRT treatments at the Greenebaum Cancer Center since 1992. Steven Feigenberg, MD, joined the center in 2009 as the director of clinical research in the radiation oncology department, specifically to lead the SBRT program. He has treated more than 400 brain tumors with SRS and more than 200 tumors outside the brain with SBRT. As is the case in most centers, the majority of SBRT cases have been in the lung.

In 2006, the Greenebaum Cancer Center was the first statewide to begin treating patients using the Trilogy® linear accelerator. One of the more recent technological advances that Feigenberg and other clinicians are using with the device is real-time position management. Trilogy’s RPM system correlates the position of the targeted tumor relative to the patient’s breathing pattern. An infrared tracking camera and reflective marker measure that pattern and range of motion, and gating synchronized with those measurements turns the treatment beam on and off at the appropriate time.
“The most challenging tumor location for SBRT is in the lung, because you have a moving target,” says Feigenberg, explaining that tumors move differently from patient to patient and can also vary from day to day. He says one advance in particular—4D CT imaging for use in treatment planning for various extracranial tumors that move related to respiration—makes therapy even more precise because it enables the clinical team to tailor the radiation beam to the specific tumor’s motion, maximizing tumor coverage and minimizing injury to surrounding normal structures. In the past, clinicians often used population-based margins, which were either an over- or underestimate.

Last year Feigenberg and coinvestigators at Fox Chase Cancer Center and Henry Ford Hospital in Detroit published a study involving 18 patients that delivered higher radiation doses in fewer treatments via SBRT for medically inoperable patients with early-stage, non–small cell lung cancer. The total dose was escalated from 40 Gy to 48 Gy, then to 56 Gy, in four equal fractions two to three times a week. Target volumes were based on 4D CT or breath-hold scans. Seventy-two percent of the patients didn’t experience any adverse side effects during or after treatment. There was only one grade 3 pulmonary event, which was attributed to heavy pretreatment with chemotherapy, radiation, and surgery. According to the authors, among those that did experience side effects, the morbidity was relatively low.

Although clinical trials in the United States are still under way, research abroad suggests that, for smaller tumors, 12 Gy in four fractions for a total of 48 Gy appears to be effective and minimize side effects, while 20 Gy in three fractions for a total of 60 Gy appears to be more advantageous for treating larger tumors.5, 6

“SBRT is currently being compared to surgery in three large prospective clinical trials, challenging the paradigm of surgery being the standard of care for patients with select small tumors.”

Steven Feigenberg, MD
Greenebaum Cancer Center

Such findings are part of the learning curve for medical professionals as they refine and improve SBRT techniques. According to Feigenberg, SBRT “is currently being compared to surgery in three large prospective clinical trials, challenging the paradigm of surgery being the standard of care for patients with select small tumors. There’s a lot of buzz about this treatment modality, which is now being investigated in the liver, pancreas, spine, and prostate.”

References
Varian’s Global Education and Training, a department within the Customer Support Services organization, is made up of dedicated professionals working around the globe, helping customers to develop successful oncology practices through the optimal use of Varian technology.

“At Varian, we are well aware that many of our customers are being asked to practice in more challenging clinical environments, and to do more with less. In addition, increasingly sophisticated treatment techniques are being developed—techniques like image-guided SBRT with motion management—that require adept and skillful use of technology,” says Kolleen Kennedy, vice president of Varian Customer Support Services. “Consequently, we have evolved our strategy to include greater attention to high-risk elements and have incorporated this focus into our training and education programs so that clinical teams can deliver high-quality, safe, and effective treatments.”

Varian takes a “blended learning” approach to education, offering classroom training at centers around the world, on-site clinical support, and remote learning options such as webinars with prominent clinical experts. Combined with round-the-clock access to help desk personnel who can even launch an impromptu SmartConnect™ remote training session if needed, the Varian resources for customer education and training are focused on one goal: enabling clinicians to use Varian technology safely and effectively.
**Global network of classroom education centers**

Varian’s Global Education and Training team is headquartered in Las Vegas, Nevada, where the company operates the largest corporate radiotherapy training center in the world, with 81,608 square feet of learning space. This includes 19 classrooms, five clinical radiotherapy machines that exactly replicate the machines available to customers, and additional machines that are used for training Varian’s service people. A virtual 3D treatment machine with simulation software, called VERT, is also available. In 2010, 1,887 students participated in 343 classes at Varian’s Las Vegas location.

“Global customers may come to Las Vegas as part of their training plan for product education,” says Jon Hollon, director of worldwide training and education. “There are some instances when we offer courses in languages other than English, such as Spanish or Portuguese; if a course is not available in a particular language, Varian may provide a translator for that student as part of the product purchase.”

To further respond to the need for training in multiple languages, Varian has made a significant investment in building a network of Varian Education Centers. In addition to Las Vegas, Varian currently operates Education Centers in three other locations:

**Mumbai, India:** Varian’s Mumbai Education Center opened in 2010 and offers classes taught in Hindi. Students can take advantage of numerous offerings and expert resources, including the same 3D virtual treatment technology available in Varian’s Las Vegas Education Center.

**Beijing, China:** The Beijing Education Center was established in 2008 and offers classes in Mandarin. In 2010, 238 students attended training courses to learn more about Varian’s IMRT technology, Eclipse™ treatment planning system, On-Board Imager® kV imaging system, and ARIA® oncology information system.

**Europe:** In Zug, Switzerland, Varian has established two classrooms where students are trained to use the Eclipse and ARIA systems. Courses are held primarily in English; however, classes can be offered in other languages to suit a customer’s needs. In addition, there are training facilities at Varian sites in Buc, France, and in Crawley, United Kingdom. Finally, the European training team organizes numerous “clinical schools” that take place at hospitals and treatment centers across Europe that have been equipped with the latest Varian technology. These schools cover IMRT, RapidArc®, respiratory gating, and IGRT, using both lectures and hands-on training.

To serve customers in South America, Varian partners with a site in São Paulo, Brazil, so customers can receive classroom education and hands-on training delivered in Portuguese.

A new education center is on the drawing board for Tokyo, Japan, slated to open in 2012. Worldwide, 34 full-time educators are providing Varian product classroom-based education programs for nearly 3,700 oncology professionals each year.

According to Sue Merritt, senior manager of clinical training for the Americas (including North, South, and Central America), Varian course instructors are themselves all radiotherapy professionals, including RTTs, dosimetrists, and physicists. “We have over 1,500 years of combined clinical experience,” says Merritt. “Worldwide, we hire training professionals who all have clinical experience in radiotherapy and maintain their professional qualifications.”

**On-site training: Post-purchase support**

Varian employs more than 100 highly trained clinical support specialists who visit treatment centers to work directly with radiation oncology department team members coming up to speed on Varian technology and applications. Each clinical support specialist provides tailored training for deploying new products, new system releases, or new capabilities. Using competency-based objectives focused on quality and safety, a customized training plan is created and executed to meet a department’s specific needs.

“Varian has established and validated a training strategy for each of our major products,” Hollon explains. “For example, we know that for ARIA, customers need about four days of on-site training once they have completed a classroom program. We may recommend combining this with some clinical consulting services for sites that are converting from another company’s...”
information system. For a site deploying the Eclipse treatment planning system, we have our Eclipse Administration and Physics class geared to physicists and our Eclipse Operations class for dosimetrists. Once those classes have been completed, we offer two days of on-site support that is complementary to the didactic classroom training and allows us to help customers employ the newly acquired skills in their own clinical settings. This exemplifies our commitment to the blended learning strategy.

In the United States, education regional managers oversee Varian’s on-site training operations. “We used to have one big national applications team in the United States,” says Hollon. “We changed that to put the on-site training program managers within the service regions.” Once a sale is concluded, a Varian project manager coordinates a sequence of activities, including site preparation, installation, training, and an agreed-upon launch date for going clinical with the new product. The on-site applications trainers are scheduled to arrive as soon as the technology is installed so that training takes place on time. Often, the classroom education is completed by the customer while the product is being installed.

“But regionalizing these teams we’ve been able to achieve a much closer relationship with customers as they move through the learning curve,” says Hollon. “This relationship over time allows us to be more effective when structuring a customer’s training plan, since we are more familiar with their individual areas of need.”

On-site support doesn’t end when the formal on-site training is over, however. “The applications training people write up a ‘trip report,’ and we make sure we provide appropriate after care,” Hollon says. “This is where we rely on our help desk team, the local service personnel, and often, our SmartConnect Now technology.”

Remote learning
After classroom and on-site training, customers have many opportunities to continue building their skills through e-learning. Varian produces a robust schedule of webinars covering a wide range of topics, from brachytherapy techniques to RapidArc planning, from updates on the ARRA HITECH Act to establishing paperless processes. These webinars are promoted and archived on the MyVarian customer support website (see sidebar, next page).

In addition, the Varian Learning Center offers self-paced, on-demand, online courses that include didactic instruction, demonstrations, and hands-on practice. Via the Learning Center, customers can train on Varian system upgrades and learn about new features and options without traveling. These are also accessed via the MyVarian customer support website.
CME programs

Varian’s Continuing Medical Education (CME) program is another vital component of the company’s global education offerings. The CME programs are approved by the American Society of Radiologic Technologists (ASRT) or the Medical Dosimetrist Certification Board (MDCB), and are open to interested MDs and RNs as well as physicists, medical dosimetrists, and therapists. Varian partners with the Institute for Medical Education (IME), based in UCLA, to deliver these programs.

