

Keys to Success in Designing a Hybrid Cath Lab

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A new trend is emerging in cardiac services — the hybrid catheterization lab. There is some controversy over the specific definition (A cath lab where they will also do surgery? An OR where they have fixed imaging?), but hybrid cath labs combine the traditional diagnostic functions of a cath lab with the surgical functions of an operating room. Most existing cath labs are not large enough to convert into hybrid labs, so hybrid labs are typically placed in locations adjacent to surgical suites. Only a handful have been developed thus far, mostly focusing on pediatric procedures, but the applicability and advantages of these labs are becoming increasingly evident.

Many interventional specialists are seeking hybrid facilities. Interventional cardiologists (adult and pediatric), along with cardiac, vascular and neuro surgeons have a number of procedures that are well-suited for hybrid rooms. These include abdominal aortic aneurysms (AAA), peripheral stenting, percutaneous valve repair, minimally invasive direct coronary artery bypass (MID-CAB)/stent and aneurysm coiling.

Despite most architects' and hospitals' experience designing and constructing cath labs and ORs, the design and construction of a hybrid room is not as simple as a pure combination of the two. What are the challenges in designing a hybrid cath lab? Following are three areas on which to focus:

Staff/Culture

The hybrid cath lab must serve two functions: diagnostic and surgical. That means a multi-disciplinary merger of medical professionals who have a stake in the space. Interventional cardiologists play the primary role in cath labs. Blending that function with an operating room, however, means that surgeons will now have a role within what was formerly just a cath lab.

Clearly, a team approach is required for the successful implementation of the hybrid lab. Planners and architects need to realize and understand the respective roles of each team of medical

professionals, finding ways to balance each team's requirements. Hospital administrators obviously need to take the lead, and set a tone of teamwork and cooperation among the clinicians.

Staffing within the room includes cardiology, electrophysiology, surgical, anesthesiology, perfusion and echo teams in addition to the nursing/support staff. Determining the various layout scenarios for each team to do their work during a particular procedure is challenging.

Critical to obtaining the buy-in of all teams is the recognition that a hybrid cath lab can serve patients in an innovative way. Offering the ability to diagnose cardiac conditions and quickly move patients to a recommended surgical procedure is a clear benefit of these facilities. Making sure that everyone on the clinical platform is in sync with that concept is an absolute necessity.

Planning

Several issues are important during the planning process that will impact the design of the hybrid cath lab. Equipment location, vibration, HVAC and radiation exposure all require special consideration.

Because the bi-plane is extremely sensitive, vibration testing is necessary to determine if mitigation is required. Vibration sources that can affect the lab operations are normally generated from within the hospital. Fan units in proximity to the lab are a frequent source of vibration. Ideally, eliminating vibration at the source is the preferred approach; when complexity does not make this feasible, other vibration isolation techniques may be required.

The location of equipment is crucial. Each clinical discipline will bring a different set of equipment into the hybrid lab, causing potential conflicts over space and placement. Finding compromise locations that still optimize efficient use of that equipment can be a challenge; the teamwork mentioned above will come into play. This includes engineering staff to predict and plan for the numerous facility issues such as power,



Figure 1. Hybrid catheterization lab.
Facility/Location: Alfred I. duPont
Hospital for Children; Wilmington,
Delaware. Image Credits: Array
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Figure 2. View of hybrid catheterization lab from the control room.
Facility/Location: Alfred I. duPont Hospital for Children; Wilmington, Delaware.
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Figure 3. Hybrid catheterization lab floor plan.
Facility/Location: Alfred I. duPont Hospital for Children; Wilmington, Delaware.
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HVAC and various building infrastructure services.

Radiation is a constant concern in cath labs, and more so in a hybrid lab. In the cath lab setting, medical personnel wear lead aprons for protection from radiation. In the hybrid lab, all personnel, including surgical, would be required to wear aprons during any procedure requiring even minimal amounts of concurrent imaging. Additionally, a

radiation safety physicist will determine how much of the lab must be shielded. Radiation protection is provided by mass, which is usually done by lining the walls with lead panels.

Additional ventilation and cooling systems may be required in the hybrid lab that would not be necessary in a typical cath lab. Since medical personnel will wear lead aprons, their comfort will be affected, possibly requiring lower air

temperatures. More importantly, many surgeons require lower room temperatures as a method of controlling patient metabolism. In many cases, a hybrid cath lab may need to operate at temperatures as low as 60 degrees Fahrenheit.

Design

Most existing cath labs are code compliant, but have insufficient space for hybrid procedures. The bi-plane unit has particularly rigid vertical space requirements. To accommodate that unit, a ceiling height of between 9' 6" and 9' 9" is required. Creating that ceiling height within an existing medical complex can be challenging. Existing plenum spaces (space between the ceiling and structural floor above) may be cramped and usually contain numerous ducts, electrical conduits and other mechanical equipment. Medical centers that were built with an interstitial floor make the insertion of a hybrid cath lab much easier; unfortunately, these are the exception rather than the norm.

Cabling, wiring and hoses — all part of modern medical equipment — should be off the floor to facilitate housekeeping and eliminate tripping hazards. Careful placement of each component is necessary and adequate oversight of vendors who often install that equipment is crucial.

For most projects, the highest Infection Control Risk Assessment (ICRA) controls will be needed during construction. The staff in adjacent spaces must be made aware that renovations can and will be disruptive. