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Cost-Impacting Factors of Mo-99 Series: HEU to LEU Conversion

As a leader in the production of Technetium-99m (Tc-99m) generators, with its Ultra-Technekow™ V4, and its parent isotope, Molybdenum-99 (Mo-99), Mallinckrodt has faced significant challenges as the organization continues to take steps to provide customers with an uninterrupted supply of product. In light of the international objective to produce less high-enriched uranium (HEU) and more low-enriched uranium (LEU), Mallinckrodt has taken steps to convert to LEU in the production of medical isotopes. In this issue, Roy Brown, Senior Director of Strategic Alliances at Mallinckrodt, provides an overview of the move from HEU to LEU and how it is impacting the nuclear medicine industry and Mallinckrodt.

While the instability of Mo-99 supply for Tc-99m generators remains the top concern in nuclear medicine, an important global challenge is the transition from the use of high-enriched uranium (HEU) targets to low-enriched uranium (LEU) targets in order to eliminate the risk of HEU diversion.

Mallinckrodt changed production procedures starting in 2010 to convert to LEU in order to ensure a reliable supply of a safely produced product.

While the process of producing Mo-99 is chemically very similar when comparing both substances, LEU produces less Mo-99 while emitting different levels of waste, which is cause for significant changes in the production process. Currently, Mallinckrodt is producing Mo-99 using both HEU and LEU targets, but the complete conversion is scheduled to be finished by the end of 2017, when Mallinckrodt will be able to offer 100 percent LEU-generated Mo-99 to all of their customers.

Mallinckrodt's conversion efforts have involved seeking and receiving approval of LEU-generated Mo-99 from the Food and Drug Administration (FDA) and Health Canada. Additionally, Mallinckrodt is actively supporting the American Medical Isotopes Production Act, which supports the domestic production of Mo-99. To read more about the conversion updates, visit the Industry Commitment page on Mallinckrodt's website.

Though the conversion from HEU to LEU is in the best interest of all citizens, converting targets comes at a cost. The conversion involves upgrading facilities and the production itself results in an efficiency loss of about 20 percent. These costs are a matter of compliance and are largely absorbed by the industry, but LEU-generated Mo-99 is provided at a higher cost than HEU-generated Mo-99.

Mallinckrodt remains committed to providing an uninterrupted supply of Mo-99, leaning on their expertise in regulatory compliance to make a successful transition from HEU to LEU.

As one of the five Mo-99 producers in the world, Mallinckrodt is joining production plants in Australia and South Africa in the process of adapting the facilities to be able to fully convert the targets used in Mo-99 production from HEU to LEU.

IN THIS ISSUE:

Mallinckrodt Pharmaceuticals

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Medicare Accountable Care Organizations

By Barbara Ossias

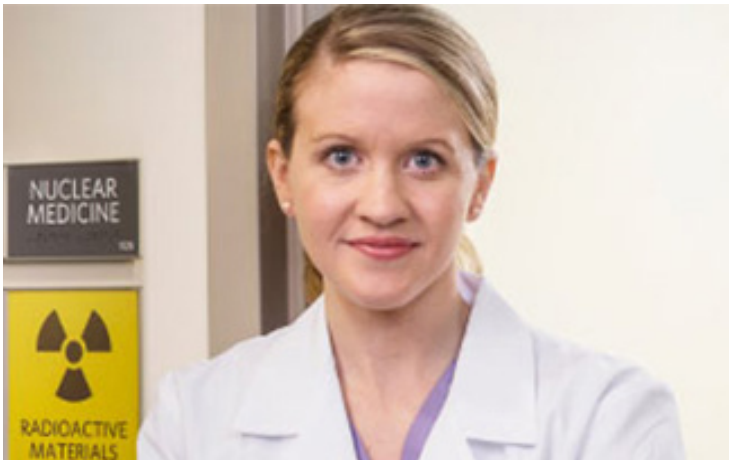
Barbara Ossias is a healthcare consultant with expertise in all phases of reimbursement support. She is founder and principal of Revenue Reimbursement Solutions, and has more than 20 years of experience working in the healthcare industry. Barbara is a paid consultant who contributed this article to Mallinckrodt.