“In 2011, 15 CME events will have been held in different U.S. cities,” says Barbara Hird, manager of educational programs for Varian. “Clinicians can also earn credits by accessing accredited web-based educational resources such as video and slide sets from these in-person CME programs.”

Setting the bar for quality

How do you optimize learning and make sure customers are getting what they need? At Varian, the Standards and Content group is responsible for creating educational program content, writing curricula, and training Varian educators to teach the material. All courses undergo a rigorous review for content quality, safety elements coverage, and process optimization, and then they are standardized.

Cheryl Mooney, manager of clinical global standards and content for Varian, explains just some of the factors her team takes into consideration to get at the best course content: “We begin by hiring knowledgeable staff,” she explains. “In addition, we pay close attention to customer feedback, whether it comes from customer satisfaction surveys, help desk calls, or our service colleagues who are with customers in the field. Our team ensures that every customer receives consistent, high-quality training.”

“Varian will continue to invest in the Global Education and Training organization, adding skilled resources, expanding our facilities, and evolving training programs as new products and treatment techniques are launched into the oncology community,” says Kolleen Kennedy. “Our goal is to support our clinical partners around the world, no matter what language they speak or what environment they practice in, so they can deliver safe and effective care that helps save lives.”

MyVarian Offers Customers Access to a Wide Range of Education Resources

The MyVarian™ customer support environment offers personalized assistance to Varian customers as well as access to education resources and product information. Redesigned in April 2011, MyVarian requires users to register and obtain a unique log-in and password. This provides access to a wide spectrum of materials, including extensive product documentation, presentations, marketing materials for promoting Varian technology, interactive user groups, webinars, and updates on relevant legislation.

Below is a sampling of key education resources available through MyVarian:

Product documentation: MyVarian was launched in 2007 to provide a self-service portal offering customers immediate access to documentation that would support them in properly using their in-house equipment and software. Today, customers still have 24/7 access to this important product information.

Webinars: Varian’s webinar library includes recordings of presentations that were delivered live to international audiences. These recordings can be accessed anytime. Examples of recent webinars include “Early Clinical Experience with TrueBeam,” by John Fiveash, MD, and Richard Popple, PhD, from the University of Alabama in Birmingham, and “Expanding the Clinical Use of RapidArc,” by John Niemkiewicz, PhD, of Lehigh Valley Health Network. New webinars are added frequently, and the library now numbers more than 80.

CE-credit management: With Varian’s Certificate Manager, customers can view and print documents for ASRT- or MDCB-approved continuing education (CE) credits that were provided at Varian-hosted events. The customer submits this documentation to the accrediting organizations to receive CE credits. Personalized accounts can be accessed anytime, making it easy to track credits.

Varian Learning Center: The Varian Learning Center allows customers to log in and complete self-paced, on-demand courses on their own schedules. Self-directed tutorials include didactic instruction, demonstrations, and hands-on practice. Through the Learning Center, customers can train on Varian system upgrades, new features, and new options without ever leaving their departments.

Peer-to-peer training: Varian provides world-class product training and support through Varian Education Centers, applications training teams, and help desk teams. To provide an even broader spectrum of learning options useful when adopting new technology, Varian has developed a peer-to-peer training program. This program connects clinicians who have adopted technologies and protocols to fellow clinicians who are beginning to adopt those same technologies and protocols. An interactive map helps users pinpoint a peer-to-peer training location that is convenient for them and suits their needs.

To learn more about MyVarian or register for an account, visit http://www.MyVarian.com.
Late last year, Memorial Medical Center in Springfield, Illinois, exchanged its Siemens linac and Impac information system in favor of Varian’s new TrueBeam™ system, fully integrated with the Eclipse™ treatment planning system and the ARIA® oncology information system for electronic medical records (EMRs) and clinical practice management.

It was a homecoming of sorts. Although Memorial Medical Center had long used Varian equipment, in 2005 it purchased a Siemens accelerator along with Impac software, in part because Memorial was seeking an image integration solution. It wasn’t long, though, before the staff was missing their Varian system.

“We did not fully implement all of the electronic features of Impac because we recognized shortly into our journey that we were going to be eager to get back to a Varian solution,” says Linda Jones, administrator for oncology, pulmonary, and clinical research services at Memorial. “Then we heard about the new TrueBeam platform and the opportunity to have both RapidArc® and multiple beam energies on our machine, and we were sold on the idea.”

For the Memorial team, that decision also meant buying the whole package, including treatment planning and EMR software. “We were clear: if we buy a product like TrueBeam, we want to be able to make full use of it,” Jones explains. “We knew we needed a fully electronic medical record as well as full integration of treatment planning, record and verify, and treatment delivery. Our team members were also very clear that they wanted to be able to go to one source for help desk support. These considerations really did help us set some priorities around how we would make decisions about what to acquire.”

