ORIGINAL REPORT

A moving experience: lessons learned from relocating a reference laboratory

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Since 1965, the American Red Cross Southern Region headquarters has been located in a 60,000 square foot building in the heart of Midtown Atlanta (Fig. 1). As the years passed, the region experienced growth not only in collections but also in the size of its infrastructure. The mounting regulatory requirement of the 1990s contributed significantly to this escalation. Insufficient space began to limit opportunities for further growth and process improvements. In an effort to ease the space constraints, several expansions and major renovations occurred during this period. It eventually became necessary to decentralize the headquarters facility by using several offcampus annexes. In other words, the blood center was rapidly outgrowing its facility.

The business decision to consolidate Southeast Division (to include Georgia, Alabama, and North and South Carolina) manufacturing within the Southern Region left no doubt that a new facility, purposely designed for the manufacturing of blood and blood components, was needed. The Midtown location simply could not accommodate the required increase in throughput, slated to approach one million units annually. The request to build a new 180,000 square foot blood processing center (BPC) in Douglasville, Georgia, was approved by American Red Cross National Headquarters in May 2002 (Fig. 2).

Excitement grew with the recognition of the opportunities ahead—most notably the chance to contribute to the design of a state-of-the-art reference

Fig. 1. Southern Region headquarters in Midtown Atlanta, Georgia (1965–2007).

Fig. 2. New blood processing facility in Douglasville, Georgia.

lab! This new facility would be designed to meet the specific operational requirements of the laboratory, a distinct departure from our past experience of adjusting processes to conform to existing spaces.

The initial enthusiasm gradually waned over the next few months as the magnitude of the job that lay ahead was realized. When Ross Perot made a late entry into the 1992 presidential race, he remarked that the scrambling required to organize his campaign was "like building an airplane in mid-flight." Moving an immunohematology reference laboratory (IRL) of this size and complexity a distance of 29 miles posed a similar problem. The luxury of a pause in operations to accommodate the move did not exist. To continue the analogy, "landing" was not an option. This article is devoted to providing the reader (perhaps one charged with the same task) with a few "lessons" that were learned during one adventure in IRL relocation.

Key Considerations

The wheels of the planning process should start turning the day after the decision to move is made. While that is a bit of an overstatement, there is a tremendous amount of work ahead and the planning process has to be managed as a top priority. Together, effective planning and communication will be the linchpin of a successful move. Take this initial period to review the organization's strategic goals and objectives to ensure that the logic applied in the planning process is sound and consistent with the organization's mission. Give careful consideration to which essential laboratory functions must be included in the new operation, in both the short and the long term (Refer to Table 1 for a list of available resources for use in moving an immunohematology reference laboratory). Getting the development process off and running will require a concerted effort and involvement of the entire laboratory staff. This is definitely a team effort.

Once constructed, the initial planning documents will lay the groundwork for the planning process. These living documents should reflect every activity that will likely occur in the new space, however extensive or minor. There will be opportunities to review and revise the plan during the development phase. Bear in mind that revisions made after construction has begun are extremely costly. Remember that a laboratory scientist is not a master builder or planner; the support and guidance of a team of professionals will ensure success. Identify a laboratory consultant with a thorough knowledge of the laboratory operations to work closely with the architects and builders throughout the life of the project. While the facility is being constructed, develop a detailed transition and move-in plan. These should include a timetable for equipment setup, qualification, and requalification. The transition plan starts shortly before the move and ends with the decommissioning of the current facility (Fig. 3). The transition plan addresses how operations in the current facility will be maintained while bringing the new facility on line. Much like focusing a microscope, the planning process should progress by a level of detail with each

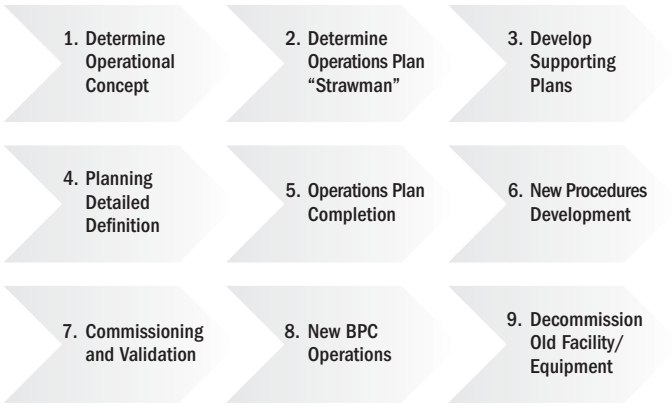

Fig. 3. Transition Plan Schedule
An example of a facility transition schedule

Table 1. Resources for moving an immunohematology reference laboratory

Code of Federal Regulations. Title 21 CFR § Part 606–Current Good Manufacturing Practice for Blood and Blood Components. Washington, DC: US Government Printing Office, 2007.

