Isotope Hope

By Kurt Woock

With a half-life of 66 hours, molybdenum-99 (Mo-99) makes getting from point A to point B quickly a matter of survival. Mo-99 is the parent of the isotope technetium-99m (Tc-99m), which is used in the detection of heart disease, detection and staging of cancer, and the study of brain and kidney function. The narrow window of opportunity during which the isotope is useful leads to a supply chain that is perpetually stretched thin—"it’s impossible to stockpile a reserve. Making conditions more precarious, every molecule of Mo-99 in the United States is currently imported. A bill recently passed by Congress and signed into law by the president lays the groundwork for bringing production—and with it, added reliability—into the United States.

There is not one particular reason Mo-99 is not produced in the United States, according to the president of the Society of Nuclear Medicine and Molecular Imaging, Frederic Fahey, DSc. The United States, which consumes half of the world’s output of Mo-99, has relied largely on Canadian and Dutch sources. Those companies import highly enriched uranium from the United States, manufacture the Mo-99, and sell it back to the United States. “There has been talk for 10 or more years about finding a new source,” Fahey said. “Push came to shove in 2009 when the reactor in Canada was down for a year. At the time, we were getting about 50% of Mo-99 from Canada.” At the same time the Canada plant went down, the volcanic eruption in Iceland further interrupted the shipments from European plants. The shutdown of a Netherlands facility made problems worse.

A host of other factors indicate that the time for change is here: The eight reactors used to manufacture Mo-99 worldwide are aging—many are upwards of 40 years old. The Canadian NRU reactor is scheduled to cease isotope production in 2016; and increased global demand provides ample motivation for the United States to have its own supply. The US government also has an interest in limiting the availability and use of highly enriched uranium. In fact, the law, which passed as part of the Conference Agreement for the National Defense Authorization Act for fiscal year 2013, calls for exports of highly enriched uranium to cease in 7 years. New manufacturing methods allow Mo-99 to be produced using low enriched uranium.

The law ensures Mo-99 production in the United States keeps rolling forward. It outlines how resources will be used and the fundamentals of cost sharing among constituents. However, the law does not come with funding. Fahey said just getting the ball rolling on a multiyear project is important. “I think what this does is send a message to those who might fund the research [universities and private companies alike] that the government now understands this, that they are in the game. I think this will spur some of these people to get ready.”

Since 2009, the Global Threat Reduction Initiative, part of the Department of Energy’s National Nuclear Security Administration (NNSA), has formed four partnerships with organizations intent on manufacturing Mo-99 domestically without the use of highly enriched uranium. The NNSA provides support, including 50-50 cost-sharing of up to $25 million per project. The funding is intended to accelerate the various plants’ entry to market and is not meant to be a long-term subsidy. The goal is to be up and running as rapidly as possible. The new law reinforces the sense of urgency surrounding these projects.

“In order to do the right test for the right patient at the right time, this is critical. We appreciate the fact that the US government understands the importance of nuclear medicine and is willing to provide for that success in the long term,” said Fahey.
Located just south of Lake Ontario, Rochester, NY, has been a hub of American innovation for more than a century. In the 1820s, construction of the Erie Canal, which curves around the southwest edge of the city, helped fuel Rochester’s growth from small town to small city, a harbinger of many canal-induced boomtowns. Frederick Douglass called Rochester home for a time and opened an antislavery newspaper 16 years before Lincoln signed the Emancipation Proclamation. Women’s rights, Western Union, and Kodak each grew up in Rochester as well.

Although it doesn’t have the same visual grandiosity as, say, a 363-mile flooded trench, the Rochester Regional Health Information Organization (RHIO) is far from insignificant. Rochester RHIO is a nonprofit organization that facilitates the exchange of electronic health information among area health care providers. It’s also part of an experiment.

UltraMobile provides digital x-ray, ultrasound, and cardiac monitoring to customers in long-term care facilities or private residences.