Jones further notes that the enthusiasm for moving back to Varian was deeply and broadly rooted within Memorial. “The accuracy and precision associated with Varian’s platform have always been impressive,” Jones says. “We have always had a good experience with our Varian equipment in terms of its overall performance and safety features. We missed the level of support that we had always gotten from Varian in terms of overall problem solving and helping to evolve radiation therapy to a new level.”

Taking advantage of ARIA

Even with strong enthusiasm for moving from Siemens to TrueBeam, Jones knew that a strong implementation team would be required to ensure a seamless transition—including the move from the group’s existing Impac application to ARIA. Jones brought together what the group called their TrueBeam Execution (TBX) team, which was made up of representatives from the department’s major disciplines, including dosimetrists, physicists, and therapists, and patient registration, billing, and information systems specialists, to plan for the smooth move from Siemens and Impac to TrueBeam and ARIA.

The TBX team was assisted by Martha Jones, Varian clinical consultant and applications specialist, who was roundly praised for the expertise and guidance she provided.
“ARIA affects every aspect of the radiation oncology experience, so you need a team that has members from all the sections of the department,” says Ray Capestrain, director of diagnostic medical physics at Memorial Medical Center. “It’s especially important to have physicians and staff willing to work through some of the difficulties of transitioning to an electronic medical record. In certain situations, doing something that benefits one section may make it more difficult for another section. But you need to look for overall efficiency. Throughout this process we greatly valued the contributions of our Varian clinical consultant.”

Kristen Lee, clinical systems analyst for information services at Memorial, says there was a bit of anxiety over changing patient record systems, “but the staff felt we had gone as far as we could with the Impac application.”

“Everyone in the department understood the reason we needed to implement a new solution and that our ultimate goal was to have an electronic medical record for patients in the cancer center,” Lee continues. “We were all engaged from the beginning because we could see the value of what moving to ARIA and TrueBeam would bring.”

“We were clear: if we buy a product like TrueBeam, we want to be able to make full use of it.” — Linda Jones, Memorial Medical Center

**A seamless transition**

Memorial’s TBX team effected a seamless transition to TrueBeam, ARIA, and Eclipse.

“Martha was here several weeks before we ‘went live’ to help us with the ARIA implementation. Our goal was not to replicate our paper processes or existing workflow. We really wanted to create optimal workflow and processes using the electronic medical record,” recalls Jones. “Martha gave us each work assignments based on our roles within the department, along with tasks that involved integrating processes with other disciplines. That got us all working together and communicating via the medical record—a big change from how we worked before, communicating on sticky notes or on notes in the written medical record. We were all learning to communicate through ARIA. When our ‘go-live’ day arrived, we were ready to go. Martha was there just in case, but everything went smoothly.”

“From an RTT perspective, one of our biggest anxieties was being prepared and comfortable with the equipment and new software prior to treating our first patient,” says Lea Manuel, lead radiation therapist. “The transition going from Siemens equipment to the Varian technology was quite seamless, especially with the training available through Varian.”

According to Jones, there were several major champions on the TBX team who really liked the new processes and showed a great interest and aptitude for coming up with electronic solutions using the ARIA system. “Every week, we were building new documents, refining our work processes, and it just naturally seemed to happen over time. In fact, we had originally planned for Martha to come back a second time postlaunch, but the staff here showed so much initiative, we haven’t needed her back. She has provided critical support via email and telephone, and we’ve been able to make substantial progress,” she says.

“ARIA is intuitive and very user friendly,” Jones adds. “We have some work left to do in the area of interfacing with the larger hospital so we can send documents and data back and forth. But for the most part, our workflow is now electronic. Our goal is to finish that process by late summer or early fall 2011.”

**Enjoying the benefits**

Memorial Medical Center is enjoying a wealth of benefits since migrating to the TrueBeam platform, Eclipse treatment planning system, and ARIA oncology information system.

**Offline Review capability.** “Our physicians love the fact that they can review data from Eclipse and ARIA securely from any workstation, from their laptop using our wireless network, or even from home,” says Jones. “We deployed our Varian solutions using a Citrix-based setup for secure remote access. With our previous solution, physicians had to take the patient either to their office or to a dedicated computer in the clinic to show them images.”

**Integrated solution.** “Having one common database supporting Eclipse and ARIA makes it so much easier to work with information,” says Paul Mueller, radiation therapist. “We also can track things electronically that used to be on paper. We used to have several appointment books and calendars for the different physicians, and we had to physically walk around to look at them separately. With ARIA, this is all handled online.”

