



Cleanroom and Anteroom Casework and Storage

From standards regarding engineering controls to guidelines for aseptic technique, the recently updated USP Chapter <797> has presented health-system pharmacy with a variety of requirements that demand close attention. It can be a great challenge to achieve compliance with <797> while managing the necessary updates to your pharmacy's physical plant. Not to be overlooked is the need for durable, easy-to-clean casework and storage solutions that support your staff's compounding workflow, day in and day out. To aid you in selecting the appropriate casework and storage solutions for your facility, *PP&P* brings you the following case studies from health-system pharmacies that have recently addressed USP <797> requirements by renovating their existing compounding complexes or designing a new facility.

pharmacy operations in our current location until the new pharmacy was completed.

The architectural design firm used for the heart hospital construction was not familiar with pharmacy workflow or the structural requirements of USP <797>. With this

in mind, we requested design proposals from three pharmacy casework companies, and ultimately chose to work with Lionville.

Lionville observed our workflow, including our compounding activities. We currently prepare compounded sterile preparations in compounding aseptic isolators, located in an isolated IV room in our pharmacy complex. The fixtures Lionville installed in our IV room are compliant with USP <797>'s cleanroom design standards, should we eventually decide to create a cleanroom. Lionville's fixtures also offered ergonomic features – such as adjustable tilted shelves in a variety of depths to fit our bins and boxes – to ease physical strain on our staff. Our Lionville representative suggested installing casework to complement our isolator workflow. The casework offers counter space, adjustable shelves, and open drawers, providing our compounding technicians with easy access to all of their supplies, which they certainly appreciate.

The casework can be modified relatively easily, should we need to adjust our workflow in the future. We have also found it easy to clean. The expertise our Lionville representative had in USP <797> requirements was an added benefit and made us confident that we were working toward our goal of full compliance with the regulations.

We moved into our new pharmacy one year ago. Lionville kept us well informed of project's progress from the design stage to completion. Fortunately, we were able to work in our existing pharmacy until the casework installation was complete. All in all, the installation took about a week. Since moving into the new space, our workflow is much more efficient and productive. Even with our overhead medication storage, we can still reach everything without straining, and our high-capacity drawers hold several cases of IV bags, allowing us to stock the IV area only once a day. ■

Elizabeth Schar, RPh, earned a BS in pharmacy from the University of Illinois at Chicago and currently serves as the distribution manager for the department of pharmacy at SwedishAmerican Hospital in Rockford, Illinois.



Photos courtesy of Lionville Systems, Inc.

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Casework to Improve Compounding Workflow

• By Elizabeth Schar, RPh

A subsidiary of SwedishAmerican Health System and a teaching hospital affiliated with the University of Illinois College of Medicine, SwedishAmerican Hospital is a 357-bed, full-service, non-profit hospital, serving northern Illinois and southern Wisconsin. Centers of excellence include cancer care, emergency medicine, heart care, orthopedics, surgery, and women's health. In developing a design for our new pharmacy complex and IV room, we faced several challenges.

Initially, we planned to remodel our existing pharmacy, but this idea was wrought with challenges. First, we were frustrated because our ideal design did not fit into our available footprint; it was much like putting a square peg in a round hole. Secondly, and most significantly, we could not stop working during the build and would have been forced to undertake a time-consuming and expensive phased construction. As such, we opted to move the pharmacy to the new space, and continue

Lionville Systems, Inc.
For more information, circle reader service number 76.

Mobile Workstations to Improve Workflow Flexibility

• By Rebecca Reagan, PharmD

Associated with the University of Kentucky in Lexington, the UK HealthCare system includes UK Albert B. Chandler Hospital, Kentucky Children's Hospital, over 80 clinics, 143 outreach programs, and a team of 6,000 physicians, nurses, pharmacists, and other health care workers. Home to UK HealthCare's central pharmacy, UK Albert B. Chandler Hospital is a 489-bed academic medical center and eastern Kentucky's only Level 1 trauma center.

Prior to November 2007, our IV room presented us with several challenges related to USP <797> compliance. First, although the large room was segregated from the rest of the pharmacy, it was not well divided into separate ante and buffer areas. Second, our cleanroom and ante-room casework was stationary and its porous surfaces were not easy to clean or disinfect. In addition to our plans to renovate our current cleanroom environment, we also expect to relocate our central pharmacy to a new patient care facility within three to five years. Therefore, we were very interested in purchasing quality equipment that was both durable and mobile, so that it can be easily adapted to our new environment after the move.

