

## The Nuclear Cardiology Lab and the Pharmacy

### PHARMACY PROCEDURE VARIES

The interaction between the nuclear cardiology laboratory and the pharmacy varies greatly from institution to institution. Institutional protocols as well as type of facility (eg, freestanding clinic or hospital) affect procedures for drug procurement, storage, prescribing, and dispensing.

In some cases, the pharmacy purchases and dispenses all pharmaceutical agents used throughout a facility, including the nuclear laboratory. Some of these pharmacies dispense agents to the nuclear lab on a per-prescription basis. At other institutions, laboratories can obtain and store a bulk delivery of commonly used agents from the pharmacy so the agent is on hand as needed.

### IMPACT OF PHARMACY PROCEDURE ON THE NUCLEAR LAB

Institutional protocols regarding storing, preparing, and dispensing pharmaceuticals can have a significant impact on nuclear laboratory operations. Delays in drug dispensing from the pharmacy can reduce lab efficiency and result in inconvenient delays for both lab personnel and patients.

Pharmacologic stress myocardial perfusion imaging (MPI) involves the use of at least 1 radiotracer agent as well as a pharmacologic stress agent. For conventional pharmacologic stress agents, the dose is calculated based on the patient's weight and then ordered from the pharmacy. Before dispensing, the pharmacy must measure the dose, transfer it from the vial, and prepare it for an infusion pump in a syringe or bag.

Radiotracers generally are dispensed by a radiopharmacy, which is separate from an institution's pharmacy. Therefore, some labs have to wait for delivery from 2 pharmacies for such MPI procedures. In some cases, the radiopharmacy is outside the facility, which can result in additional delivery issues.

Labs at freestanding clinics tend to have more latitude in developing their own pharmaceutical dispensing protocols than do labs that are part of larger hospitals or health systems. In a large institution, the pharmacy may control all aspects of drug procurement and dispensing throughout the hospital or system.

The ability to store a supply of pharmacologic stress agents within the lab itself can help avoid potential delays and provide additional

flexibility in testing. This can be especially convenient for patients who are added into the schedule on short notice or who are switched to another test during a laboratory visit, obviating the wait for drug delivery from the pharmacy, which adds time.

### RELEVANT STANDARDS AND GUIDELINES

#### UNITED STATES PHARMACOPEIA (USP) CHAPTER 797

The USP Chapter 797 guidelines comprise an extensive discussion of recommendations and best practices involving the compounding of pharmaceutical agents.<sup>1</sup> The pharmacologic stress agents and radiotracers used in MPI fall within the parameters of this chapter. These guidelines apply to all healthcare practitioners who mix, transfer, or handle compounded sterile preparations in any way.<sup>1</sup> USP 797 does not cover the administration of these agents.

While the USP guidelines are not categorically enforceable, the Joint Commission on Accreditation of Healthcare Organizations "expects organizations to review their procedures for preparing sterile medications in light of" USP Chapter 797.<sup>1</sup> The organization "may choose to implement all or some elements of" these guidelines.<sup>1</sup> (Watch for a future *Tech Tips* on USP Chapter 797.)

#### JOINT COMMISSION STANDARDS

Unlike the USP guidelines, the Joint Commission standards are mandatory requirements for obtaining and retaining accreditation. They are also more comprehensive and cover all aspects of medication management, as categorized into 6 critical processes<sup>2</sup>:

- Selection and procurement
- Storage
- Ordering and transcribing
- Preparing and dispensing
- Administration
- Monitoring

Due to the comprehensive scope of the medication management standards, awareness and compliance are not the sole responsibility of the pharmacy but should be addressed on an institutional level.<sup>3</sup> If a facility uses contracted pharmacy services, it is responsible for monitoring the performance of those contracted services in terms of the Joint Commission requirements.<sup>2</sup>

Certain Joint Commission standards are especially relevant to the interaction of, or delineation of responsibility between, the pharmacy and the nuclear laboratory. For example:

**MM.4.10—All prescriptions or medication orders are reviewed for appropriateness** (applicable only to organizations that operate a licensed pharmacy). Element (M) C2 states that a pharmacist should review all medication orders unless a “licensed independent practitioner” controls the ordering, preparing, and dispensing of the medication, or in urgent situations.

**MM.4.20—Medications are prepared safely.** Element B1 states that “when an on-site, licensed pharmacy is available, only the pharmacy compounds or admixes all sterile medications, intravenous admixtures, or other drugs except in emergencies or when not feasible (for example, when the product’s stability is short).”

Currently, the Joint Commission considers radiopharmaceuticals as drugs, which subjects their use to standard MM.4.10, above. However, the Society of Nuclear Medicine has urged the Joint Commission to reclassify radiopharmaceuticals as contrast media in order to avoid extended waiting periods or inadvertent limitations on their accessibility.<sup>4</sup> The Joint Commission’s decision is pending.