Participating in RHIO Brings Challenges and Benefits

By Kurt Woock

Will Irwin, president and owner of UltraMobile Imaging, is part of the collective. UltraMobile provides many different types of x-rays, ultrasound, and cardiac monitoring to customers in long-term care facilities or private residences. “I felt that I needed to participate as soon as possible. It was a community responsibility,” Irwin said. “One of the reasons health care has been so expensive is that health care providers have operated in their individual silos of care. Because of that, particularly in diagnostic testing, tests are repeated, and information isn’t shared across the system. We’re a long way from eliminating that kind of thing, but our RHIO represents a sincere effort to begin to address that problem.”

About 40 health care organizations in the Rochester area provide patient information to the RHIO. Rochester RHIO orchestrates information sharing by gaining prearranged consent from patients who opt in. “Without it, cases arise
when I have to go back to an individual resident and obtain consent from them or a son or daughter,” Irwin said. “It’s not very practical. That consent issue is figured out at the front end.” More than 400,000 patients have enrolled in the program. The RHIO helps prevent repeated testing, and it clears the red tape and errors that can occur during emergency care or when using handwritten records. To ensure transparency, patients can track who views their files.

Rochester RHIO was based on an incentive-based, entrepreneurial model. The federal government offered some funding with a stipulation that if the program attracted a certain number of providers, a second round of grants would follow. The state government, area businesses, hospitals, and insurers have contributed, too. Eventually, Irwin says the program, currently supported by grants, will charge fees. The capability of the program is evolving, too. At first, the program facilitated the exchange of reports. Gradually, the images are being added, as well.

Irwin says programs like Rochester RHIO will help the national health care system shift to a more sustainable model. “How we care for the elderly has got to become more affordable,” he said. “We’ve got to be able to do more home care, allow more people to age in place. And the only way that we can keep costs down for that is by beginning to share the information we already have. That’s why I am so enthusiastic. I personally think my mobile business is part of the solution. We shouldn’t make children of an elderly patient take a day off to drive them to a hospital to get an x-ray or ultrasound. It should be easy to get that data to the people who can act on it.”

For UltraMobile, getting that data to Rochester RHIO required more than simply signing on. Irwin’s company uses MediMatrix’s Health Information System. “We had the data,” he said. “We captured it every day. The problem was how to get it into a format that was acceptable to the RHIO. It was really a mapping problem. We had the radiologists’ reports, but we had to map their interpretations into consistent fields understandable to the RHIO.” By working with MediMatrix, radiologists’ reports from UltraMobile were converted to the universal format employed by the RHIO called HL7.

Irwin said the program took some time to gain enough critical mass to be useful on an everyday basis. But, more and more, the RHIO’s potential is being realized. And, as it proves useful, more people sign up. Many constituencies benefit. For one, the RHIO makes it easy for providers of different sizes to interact: Small companies don’t face prohibitive start-up costs and large hospital systems aren’t stuck with extra responsibilities. Patients, especially those in rural New York, benefit from the simple sharing of diagnostic data between health care providers.

The long-term goal is for successful programs to be replicated across the country. Eventually, those programs would be linked together. This bottom-up approach works only if communities like Rochester commit. Committing to new programs comes with risks, but failing to do so is equivalent to committing to the status quo, which most agree is not sustainable. “RHIO is a very democratic thing,” Irwin said. “It has nothing to do with a fee for service model. It is based on taking care of populations of people.” RHIO doesn’t provide an all-encompassing vision of the future, but it’s one piece of the puzzle.

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Together, a handful of new CR/DR products on the market represent a certain kind of progress. None of the products makes a radical leap in fundamental technological capability, but all make a steady push forward on a variety of fronts, most notably imaging flexibility and patient comfort. These improvements—a few inches of extra space here, a smaller footprint there, no wires anywhere—seek to make the imaging process as crisp as the image themselves. An easier patient experience leads to quicker throughput, a reduction in the need to reimage: in other words, better workflow. What follows is a roundup of some of the most recent upgrades, enhancements, and new CR/DR arrivals.