Code of Federal Regulations. Title 21 CFR § Part 610–General Biological Products Standards. Washington, DC: US Government Printing Office, 2007.

Code of Federal Regulations. Title 21 CFR § Part 211–Current Good Manufacturing Practice for Finished Pharmaceuticals–Blood. Washington, DC: US Government Printing Office, 2007.

Code of Federal Regulations. Title 21 CFR § Part 820–Quality System Regulation. Washington, DC: US Government Printing Office, 2007.

Standards for Blood Banks and Transfusion Services. 24th ed. Bethesda, MD: AABB, 2006.

Standards for Immunohematology Reference Laboratories. 5th ed. Bethesda, MD: AABB, 2007.

South S. Achieving breakthrough improvements with the application of Lean Six Sigma tools and principles with process excellence. LabMedicine 2005;36:240-2.

Jacobson JM, Johnson ME. Lean and Six Sigma; not for amateurs (part 1). LabMedicine 2006;37:78-83.

Jacobson JM, Johnson ME. Lean and Six Sigma; not for amateurs (part 2). LabMedicine 2006;37:140-5.

successive stage. The entire IRL relocation process might be divided into five major phases:

- Phase I: Establishing the location of the IRL within the new facility
- Phase II: Designing the IRL
- Phase III: Planning the move
- Phase IV: Executing the move
- Phase V: Finalizing the move

Key considerations for each of the five phases of the move are highlighted below.

Phase I: Establishing the location of the IRL within the new facility:

- Work with other department heads to develop facility incoming and outgoing process flows to identify inputs, outputs, and required IRL adjacencies (e.g., storage and distribution, irradiation, liquid and frozen red cell inventory locations, and bio-waste).
- Plan placement of liquid nitrogen delivery systems. Consider the proximity of the IRL to the exterior walls if piping of liquid nitrogen is planned. If liquid nitrogen tanks will be used, consider proximity to delivery bays as well as delivery pathways.
- Consider the communication and logistical challenges of a larger physical space and evaluate the need for mitigation strategies (e.g., robotic sample delivery system).
- Determine whether laboratory space will include or exclude administrative space and meeting areas.

Phase II: Designing the IRL:

- Prepare a flow analysis (spaghetti diagram) for each key IRL process. Design the layout to facilitate maximum efficiency and efficacy of processes and eliminate physical barriers.
- Consider all staffing patterns in the work flow analysis. Staffing levels often vary between shifts (i.e., 18 staff may work on day shift while only 2 staff work on night shift). A work flow designed solely around day shift patterns may not be functional for night shift.
- Apply Lean principles wherever possible. The goals of Lean are to improve quality, eliminate waste, reduce lead time, and reduce total cost.
- Be aware that a poorly designed lab can be disruptive to quality and service delivery.
- Focus on the number, size, location, and specific work functions and support activities that need to be included in the design and co-locate similar processes wherever possible.
- Network with other IRLs to get ideas. Visit new or recently renovated IRLs whenever possible.
- In general, plan for more space than will be needed, to allow for future growth.
- Bear in mind that flexibility is an important consideration in designing the work spaces. Adjustable casework that can be reconfigured makes it possible to redesign work spaces to meet future needs.
- Define any special requirements for work spaces (e.g., air handling in areas with heat-generating lab equipment that could impact the ability to regulate the temperature to keep it within requirements).
- Select new lab furnishings and surfaces that are compliant with the regulations of the Occupational Safety and Health Administration.
- Ensure that utilities (e.g., power supply, data ports, and drainage) are sufficient in number and location to allow flexibility in placement of instruments and equipment.
- Plan for additional cooling capacity in areas with heat-generating equipment (e.g., ultra low freezers).
- Provide adequate lighting, especially immediately adjacent to the work station, as well as emergency power.
- Include space for automated equipment in the floor plan. Even if automation is not currently part of the laboratory, it likely will be.
- Consider floor drains or other means for direct disposal of cell washer waste liquids, if allowed by local code.
- Include space for record storage, both hands-on and temporary storage.
- Consider creating a designated review area. Locate the review room away from work stations and the flow of foot traffic. Include a door to reduce noise, distraction, and the potential for interruption. This area should be telephone free. Include a small, monitored refrigerator for temporary product storage, if possible.
- Consider creating a reagent preparation area.
- Consider a separate room or area for frozen reagent RBC storage.

- Consider creating a customer communications area, equipped with telephone, computer, and reference resources.
- Once the new facility plan has been established, it will be critical to continually evaluate all subsequent organizational and operational changes against it.
- Confirm understanding of all changes in the final building plans in writing. Include all affected department heads, move leads, and the architect among the recipients.
- Develop a prototype of the proposed IRL floor plan and share it with IRL staff for input.
- Don a hard hat and access the building during construction as frequently as possible, to avoid surprises.