Accountable Care Organizations (ACOs) are legal entities that are designed to allow integrated networks of providers to work together with the goal of improving patient outcomes while cutting costs, then share in the savings that come from coordinated care. With the passage of the Affordable Care Act, the Center for Medicare and Medicaid Innovation (CMMI) began working with the Centers for Medicare and Medicaid Services (CMS) to develop ACOs. ACOs may provide a framework to control costs primarily by reducing avoidable, duplicative, variable and inappropriate use of healthcare resources, but ACOs pose challenges to medical imaging providers.

Currently, Medicare ACOs account for 7.8 million beneficiaries and 15 percent of all Medicare spending. Since the move to ACOs began, Medicare has offered several ACO programs:

- Medicare Shared Savings Program (MSSP) – Helps Medicare fee-for-service program providers become an ACO.
- Advance Payment ACO Model – Supplementary incentive program for selected participants in the Shared Savings Program.
- Pioneer ACO Model – A program designed for early adopters of coordinated care. Now closed for applications – replaced by a new ACO in 2016.

Imaging providers will need to be aligned with a Medicare ACO to be reimbursed for procedures as the system expands and we move away from fee-for-service payment. Not being in an approved ACO in the future will mean not being able to participate with the program.



For Medicare, it is essential for the current 405 ACOs to stay in the MSSP through 2016, and for a substantial number of new ACOs to join the program to meet the goals of shifting away from fee-for-service.

In 2016, 30 percent of Medicare payments will be made to ACOs; by 2018, 50 percent of Medicare payments will be made to ACOs.

The Next Phase in Medicare ACO Participation

CMS is now accepting applications for participation in the next phase of the Shared Savings Program. Participation will reward providers with incentive payments, but providers must complete the application process now for 2017. Providers must complete/submit a Notice of Intent to Apply (NOIA) and an application to be considered for participation in the Shared Savings Program. Information and instructions can be accessed on the CMS website about the Shared Savings Program Application.

Proposed Changes in the Medicare Part B Average Sales Price (ASP) Reimbursement Methodology

CMS has issued a proposed rule to test new models to improve how Medicare Part B pays for prescription drugs. Medicare Part B covers prescription drugs that are administered in a physician's office or hospital outpatient department, such as Lexiscan and other pharmstress agents, from an ASP Reimbursement Methodology. Drugs paid for under Medicare Part B generally fall into three categories:

- Drugs furnished incident to a physician's service in the office or hospital outpatient settings.
- Drugs administered via a covered item of durable medical equipment.
- Other categories of drugs explicitly identified in the law.

The proposed Medicare Part B Model would test new ways to support physicians, and other clinicians, as they choose the drug that is right for their patients. It is designed to test different physician and patient incentives to prescribe the most effective drugs and reward positive patient outcomes with new payment approaches.

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Customer Profile: The University of Oklahoma College of Pharmacy

In each issue, @nuclear will profile one of Mallinckrodt Pharmaceuticals' most valued customers.

The University of Oklahoma College of Pharmacy Nuclear Pharmacy provides both education and pharmaceutical services to meet the needs of the medical community in the Greater Metropolitan Oklahoma City area, dispensing approximately 400-475 prescriptions daily. This pharmacy is a state-of-the-art facility with a full Nuclear Pharmacy staff, consisting of nuclear pharmacists, pharmacy interns, technicians and drivers. G.T. Dolan, a 2007 graduate from the University of Oklahoma, manages the full-service pharmacy of 20 employees.

How did you get involved with nuclear medicine? What keeps you interested in the industry?

I started in nuclear medicine through an internship, where I got to see the functions of a lab and learn how to work with sterile products. There, I determined nuclear medicine would be a good fit for my career.

I have developed a deep appreciation for nuclear pharmacology because the services we provide are essential to the patients. I enjoy working in a field that offers low dose diagnostic tools. We provide cardiac tracers, tagged white blood cells, and other radiopharmaceuticals that care providers and hospitals rely on to provide the highest level of care to patients.

What is the biggest innovation or advancement in nuclear medicine since the start of your career?

I think the increased prevalence of PET-based isotopes and PET-based studies, which are primarily used in the oncology field. It's benefited the field of oncology immensely, since PET imaging is a valuable research and diagnostic tool, and it offers benefits that health providers can extend to their patients.

What do you think are the main challenges facing the nuclear medicine industry?