**Viztek’s Dynamic System**

The Dynamic system from Viztek is a multipurpose digital radiography and fluoroscopy solution that produces high-quality static mode DR images in as little as 5 seconds. It offers a 17-inch by 17-inch panel that eliminates the need for rotation. The unit supports patients up to 584 pounds. It can be lowered to an 18.9-inch horizontal tabletop height and offers 79 inches of patient coverage, minimizing patient repositioning, while accommodating long-leg imaging through auto movement and positioning.

The Dynamic system manages a variety of fluoroscopy subtypes, including gastrointestinal, pediatrics, injections, tomography, arthrography, interventional radiography, urogenital, and digital subtraction angiography.

**Del Medical OTC12D Series Radiographic Suites**

Del Medical has released two units in the OTC12 Series, which joins Del Medical’s other scalable, overhead tube crane digital imaging suites. Designed to improve patient care and workflow efficiency, the OTC12D-M and OTC12D-A offer exam versatility, high quality, and reliability at a low total cost of ownership.

The OTC12D-M incorporates tube-side, touchscreen generator, and positioning controls, giving technologists the ability to focus more on the patient. It is accompanied by the EV800 elevating table, with an 800-pound patient load capacity, and four-way float top. Standard features of the EV800 include a newly designed flat tabletop, recessed foot treads, and tableside hand controls for table elevation and float.

The OTC12D-A includes automatic collimation and tube-side, touchscreen generator, and positioning controls. Like the M model, the OTC12D-A comes with the EV800 elevating four-way float top table and the VS300 wall stand. Del Medical will offer vertical tube tracking to the VS300 with the OTC12D-A in early 2013. Standard features on Del’s 300 Series wall stands include overhead and side mount PA positioning handgrips.
A multipurpose DR and fluoroscopy solution that produces quality static mode DR images in as little as 5 seconds, Viztek’s Dynamic system is also built to support bariatric patients.

**Del Medical DR Mobile Unit**

Del Medical also has added the DR Mobile. The DelWorks DR Mobile is a compact, mobile x-ray system that can fit in diverse hospital environments, such as the operating room, emergency department, and patient bedside exams.

The DelWorks DR Mobile can be equipped with a wired or a wireless detector. The unit comes with a 19-inch touchscreen display utilizing the latest version of the DelWorks DR workstation software. Users can preview images within seconds after exposure and transfer them to the hospital network.

The DelWorks DR Mobile’s 32 kW output allows for fast exposure times, reduced motion artifact, and optimized penetration of dense anatomy. The unit’s maneuverable telescopic tube arm with collimator handle has inching controls for precise tube positioning. Dual-mode operation allows for easy switching between the built-in DR and CR.

**Konica Minolta Aero DR 10 x 12**

One of the industry’s lightest, wireless DR flat panel detectors, Konica Minolta’s Aero DR is now available in a plate size perfect for imaging the littlest patients. Thanks to its small size and proven dose efficiency, the recently launched Aero DR 10-inch by 12-inch is an ideal solution for pediatric imaging.

Introduced this past November, the 10-inch by 12-inch plate joins the existing line of Aero DR, which includes 14-inch by 17-inch and 17-inch by 17-inch plates. The flat panel detector incorporates Konica Minolta’s Cesium Iodide (CsI) scintillator that boasts ultra-high detective quantum efficiency (DQE) for high-quality images but with minimum x-ray dose exposure. By combining the CsI panel and Konica Minolta’s image processing technology from its REGIUS systems, the Aero DR delivers consistent and reliable high-quality imaging.

**Toshiba RADREX-i Wireless DR**

Toshiba America Medical Systems Inc introduced the RADREX-i Wireless DR x-ray system in November. RADREX-i Wireless includes the automated RexSpeed features and
PRODUCT SPOTLIGHT

CR/DR

New from Toshiba America Medical Systems, the RADREX-i Wireless DR x-ray system includes the automated RexSpeed features and RexView with image preview from the original RADREX-i.