We began the renovation project in November 2007, and completed it in March 2008. The construction project divided our old IV room into two physically separate rooms – an ante room that houses computers, printers, refrigerators, drugs, and other supplies, and an ISO Class 7 cleanroom that houses four ISO Class 5 laminar airflow workstations.



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"Dr. Michael L. Langberg, Cedars-Sinai's chief medical officer, confirmed in a statement late Tuesday that "as a result of a **preventable error**," three patients had their intravenous catheters flushed Sunday with a concentration of heparin 1,000 times higher than the normal protocol. Staff members used vials containing a concentration of *10,000 units per milliliter* instead of similar vials containing a concentration of *10 units per milliliter*." November, 2007 Los Angeles Times

6 Typical QA Verification Situations:

1. Filling and replenishing of med carts/cassettes/trays/crash carts/boxes.
2. Stocking of medication in the Pharmacy department.
3. Filling first doses, stats, daily orders, etc.
4. Stocking of medications outside of the pharmacy.
5. Filling of 'automated dispensing machines' (ADM) to assure that the items placed/replaced in the ADM are accurate.
6. QA of the dispensing machine/robots.

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Case Studies

Workflow access between the cleanroom and the anteroom is limited to two air-lock pass-through window chambers, through which we pass labels and drug supplies into the cleanroom.



Photos courtesy of InterMetro Industries Corporation

Completed products are sent to the anteroom for pharmacist verification. Our technicians enter the cleanroom through a small gowning and garbing room.

Of course, in renovating our compounding complex, we were eager to upgrade our cleanroom and anteroom casework. We ultimately selected InterMetro fixtures for several reasons. For one, we had purchased InterMetro casework for a prior renovation and were very pleased with their

product and service. Also, we were specifically looking for ease of cleaning and flexibility in our cleanroom and anteroom fixtures. The casework's Microban-treated work surfaces and clean-ability became key decision criteria for us, as did our ability to custom design the carts we purchased from InterMetro. To accommodate our compounding workflow, we equipped each of the carts with drawers for drug storage and shelves for other supplies. We also included file drawers for ease in storing quality assurance and training documentation in our anteroom. Furthermore, because the casework is available on lockable casters, it has allowed us the flexibility to adjust the arrangement and spacing of our workstations as we have redefined our post-renovation compounding workflow. ■



Specializing in inpatient medication distribution and sterile compounding, Rebecca Reagan, PharmD, has been a health-system pharmacist for 22 years. Currently the associate director of pharmacy services responsible for central pharmacy operations, Reagan has worked for UK HealthCare since 1998. She obtained a BS in pharmacy from the University of Tennessee College of Pharmacy and a PharmD from the University of Kentucky College of Pharmacy.

InterMetro Industries Corporation

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Constructing a New Cleanroom

• By Sharlene Lau, PharmD

A 401-bed, not-for-profit community hospital, Bethesda Memorial Hospital and its affiliates offer a full array of health care services, including a nationally accredited vascular institute, general and specialized surgery, maternity services, and neonatal and pediatric intensive care, among other specialty areas. Prior to renovating our pharmacy's cleanroom in December 2007, we faced several challenges in achieving USP <797> compliance. We temporarily relocated our compounding operations to a new room, and contracted with R.C. Smith to build an IV room that met the specifications set forth by USP <797>. R.C. Smith provided the design and construction of the cleanroom, working with our facilities staff and engineer throughout the project.

We chose to work with R.C. Smith on the design of our cleanroom, because we had visited other cleanrooms completed by the company and liked what we saw. We wanted a design that would accommodate our daily workflow, while meeting USP <797>'s stringent construction requirements. R.C. Smith was quick to address our requests, such as our desire to add a STAT hood to our cleanroom. They worked with us throughout the entire process, which took about three and a half months.

Per our goals, our new cleanroom accommodates our workflow and meets USP <797> requirements. Furthermore, our pharmacy staff is very satisfied with the design, as it did not hinder their workflow. R.C. Smith's work ensured a functional cleanroom for our pharmacy. We are very pleased with the workflow design and the casework quality. ■

Sharlene Lau, PharmD, has been the director of pharmacy at Bethesda Memorial Hospital for three years. Prior to assuming her current post, she was the operations manager for two years, after serving as clinical manager for seven years. She received her doctorate from the University of Florida, Gainesville.



Photos courtesy of R.C. Smith Company

R.C. Smith Company

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