There have been some questions facing the industry as to the source of the nation's isotope supply in the next three to five years, which has led to some challenges. Though rising costs are associated with the conversion from high-enriched uranium (HEU) to low-enriched uranium (LEU), the change is necessary in the industry to keep medical isotopes in production.

It's critical to confront the source of the isotopes, and the challenge will be to see who is going to have the resources to provide those responsibly.

One thing that could greatly improve the industry would be a domestic supply of Molybdenum-99, which would alleviate the costs and availability issues associated with overseas transport and production.

Industry Scan

Stay informed with the latest nuclear medicine industry news and insights.

Pediatric Imaging Today
RadiologyToday

The country's first pediatric hospital, Children's Hospital of Philadelphia (CHOP), is expanding its pediatric imaging center into its new suburban specialty care and ambulatory surgery center.

Read the full article.

Pretargeted Radioimmunotherapy May Eliminate Colorectal Cancer
Imaging Technology News

An emerging cancer therapy, pretargeted radioimmunotherapy (PRIT), resulted in complete remission of colorectal cancer in mouse models. This investigative treatment harnesses an antibody that attaches to the cell-surface antigen glycoprotein A33. Researchers united the anti-GPA33 antibody with radionuclide agents that deliver a powerful dose of radiation directly to the tumor.

Read the full article.

What Medicare Pays Doctors for Services and Drugs
Modern Healthcare

The CMS posted data that breaks down the $91 billion that Medicare paid individual physicians, diagnostic labs, ambulance services and other companies in 2014.

Read the full article.

Department Spotlight: Product Monitoring

Maintaining a reliable system for monitoring Mallinckrodt Pharmaceutical's nuclear medicine products helps ensure that customers receive the highest quality products and patients get the diagnostics they need. The Product Monitoring Department contributes to Mallinckrodt's commitment to high product quality. Margie Besing, Director of Product Monitoring, discusses her team's role in meeting that commitment.

Q: What is the goal of your department?

Margie: The Product Monitoring Department's main goal is ensuring customer needs are met after products are released for distribution by the Mallinckrodt manufacturing facilities. We achieve this by maintaining strict compliance with the Food and Drug Administration (FDA) regulations for monitoring and evaluating products in the marketplace, including processing complaints and assessing complaint reports to determine a need for further escalation – up to and including product recalls. We are responsible for all Mallinckrodt products – in Nuclear Medicine, Finished Pharmaceuticals, and Active Pharmaceutical Ingredients (API) – which we monitor with Mallinckrodt's core values of quality, integrity and service in mind.

Q: How does product monitoring serve nuclear medicine customers?

Margie: We are staffed with healthcare professionals who have clinical experience with our products. For example, Marit Sherry brings her experience as a Certified Nuclear Medicine Technologist (CNMT) and 27 years with Mallinckrodt to her role as the resident subject matter expert for our Nuclear Medicine products. She is the main point of contact for our Nuclear Medicine customers.

After a complaint is received, we follow protocol to fully process the report. We enter the complaint into our validated database, following up with the customer if more information is needed. If necessary, we facilitate the sample return process, assuring that our customer receives proper credit or a replacement product. The complaint is forwarded to the manufacturing facility QA team for investigation. When all steps are complete and the complaint is closed, a summary of the investigation is sent to the customer.

Q: How does your department contribute to safety?

Margie: In order to contribute to overall safety, we strictly adhere to the critical complaint escalation procedure. Complaints that are escalated may require that a Health Hazard Evaluation (HHE) risk assessment be performed. This is the tool that is used to determine whether or not to initiate a product recall. In HHE, specific data is reviewed by members of the Quality, Legal, Regulatory and Medical teams to determine the risk to health in the marketplace. If a product recall is initiated, Product Monitoring manages the process, including customer communication and collaborating with regulatory agencies.

Q: How is product monitoring evolving at Mallinckrodt?

Margie: Mallinckrodt is continually evaluating and exploring ways to improve the complaint process, which allows us to constantly advance our expertise in balancing regulatory oversight with customer care.

- We ensure that our department is cross-trained on all Mallinckrodt products.
- We provide product training internally, as well as new hire sales training, on Post Market Surveillance. This is essential because sales teams are sometimes the first to be notified of a product issue.
- Additionally, we use statistical analyses to monitor complaints and report trends monthly within Mallinckrodt to help the broader organization stay informed.