(Many of the medication management standards apply to the nuclear lab. Review the Joint Commission standards to determine which apply to individual facilities.)

## OTHER REGULATORY AGENCIES

Federal, state, and local regulatory bodies generally also have standards and requirements that must be followed when ordering, storing, handling, and administering drugs. Laboratory and pharmacy personnel should be familiar with such regulations and determine who within the organization is responsible for ensuring awareness and compliance with these rules.

## CURRENT HOSPITAL PRACTICES

### ASHP DATA

The American Society of Health-System Pharmacists (ASHP) conducts intermittent surveys to determine practice trends in the areas of prescribing and transcribing, dispensing and administration, and monitoring and patient education. Generally, results of the most recent ASHP surveys indicate that pharmacists are continuing to improve medication use at various steps in the medication-use system.<sup>5,6</sup> Following are several highlights from these surveys that are relevant to interactions between the pharmacy and nuclear lab.

### MEDICATION RECONCILIATION

The Joint Commission set forth a national patient safety goal on medication reconciliation to encourage complete and accurate reconciliation across the continuum of care.<sup>6</sup> In 2005, 45% of hospitals had implemented the Joint Commission patient safety goal on medication reconciliation.<sup>5,6</sup> In 2007, approximately 78% of hospital pharmacy directors reported that their hospitals had developed and

**References:** 1. USP. *USP <797> Guidebook to Pharmaceutical Compounding—Sterile Preparations*. Rockville, MD: United States Pharmacopeial Convention, 2008. 2. Joint Commission. Medication management. <http://www.jointcommission.org/NR/rdonlyres/5B27D3A9-5FE3-44EE-880E-AD6396109592/0/BHC2008MMChapter.pdf>. Accessed August 22, 2008. 3. Fogel TP, et al. *Hosp Pharmacy*. 2006;41:1090-1100. 4. SNM. [Letter to Joint Commission]. [http://interactive.snm.org/docs/snm\\_jointcommission\\_mm4-10\\_interimaction\\_comments\\_1-24-2007.pdf](http://interactive.snm.org/docs/snm_jointcommission_mm4-10_interimaction_comments_1-24-2007.pdf). Accessed September 23, 2008. 5. Pedersen CA, et al. *Am J Health Syst Pharm*. 2006;63:327-345. 6. Pedersen CA, et al. *Am J Health Syst Pharm*. 2008;65:827-843.

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implemented a successful approach to meeting the Joint Commission goal.<sup>6</sup> Hospitals of all sizes have had similar success in meeting these medication reconciliation requirements.<sup>6</sup>

### DRUG DISTRIBUTION SYSTEMS

Drug distribution is apparently becoming more decentralized.<sup>5</sup> Centralized distribution systems include traditional manual unit dose and stationary robotic systems that automate drug dispensing using bar-code technology. Decentralized drug distribution systems include satellite pharmacies and automated dispensing cabinets.<sup>5</sup> In 2005, more than 25% of hospitals reported using decentralized systems.<sup>5</sup> Larger hospitals were more likely to use a decentralized system.

### PHARMACIST APPROVAL AND CONSULTATION

Pharmacist review of medication orders in areas where medical procedures are performed can improve safety and quality of care.<sup>5</sup> The Joint Commission medication management standards support pharmacist review of orders (see discussion of standard MM.4.10, above).<sup>2</sup> According to 2005 survey data, the percentage of hospitals that had formal policies regarding pharmacist review of medication orders varied widely by department, from 5% in the emergency department to 25% in labor and delivery.<sup>5</sup>

Pharmacists at more than 75% of hospitals surveyed in 2007 provided consultations on issues such as dosage adjustments, drug information, and pharmacokinetics.<sup>6</sup> This trend demonstrates that pharmacists may be making a significant contribution to prescribing by providing consultations to prescribers.<sup>6</sup>

### FORMULARY MANAGEMENT

More than 80% of hospitals surveyed in 2007 took steps to minimize duplication of multisource products and of therapeutically equivalent products.<sup>6</sup> More than 60% used pharmacist interventions to help monitor prescriber compliance with established medication-use policies and educate prescribers about medication costs. Almost 50% regularly reviewed therapeutic categories and nonformulary medications.<sup>6</sup> Many of these formulary management techniques were significantly more common in large hospitals versus smaller facilities.<sup>6</sup>

## SUMMARY

Great variability exists in the interaction between nuclear cardiology labs and their institutions’ pharmacies. Storage, preparation, reconciliation, and dispensing procedures vary based on a number of factors, such as pharmacy protocol, management decisions, and facility type—eg, large hospital, small hospital, or freestanding clinic.

Minimizing delays in drug preparation and dispensing can benefit a nuclear lab and its patients, helping to make procedures as efficient (for the lab) and convenient (for the patient) as possible. Regular review of the laboratory-pharmacy interaction procedures, as well as of agents on formulary, may help identify changes that could benefit the nuclear lab.

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