RexView with image preview from the original RADREX-i, plus a new lightweight, cableless 14-inch by 17-inch panel. Ideal for out-of-bucky work, including tabletop imaging of extremities such as hands, wrists, forearms, and feet, and wheelchair and gurney patient imaging, the wireless detector provides technologists with added flexibility while improving workflow. The wireless panel also improves image quality, as it can be positioned more closely to the anatomy when performing out-of-bucky work. The system can accommodate virtually all patient types and makes imaging safer with its RexProtect dose saving features.

Agfa DX-D 400

Agfa HealthCare has launched its DX-D 400, a floor-mounted x-ray suite and the newest member of the company’s imaging portfolio. The DX-D 400 is compact and versatile. Combined either with CR technology or with a cassette-sized DX-D detector and the NX workstation, the DX-D 400 offers imaging technology at an affordable cost. The DX-D 400 can be implemented in imaging centers, private practices, and hospitals that are interested in replacing or adding digital x-ray technology.

The DX-D 400 is a scalable solution offering options for tube capacity and generator size. Users can order it with or without DR capability. DX-D 400 produces clear, sharp images with multiscale contrast detail enhancement provided by MUSICA software.

Siemens Luminos Agile

The Luminos Agile fluoroscopy/radiography system from Siemens Healthcare has received 510(k) clearance and is now available in the United States. The Luminos Agile is a patientside controlled system with dynamic flat-panel detector technology and height-adjustable table, and has dual-use capability for fluoroscopy and radiography.

The Luminos Agile’s 17-inch dynamic flat-panel detector provides an image that is up to 117% larger than a 13-inch image intensifier. This enables users to view objects without repositioning or changing the field of view, reducing overall fluoroscopy time and dose.

The Agile’s table height adjusts from 25 to 44 inches. With its horizontal and vertical transfer positions, the system accommodates a wide range of patients, including children and those with mobility challenges. The Agile’s 600-pound table weight capacity and 24-inch-wide opening provide easy access for bariatric and immobile patients, and the space-saving open design enables easy access from all sides of the table. These features help to dramatically improve the patient experience.

The fully motorized tower, and synchronized table and
wall bucky tracking, allow for improved radiography workflow and increased patient throughput. The OPTI Grip handle provides ergonomic tableside operation for left- and right-handed users, and the Fluorospot Compact digital imaging system for both fluoroscopy and radiography helps improve workflow efficiency. Advanced postprocessing further enhances image quality to support more accurate diagnosis.

The Siemens Combined Applications to Reduce Exposure (CARE) dose reduction program for the Agile decreases radiation exposure for patients and staff without compromising image quality, while the unique DiamondView Plus imaging chain allows for significantly better image quality and noise reduction. Digital Density Optimization improves image contrast and detail recognition for critical regions of fluoroscopic images.

Siemens Mobilett Mira Mobile Digital X-ray System

Siemens Healthcare has another new product—the company’s first mobile digital x-ray system with a wireless detector, the Siemens Mira. Its wireless capability facilitates examinations of patients with limited mobility, and its unique rotating swivel arm helps increase ease of use for clinical staff.

The x-ray detectors on mobile units are often connected to the system via a data cable. With the Mobilett Mira, Siemens combines the advantages of mobile x-ray imaging with the flexibility of a wireless detector. Mobilett Mira’s integrated drive allows users to navigate it through small spaces such as elevators. With a resolution of more than 7 million pixels, the detector delivers image quality comparable to that of high-resolution systems. The system works with very short exposure times beyond 1 millisecond, reducing patient radiation exposure. In addition, Siemens has redeveloped its mobile x-ray swivel arm system for the Mobilett Mira so that it moves vertically and also rotates up to 90 degrees. The swivel arm integrates all electric connection cables that conventional mobile x-ray systems often carry externally, making it easy to use and easy to clean.
Two New Software Offerings from GE

