Designing a New Pharmacy and Cleanroom

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to keep the storage of our large volume IVs as compact as possible. Our high-volume, fast moving products such as saline and lactated ringers are stored on palate racking, much like you see in wholesale stores like Costco.

**Focusing On The Cleanroom**

Prior to designing our current space, we had taken steps to conform our old cleanroom towards <797> compliance. We adopted the practice of not allowing any cardboard in the room, instituted appropriate gowning and garbing techniques, restricted movement in the room, and adopted appropriate hand washing technique. We were able to keep our beyond-use dating to the minimums and refrained from performing any high-risk compounding. We outsourced most of our IV compounding and also worked with a local <797>-compliant pharmacy to compound some products we were not comfortable doing ourselves, such as those needing extended dating.

When planning the new cleanroom, the designer gave valuable insight into the actual layout and was helpful conceptualizing workflow and movement for the room. We provided them with the general footprint and certain design requirements. For example, the chemo hood needed to exhaust to the exterior of the building, requiring the builder to engineer the duct work accordingly. Also, like many hospital pharmacies, we are located in the basement of our facility, and that was a limiting factor. The designer’s solution was to control the cleanroom space in order to decrease the number of footsteps needed to access supplies and move products. We realized the benefits of having our techs be able to just turn around and grab supplies off the shelving and the mobile carts. In addition, we incorporated into the design, Baxa’s DoseEdge remote IV verification system. This provides for maintaining an uninterrupted workflow for the IV technicians via remote pharmacists’ verification of their compounding. In consideration of the limited staffing during third shift operations, we also installed, exterior to the cleanroom, a compounding aseptic isolator to compound any necessary stat or urgent IVs during the night. Ultimately, we combined the basic layout from our builder with the design of our shelving, storage, and workspace materials, taking into account airflow, air exchange, and particulate count requirements to engineer the best possible combination.

**Additional Design Considerations**

When running a 24/7 pharmacy operation, it is beneficial to have sufficient break and conference areas. With the new design, we were able to combine

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**Tips for Easing the Design Process**

One of the biggest challenges of a cleanroom build is educating the builder, engineers, and architects on USP Chapter <797> requirements.

Discuss all possible elements of a proper, <797>-compliant cleanroom early in the design phase to avoid costly changes during construction. Discuss how the floor will join with the cabinets and walls, investigate washable paint, and determine whether the ceiling will be hard lid or have caulked ceiling tiles. In our experience, while caulked ceiling tiles may allow for easier access to pipes in the ceiling, a hard-lid ceiling eases the design process and simplifies future cleaning practices.

Involve engineers early in the process to establish an appropriate temperature balance in the cleanroom. Due to the location of pipes in the ceiling of our pharmacy, it has proven difficult to get appropriate cool air movement in parts of the room to ensure our fully garbed techs are operating in a comfortable working environment.

Assign staff members to serve as <797> specialists. We sent one pharmacist and one technician to a weeklong training program on <797> protocols and cleanroom practices at Baxa’s STAR Center. They then consulted with our builders, and we were able to achieve compliance.
these features into one room so that we can now hold department meetings and training sessions without having to leave the department. We negotiated the design concept to include an ample conference room that would serve as our break room but also have a PC projector, conference phone, a DVD player, and a large TV monitor, all to help with our in-services and training programs. We are now able to accommodate online Web conferencing, which has been a big benefit to our practice. Another important aspect of the initial, overall design is properly manipulating the layout of the shelving to assist with workflow and the movement of carts through the department. Close consideration must be made to review the actual pathways the technicians move product through so as to reduce the number of trips needed. It is vital to consider every minor detail and not skip past “simple” concepts such as counter space.

Other new design aspects we negotiated early in the process have proven prescient as well. We do quite a bit of training and precepting of pharmacy students from the local college, and we are now able to provide work areas and PCs for them. We brought together all the previously disparate offices into the central pharmacy, which now includes offices for two supervisors, our buyer, and me. We included a pleasant reception area and desk for our secretary, a small conference table to meet with sales representatives, and a small, quiet library for research. The final piece was the development of a non-sterile compounding room for the preparation of creams, ointments, oral solutions, etc.

Moving While Operating

The act of physically relocating our operation from the temporary operating space to the final space posed some interesting challenges. As a 24/7 pharmacy operation, we had to continue our processes during the transition. We decided to move over the course of two nights during one weekend to take advantage of generally slower working periods, and brought in extra staff while others continued to operate in the old pharmacy. Like the pharmacy design itself, it was valuable to plan the move ahead of time. We pre-planned the layout of all the product types and where they should go, so when the night of the move came all we had to do was load them onto carts and unload them in the designated area. Interestingly, one unforeseen challenge was transitioning from such a small space to such a big space, as we had become used to practicing in tight quarters. The total pharmacy space increased from 1,600 to 5,500 square feet,
so we were somewhat disoriented the first few weeks as everyone became accustomed to the larger space and to where things were located.

The larger area design has afforded us the opportunity to be flexible in our practice orientation, and we are still experimenting with different approaches to workflows. While some may look at this as a challenge, it is a great opportunity to seek out and implement better and more efficient processes.

Conclusion

Now that we are more comfortable in our new surroundings, the general morale—and workflow—of the department has improved significantly. Though we are still adapting, our efficiency has already increased. Five years ago we dispensed 125,000 to 130,000 doses per month, and now we are up to 185,000 per month. We have been able to absorb that increased workload without significant disruption.

Ultimately, those fortunate enough to have the opportunity to be part of a pharmacy rebuild should consult with all potentially affected parties, including the pharmacy staff, as their input will be critical. The ideas and concepts developed by my staff made a huge impact on the ultimate design and layout of the pharmacy. I also highly recommend employing experts in pharmacy and cleanroom design. Their experience will often uncover unexpected solutions, including simple ones such as installing pull-out shelves in the unit dose storage area so there is a place to put paperwork while loading medications. Lastly, never underestimate the value of site visits, both to influence your administration towards necessary upgrades, and to determine what will work best for you.

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