**Robust reporting.** “ARIA reports have been an impressive addition for our administrative efforts,” Jones says. “Now we can easily track on a daily basis how many patients are scheduled for treatment. We can see the use of resources for any one of our patients. We can see the individual charges for each patient. We can see all of the information about who’s been involved in that patient’s care. We’ve also been able to generate some custom reports as well that help us in our administrative data analysis of our practice.”

**Workflow improvements.** An unexpected benefit of the migration from Impac to ARIA was the improved workflow created during the transition. “Our Varian consultant asked us about every step we take,” Jones says. “She challenged us to make sure we were doing things as efficiently as possible as we created our new forms in ARIA. The process really improved our overall workflow.”

**Happier patients.** “One of the first things we noticed after moving from our Siemens system was that our patients get treated much faster,” says Jones. “The fully automated features of TrueBeam cut a lot of time from treatments, especially complex treatments such as a head and neck that has multiple fields involved.” According to Jones, most treatments are at least twice as fast. “Our doctors have reported that head and neck treatments that used to require 20 minutes can be completed in 5 minutes. Our patients like this.”

**Data security.** Memorial chose a novel software deployment strategy, installing ARIA on hospital servers, rather than on department computers, and accessing the system across a Citrix-based network. “That allows us to take advantage of the hospital’s hazard response system, which includes a completely redundant backup process,” says Jones. “With our recovery procedures, we’ll never lose more than 15 minutes’ worth of data in an emergency.”
A New ARIA in 2011: User-Centric Design
The ARIA® oncology information system has long provided cancer treatment centers with powerful tools for managing the full spectrum of clinical, administrative, and financial activities in multidisciplinary settings. It incorporates a comprehensive oncology-specific electronic medical record (EMR) that enables clinicians to design a personalized care plan for each patient, from initial diagnosis through follow-up.

With the 2011 release, the ARIA system is certified for use in demonstrating stage 1 "meaningful use" of an EMR. It is also more tightly integrated with Eclipse™ treatment planning than ever before, allowing clinicians to access either system seamlessly from their home screens and task lists.

“What’s changed the most, with this new release of ARIA, is how tasks are accomplished,” says Corey Zankowski, senior director of product management. “ARIA has been completely redesigned for release in 2011, based on careful observation of how different users interact with the program.”

Zankowski is referring to a new user-centric design approach that has been applied to the ways users access and utilize ARIA. The graphical user interface has been redesigned so that all the diverse professionals, including doctors, nurses, radiation therapists, physicists, dosimetrists, and administrators, can easily get what they need, when they need it, at the level of detail necessary for the task at hand.

In addition to support for ARRA HITECH, the main changes to ARIA for 2011 can be grouped into three general areas: personalization to the user, expedited workflow, and enhanced automation for greater ease of use. ARIA 2011 incorporates powerful new workflow management features that make the system more role specific and user friendly than ever before. It also employs an icon-oriented, graphical look, so that navigation is guided by pictures rather than words, making it easier to learn and to use.

**Personalization to the user**

With ARIA 2011, users log in to their own personalized home screens that they have configured to meet their own needs, much like users of the Yahoo! Internet browser have the option of setting up “My Yahoo!” dashboards that aggregate the types of information that particular users want to see.

“**The focus in this release was on patient-centric processes**—making it easier and more intuitive for the people who work with patients and with patient information.”

Roman Wicha, Varian product manager

“The system can be set up to block one task until the required predecessor task has been completed. You can define a care path that

“For customers using Eclipse with ARIA, the 2011 release changes the paradigm from having a separate oncology information management system and treatment planning system into having a unified dashboard that accesses a complete clinical management system,” says Chris Toth, senior director of marketing for Varian’s Oncology Systems business. “In an era of more complex treatments and greater demands on clinicians’ time, this enhanced workflow expedites processes.”

“If you’re a physician, you may want to start with a look at all the tasks that you’ll need to complete today, including your schedule with a list of all the patients you’ll be seeing,” explains Roman Wicha, a manager of treatment management products at Varian. “If you’re a dosimetrist, you’ll want a different view—perhaps all the tasks assigned to you and to physics/dosimetry on that day. ARIA 2011 can be customized to show you the data you need to see as soon as you need to see it, and to remind you of your tasks and appointments.”

The patient summary is available quickly from anywhere within the ARIA system, with no need to launch another module. Customized views of the patient’s EMR can be defined in accordance with a user’s role for quick access to specifically relevant information, be it the diagnosis, medications, any issues reported in the last visit, contact or insurance information, treatment progress, or other data from the electronic patient record.

**Care paths: A new approach to workflow**

Personalized home screens and EMR summary pages are just starting points in ARIA 2011. Cancer care is a collaborative process, with many intersecting actions taken by different people who fulfill specific interrelated functions. Many activities must follow a specific sequence because of dependencies. For instance, you can’t produce a treatment plan before imaging the patient, and shouldn’t commence a treatment before completing required QA processes. ARIA 2011 links and sequences tasks according to a treatment center’s protocols. This can be tied to scheduling, so that when a predecessor task has been completed, the next task in the sequence becomes active automatically and appears on the relevant person’s schedule of tasks.