GE Healthcare, Waukesha, Wis, released two new software packages for advanced analysis of cardiovascular magnetic resonance (MR) images: CardiacVX and MR VesselIQ Xpress. The company’s CardiacVX software delivers fast, intuitive, semi-automatic analysis of key cardiac parameters, allowing the user to create a comprehensive cardiac patient report within a streamlined clinical workflow. MR VesselIQ Xpress, based on GE Healthcare’s CT VesselIQ Xpress platform, is an optimized image analysis package for MR angiographic data. It analyzes selected vessels for stenosis, directional tortuosity, and other vascular anomalies. MR VesselIQ Xpress provides advanced tools such as automatic vessel tracking with centerline display of any vessel, quick 3D visualization, and fast access to vessel cross-section and profile images.

www.gehealthcare.com; (866) 281-7545

ViZion + DR Panels from Viztek

Viztek, Raleigh, NC, the advanced digital imaging solution provider, has 510(k) clearance for the ViZion + DR line of panels. This new line of products includes multiple panels in tethered, wireless, and fixed configurations offering high quality images at quick speeds. The panels require no generator interface. The ViZion + DR panel product line has a versatile range of applications, including new x-ray rooms, retrofit rooms, and mobile implementations. The fixed panels will be available in Viztek’s Straight Arm and U-Arm configurations.

www.viztek.net; (800) 366-5343

Clinical Viewer from DICOM Grid

DICOM Grid, Phoenix, Ariz, a global provider of cloud-based medical image exchange solutions, recently launched their next generation clinical viewer. This latest release enables the easy access and viewing of complex medical imaging data and associated reporting from any browser-based device. Mobile viewing enables doctors to streamline collaboration with patients. The viewer comes equipped with a variety of interactive tools used for measuring, annotating, and manipulating images. It can even be optimized for low bandwidth environments.

www.dicomgrid.com; (888) 315-0790

Postprocessing and Structured Reporting from RamSoft, Digisonics

RamSoft, Toronto, has partnered with Digisonics to offer integrated, vendor-neutral, cardiac postprocessing and structured reporting for all cardiovascular modalities. Digisonics was recently named Best in KLAS for the cardiology market segment for the fifth consecutive year. RamSoft’s PowerServer RIS, PACS, and tele-radiology solutions transfer the relevant patient studies via DICOM to the Digisonics workstation for high performance image analysis and professional reporting, which can be completed in minutes. This integration maximizes efficiency and productivity by automating the complete workflow for cardiac specialists.

www.digisonicsinc.com; (713) 529-7979

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Transthoracic Echocardiography Simulator from HeartWorks

In echocardiography, images of the functioning heart are obtained through a transthoracic procedure, a handheld probe placed over the chest, or a transesophageal procedure that creates close-up images of the heart via a probe guided through the mouth into the esophagus. A new simulator from Heartworks, London, could make training for the procedure more effective. The simulator, which uses Ascension Technology sensors, utilizes a lifelike manikin torso, visualization software, and an ultrasound probe to provide training in both procedures. Using the ultrasound probes, trainees gain practice obtaining varied views and interpreting 2D ultrasound images while working in the context of the 3D structures of a beating heart. The simulated 2D and 3D images are displayed side-by-side on a computer screen.

www.heartworks.me.uk; 44 (0) 203 447 9360

FDR Go from FujiFilm

FujiFilm Medical Systems USA Inc, Stamford, Conn, reintroduced the FDR Go at RSNA 2012, representing the latest evolution of its digital portable portfolio. Fujifilm’s new DR models have evolved to a next-generation level with advanced Fujifilm DR features such as irradiated side sampling (ISS) and dynamic visualization (DV). ISS senses x-rays at the top detector layer, minimizing light spread (blur) and capturing sharper signals. DV clarifies images for higher visibility detail and enables wider range of window and leveling throughout the entire image. The FDR Go is designed for image preview in as fast as 1 to 2 seconds. Clinicians can then send images wirelessly to the hospital network without leaving the patient bedside. Features designed to simplify workflow include: SpeedLink, which automatically maps generator techniques, tube head inching, and spare battery charging.

www.fujifilmusa.com; (800) 872-3854

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