Phase III: Planning the move

- Designate one senior move coordinator for the entire facility project, to serve as the central point of contact and clearinghouse for all communications, planning, and changes.
- Designate for each functional area a move lead and a planning team, made up of a cross section of departmental staff. Include a quality assurance representative with previous IRL experience on the team, if possible.
- Determine contingencies for sequencing the phased move plan (e.g., the entire storage and distribution function cannot be scheduled to move before the reference laboratory moves).
- If possible, be selective about the time of year of the move. Spring was selected for the move to Douglasville, to avoid the extreme weather conditions of the summer or winter months.
- Consider contracting with a specialized company (e.g., Pacific Scientific Transport) for moving rare reagent droplet RBC and rare frozen RBC inventories. While outsourcing this activity can be somewhat costly, minimizing the risk of losing these critical—and in some cases irreplaceable—resources is worth the expenditure.
- Contract with a moving company with a proven track record. A systematic approach to labeling moving boxes and crates is critical.
- Develop a plan to move temperature-sensitive reagents and supplies.
- Use this opportunity to reorganize and "clean house." Consider holding regularly scheduled "purge days" in the months leading up to the move. Encourage staff to discard materials (equipment, nonregulated documents, etc.) that are not being taken to the new facility.
- Discourage reordering large quantities of envelopes, letterhead, business cards, etc. with the address of the old facility. Remember to reorder these items once the new address is known.
- Establish a document control plan. At a minimum, most regulated documents require an address change. Avoid changes in formatting during this process, since the addition of lines could impact pagination.
- Working with equipment and quality staff, establish a process for the systematic execution and approval of qualification and requalification plans during the transition to the new facility.
- Involve staff in the move planning—develop teams to help with identified parts of the premove, move, and post-move.

Communication Plan

- Hold regularly scheduled functional area move team meetings and cross-functional meetings with move leads and department heads. This dialogue will be critical as transition and move plans evolve over time.
- Meet with hospital customers who will be impacted by the move to hear their concerns. Develop and communicate the resulting mitigation strategies.
- Communicate with hospital customers regularly. Include move dates, move plan details,new phone system information, changes in delivery routes and times, and temporary contact information for use during the move.
- Consider providing cards or magnets with new telephone numbers to hospital customers. Their comfort level with the move will increase with regular, positive communication.
- Review all existing service contracts. Communicate with vendors about changes in terms caused by the relocation. Ensure that they have the new facility address and know when to begin shipping supplies or reagents to the new location.
- Provide written communication of the new address to all contract customers (e.g., those with transfusion service agreements).
- Communicate with IRL staff frequently. The need to do this cannot be stressed enough. Monthly updates at staff meetings, open houses,

information to assist staff with housing relocation, and transportation information are just a few items to consider.
- Use multimedia reminders. As move time approaches include a standard footer note for inclusion in all fax and e-mail communications, announcing the upcoming move and contact information. Recorded voice mail messages can also be used to provide brief reminders to callers.

Staffing Plan
- Technical staff will have their hands full keeping up with testing during the move. Ensure that they have adequate resources for packing, unpacking, cleaning, decontaminating surfaces, and answering the telephone.
- Hire nontechnical temporary staff 2 to 3 months before the move to allow time for training and familiarization.
- Work with reliable temporary staffing agencies. Last-minute resignations of trained temporary staff can be problematic.
- Consider planning for split operations during the move. The transition of the IRL from the Midtown location to the Douglasville BPC occurred over a 3-week period, with an increasing number of staff working from the new facility during each phase.

Phase IV: Executing the move
- Designate key staff (equipped with cell phones) to serve as points of contact at each facility while the move is in progress.
- Ensure that cell phone coverage will be enabled in the new facility. This is critical for communicating during the move until the new facility's phone system is activated.
- Review the list of items to be moved before the actual move to prevent delay when the movers arrive.
- Place signs on equipment, supplies, etc., being moved, indicating the exact room number at the new facility to which they are to be delivered. Place signs marking the exact locations for placement of each item in the new facility.
- Ensure there is continued support of the old facility until the move is complete (e.g., telephone, trash removal, rest room maintenance, and vending machine supplies).

Phase V: Finalizing the move
- Temporary nontechnical staff can be used to decontaminate equipment and surfaces during the decommissioning of the old facility.
- Ensure that all telephones at the old facility are forwarded to voice mail messages that provide the new telephone numbers at the new facility. These voice mail messages should remain available for several weeks after the move.
- Plan a grand opening event for the new facility. The event should be scheduled at least 6 weeks after the move, to allow time for unpacking and completion of punch list items. Be sure to invite local media, local officials, hospital customers, financial contributors, and blood donors.

The information presented in this article is not intended to be an all-inclusive checklist for executing a move. It essentially represents a compilation of "lessons learned." Undoubtedly there will be many unique aspects to the circumstances surrounding the "moving experience," but hopefully a few of these key considerations will be of direct value and others may serve as springboards for further discussions with the move team.

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