“Care paths can be set up in accordance with best practices and with commonly accepted standards of care, and this has implications for patient safety,” Wicha says. “The system can be set up to block one task until the required predecessor task has been completed. You can define a care path that
won’t allow the first treatment to proceed until QA is completed.”

Treatment planning with the Eclipse system is tightly integrated into ARIA, with seamless access to all functions. “One of the most complex areas in radiation oncology is the treatment planning process and workflow,” says Charmaine Lawrence, ARIA product manager. “It can be cumbersome to create and approve a treatment plan when different people are responsible for different parts of the process. With ARIA 2011, the treatment planning steps are managed through a task-driven process that maps out actions and responsibilities.”

Other features enable reassignment of tasks, or task escalation. “If a dosimetrist responsible for creating a treatment plan by noon on a given day falls ill, ARIA can inform a backup person the moment the task becomes overdue,” Wicha says. “That way, the appropriate person is notified whenever an incomplete task could cause problems if not reassigned.”

Automation and standardization for efficiency and consistency

Workflow—through the judicious use of customized care paths—can be standardized for efficiency and consistency. Users follow preestablished care paths, and task sequences drive the software. Users of ARIA 2011 will not need to know which software module they need to launch for a given task. As they progress through a care path and click on a defined task, the system will launch the relevant module with the proper patient loaded, whether it is Eclipse for treatment planning, Offline Review, or something else.

“You don’t have to know what application you need; you just have to know what task you are doing next... When you’re ready to complete a task, you click on it and the correct application launches. It’s like a project management dashboard.”

Phil Koken, PhD, VU University Medical Center

For example, the system can be configured so that whenever new images are generated, an image review task is automatically created and assigned to the relevant doctor. When he or she selects the image review task, the system will launch Offline Review and load the relevant patient’s images. “All tasks in a care path can be managed in this way,” Wicha points out. “This allows clinical professionals to focus on the patient and the clinical path rather than worry about which application to launch. In fact, even the names of the tasks in a care path are configurable by the users, and can be translated into other languages for use outside the United States.”

The system can be further configured with rules that are unique to a treatment center’s processes—for example, an image must be reviewed within 24 hours or prior to the next treatment. With such a rule in place, if the review is not completed, the next step in the care path cannot proceed without an intervention.

ARIA 2011 enables treatment centers to define checklists and attach them to any task, as a QA/safety measure. Systems can be configured to require that these checklists be completed during “time-outs” that would occur at key points during the radiotherapy process—a safety measure that Varian supports and has pledged to facilitate through changes in the ARIA information system.

“For example, in order to configure a ‘treatment approval’ task, the user can specify: as part of this, there must be a double check of the plan against the prescription,” says Wicha. “Or the system can require a time-out session with a longer set of checklist items pegged to the institution’s established QA procedures. Once configured, the system will require that checklist items are completed prior to the next step in the care path. Also, users can build in approval mechanisms, and have data be locked once approvals have been logged so that no one can make inadvertent changes to the treatment plan without override permissions.”
“Varian recognizes the importance of continuing to find ways of enhancing the safety of radiation therapy,” says Zankowski. “These new features in ARIA 2011 improve and simplify clinical workflow, and we expect them to contribute to a more consistent process following established workflows and defined QA measures, which could result in improved patient care.”

Aggregating useful data

According to Wicha, early testers of ARIA 2011 are starting to see benefits in the data that can be captured and analyzed. “The focus in this release was on patient-centric processes—making it easier and more intuitive for the people who work with patients and with patient information,” he says. “Our product development roadmap will look next at administrators, and how we can use data being captured by ARIA to help them spot process inefficiencies and bottlenecks. The goal is to help them make informed decisions about where to add staff or equipment, or perhaps reengineer a process.”

“For customers using ARIA 2011 in a fully integrated environment that includes Varian’s treatment planning and treatment delivery technologies, there will be other significant benefits,” says Lawrence. “For these sites, there will be a more robust ability to query the data for information about treatment processes and outcomes. That’s because all the data will reside in one system that minimizes any handing off—image data, patient information, the treatment plan, the electronic medical record.”

“Good quality treatment data should be captured as a by-product of good processes and good design,” adds Zankowski. “When processes are standardized within an integrated environment, the data collected have great potential to shape best clinical practices.”