To be sure we can offer high quality products to help meet the needs of patients, Mallinckrodt relies on the Product Monitoring Team, as well as customer reports, to be passed to the appropriate team for evaluation. Any issues with Mallinckrodt products can be reported by calling 800.778.7898 or emailing the Product Monitoring Department at pmquality@mallinckrodt.com.

Cyclotron Corner

Dr. Bill Uhland, Principal Chemist and Development Engineer, shares fun facts and statistics that highlight the science and history behind nuclear imaging. In this edition, we explore Tc-99, which is commonly used in contrast injections.

In my last article, I started discussing reactor-produced drugs. In nuclear medicine today, about 90 percent of the injections involve some form of technetium-99m (Tc-99m), another reactor-produced drug. (Once again, just pretend you're reading "Dr. Bill's Reactor Corner.")

Element 43, Technetium, does not occur in nature, and hence for years was a blank spot on the periodic table.

In 1925, Walter Noddack, Otto Berg, and Ida Tacke reported the discovery of element 43, and named it "masurium." Unfortunately, their work could not be replicated, and a few years later this "discovery" was dismissed as an error.

In 1936, Carlo Perrier and Emilio Segrè analyzed the lip of the cyclotron at what is now the Lawrence Berkeley National Laboratory. The cyclotron contained molybdenum, and the first evidence of element 43, which does not occur in any non-radioactive form. It was named "Technetium," from the Greek word "Technos," meaning artificial, as this was the first element to be produced artificially.

Half-lives of technetium isotopes range from 4.2 million years for Tc-98 to 6.1 hours for Tc-99m. The "m" in the symbol stands for metastable, and Tc-99m decays to Tc-99, which has a half-life of 211,100 years (Notice that although there is no "m" in the designation, the mass number is the same, making this a nuclear isomer). The Tc-99 decays to ruthenium-99, which is not radioactive.

The six-hour half-life of Tc-99m makes it ideal for imaging patients. This allows the patient to be radioactive long enough for proper imaging, but not much longer. Furthermore, when Tc-99m decays to technetium-99, it emits a gamma ray of 140 keV. This is energetic enough to penetrate the skin, yet can still be collimated by the gamma camera to allow high resolution imaging.

As useful as the gamma energy is for Tc-99m to image, the six-hour half-life makes it challenging to get the material to the hospital in a timely manner. To overcome this, a generator that produces very pure Tc-99m can be moved closer to the patient.

Using Generators in Hospitals and Nuclear Pharmacies

Tc-99m generators typically have a well-shielded ion-exchange column that is loaded with molybdenum-99 in the form of sodium molybdate, which decays to Tc-99m while it is on the column.

At the hospital or nuclear pharmacy, a saline solution is run through the column, and the Tc-99m is eluted off in the form of sodium pertechnetate, while the Mo-99 remains rooted onto the column. After elution, the Tc-99m is compounded with a non-radioactive substance that is specific for the type of procedure to be performed. For example, Technetium (Tc-99m) mebrofenin used for hepatobiliary imaging.

Medicare Accountable Care Organizations

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Medicare Part B currently pays physicians the average sales price of a drug, plus a 6 percent add-on; the proposed model would test whether changing the add-on payment to 2.5 percent plus a flat fee payment of $16.80 per drug per day could change prescribing incentives and lead to improved quality and value. CMS would update the flat fee at the beginning of each year by the percentage increase in the consumer price index for medical care for the most recent 12-month period. This test would begin no earlier than fall 2016 and would not be fully phased in until 2017.

National Correct Coding Initiative (NCCI) Issue with WBC Studies

CMS created the NCCI to promote correct coding methodologies and to control improper coding leading to inappropriate payment in Part B claims. They do this by determining code pairs where they will only pair for one code in the pair. There is currently an edit in place that denies Tc-99m Ceretec used for a limited scan to detect infection when CPT code 78805 is being billed with HCPCS code A9521 for the Ceretec dose. Another edit pair is denying payment for In-111 Oxine billed with A9570 billed with CPT code 78805. Comments have been made to CMS on both edit pairs, but the earliest the edit could be removed is October 1, 2016.

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Please send all questions and comments to
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