Varian continues to work with key thought leaders in the areas of oncology-specific electronic medical records and clinical workflow to develop the 2011 enhancements to ARIA. “We meet with an advisory board every two months to share work-in-progress and to collect feedback that can be quickly incorporated into the development effort,” Zankowski says. “We used a very international mix of advisors covering the United States, Canada, Australia, and Europe, and a cross section of clinical professionals, including IT managers. This system has been certified so that our radiation oncology customers can use it to demonstrate stage 1 ‘meaningful use’ of an EMR, in order to qualify for HITECH Act funding.”

ARIA 2011 Clinical Management Capabilities

User-centric design. Doctors, nurses, radiation therapists, physicists, dosimetrists, and administrators can easily access what they need, when they need it, at the level of detail necessary to the task at hand.

Personalization to the user. Users log in to a personalized home screen configured to meet their own unique needs, much like users of the Yahoo! Internet browser have the option of setting up “My Yahoo!” dashboards with the information that particular users want to see.

Icon-oriented graphical interface. Users interact with the system using easily recognized pictures and symbols, rather than words.

Unified dashboard. The system is more tightly integrated with Eclipse™ than ever before, presenting as a single clinical management system that allows seamless access to both applications from home screens and task lists.

Care paths linked to scheduling. Care paths are sequences of tasks that are preestablished according to a treatment center’s workflow protocols. Once set up, they drive the software and are tied to scheduling, so that when one task has been completed, the next task in a sequence is automatically activated and appears on the relevant person’s schedule of tasks for that day.

Task-driven processes. Users work through a schedule of activities and appointments, without needing to know what application or module should be launched to accomplish each step. They simply click on a defined task and the correct application launches.

Automation and standardization for efficiency and safety. Workflow—through the judicious use of customized care paths—can be standardized for efficiency and safety, using rules that are unique to a treatment center’s processes. Clinics can define checklists and attach them to any task as a QA/safety measure, and require that these be completed before a treatment progresses.
GEARING UP FOR Meaningful Use of an EMR

The race is on! The starting gun was the release of “meaningful use” criteria from the Centers for Medicare & Medicaid Services (CMS) and the Office of the National Coordinator for Health Information Technology (ONC) defining what would constitute the meaningful use of electronic medical records (EMRs) as mandated by the HITECH Act, part of the American Recovery and Reinvestment Act (ARRA).
Varian customers in the United States should be well positioned in the race to qualify for the financial incentives CMS is offering to medical centers and oncologists for deploying—and showing meaningful use of—EMRs. The final rule requires that organizations demonstrate meaningful use of their EMR for at least three consecutive months in their first calendar year of participation in the program. To qualify for the full US$44,000 per provider in incentive payments, they need to begin meaningful use reporting by September 30, 2012.

"With our ARIA® system and existing practices, I think we will have a fair amount of the meaningful use requirements already satisfied with very little additional effort," says John W. Ridley, executive director of oncology services at Decatur Memorial Hospital of Central Illinois. "The new ARIA 2011 to be released later this year will help us accomplish the remainder."

During 2011, Varian will release a new version of its ARIA oncology information system, which will be compliant with ARRA HITECH stage 1 requirements. Varian was already updating ARIA to be compliant prior to the final rule release, and has now received certification for use by a certified EMR, to qualify for U.S. federal funding under the ARRA HITECH Act.

Varian executives, who had partnered with other oncology EMR vendors to provide CMS with input regarding the specific needs of the oncology community during the rule-making process, were pleased to see that the final rule incorporated a number of their suggestions. The final rule focuses primarily on requirements for stage 1 of the new multiyear EMR program. Rules that cover the more stringent parameters for compliance with stages 2 and 3 of the program will be announced sometime in the future.

**Get trained on meaningful use**

Credit the federal government with seeking actual substance with EMR deployments. It isn’t enough to simply have an EMR in place; the government wants to ensure that the technological innovations that electronic records enable are actually being used, hence the requirement to show meaningful use.

"Achieving meaningful use requires a partnership," says Ken Hotz, Varian oncology information systems senior product manager. "Varian needs to provide a certified EMR. And the providers and the clinic staff need to demonstrate meaningful use in their daily operations. Meaningful use is a measure of the provider’s sufficient use of the prescribed capabilities."

With release of the final rule, Varian launched a new set of webinars describing the criteria, features, and policies CMS requires for meaningful use, as well as the metrics CMS will use in determining whether the policies are sufficiently followed. The meaningful use criteria are stipulated through a list of 15 core capabilities, and through requirements for adoption of an additional five options that can be selected from a menu of ten. All webinars were recorded and are available, along with a wealth of other resources, on http://www.MyVarian.com.

Ridley recently tuned into a webinar presented by Rob Thibault, manager of clinical implementation consulting at Varian. "Decatur Memorial is a completely integrated Varian site with three linear accelerators, multiple Eclipse™ treatment planning workstations, and a large network of ARIA workstations,” Ridley says. “So we have a keen interest in keeping up with Varian’s work, particularly with respect to ARRA HITECH.”

While he was aware of many of the things Thibault spoke of, Ridley was anxious to hear insights to clarify some of the ambiguity with the new regulations. "There’s a lot of interest in this, and the Varian webinars have been well attended," Ridley says. "The webinars I tuned into this week each had well over 200 people participating."

Additionally, Decatur’s Kim Wolpert, radiation oncology director, had just traveled to a Varian training center to work with a prerelease version of ARIA 2011. "I'm confident that the new release of ARIA will enhance our workflow, as part of meeting our meaningful use needs," Wolpert reports. "It is obvious that a lot of work and resources have gone into making that happen."

At this point Ridley’s main concern with implementing meaningful use is in determining how best to provide patients with access to their EMR. The technology isn’t a problem. Decatur will do this through a password-protected patient portal into ARIA data. His concern is with being sensitive to the patient.

**Customized Consulting Services**

Varian provides customized consulting services to customers not only in North America but worldwide, including services specific to the ARRA HITECH Act such as:

- Paperless process implementation (with an ARRA HITECH focus)
- ARRA HITECH gap analysis
- New site implementation
- Optimizing your best practices
- Data management (customized reporting needs)
“Electronic access to scheduling information and into a wealth of survivorship programs and resources will be great,” Ridley says. “But at the same time a patient’s anxiety levels might go up if he or she were able to read a physician’s dictated notes, or look at images without clinical guidance. Meaningful use doesn’t require this depth of access, but these are questions that will need to be considered.”

**Determine what you can start doing now**

Ridley’s team has begun assessing which of the 15 core capabilities and which of the five menu items they can already implement using their current version of ARIA—an area he found of special interest in Thibault’s webinar. He is also working with his team to plan how the other meaningful use criteria will be put into practice, once supported by the upcoming release of ARIA 2011.

“From past experience working with Varian, I knew that when they said the new release would meet all meaningful use criteria, it would,” Ridley says. “Varian has always focused on continually upgrading its products and delivering those upgrades to the field. We enjoy a true partnership with Varian, and our therapists love using the equipment as well as the front-end software, which has always been user friendly.”

**Tips on preparing for meaningful use**

To help ARIA users qualify for incentive payments under the HITECH Act, Varian has launched a number of customer service programs, including Clinical Consulting Services and regularly scheduled symposia and online webinars, that cover how to use ARIA to demonstrate the meaningful use of an EMR.

Here are some tips from a recent webinar presented by Thibault:

- **Assign an internal champion.** Appoint one person who needs to understand the complexities of the ARRA HITECH initiative. As part of his or her role, this person should set up a cross-functional core team to assist with the implementation.

- **Understand the guidelines.** It is important to understand the 15 core capabilities and the 10 menu options, which are covered by the recent Ken Hotz webinar available at http://www.MyVarian.com.

- **Don’t procrastinate.** Many of the guidelines can be met with current functionality. So use the functionality you already have to make meaningful use part of your operational procedures.

- **Review current processes and amend as needed.** Identify what is currently being done and optimize how this may have to change in order to capture the required data. If a nurse needs to enter vital signs, does he or she have immediate access to a computer to do so? Are you capturing mandated demographic data? One requirement is to simply ask about smoking and record the response.

- **Identify educational resources for patients.** Search now for electronic resources you will be able to point patients to.

- **Create IF/THEN scenarios.** Decide now which clinical decision support rules to implement. For example, if white blood cells drop below X, then the course of action is Y.

- **Formulate patient reminders.** Work now on defining reminders to be sent to patients regarding preventative practices and follow-up care.

- **Perform security and privacy audits.** Policies and procedures need to be in place for password management, workstation security, emergency access to your systems, and other factors such as the deactivation of accounts of departing staff members.

**ARIA for Medical Oncology and ARIA for Radiation Oncology Receive ARRA HITECH Certification**

ARIA® for medical oncology (version 10 MR2) and ARIA for radiation oncology (version 11) have been certified for use in demonstrating stage 1 “meaningful use” of an EMR to qualify for U.S. federal funding under the HITECH Act.

Both versions of ARIA have now received complete EMR certification for ambulatory environments from the Drummond Group. Tested under the Drummond Group’s Electronic Health Records Office of the National Coordinator Authorized Testing and Certification Body (ONC-ATCB) program, the ARIA systems were certified as 2011–2012 compliant in accordance with the criteria adopted by the U.S. Secretary of Health and Human Services.
This is ARIA

ARIA is now an ARRA HITECH–certified EMR that provides oncology-specific clinical decision support for cancer care professionals. Together with EQUICARE CS survivorship software*, ARIA helps you manage the journey from cancer patient to cancer survivor.

*EQUICARE CS is offered in conjunction with Cogent Health Solutions.
Discover the Eclipse difference today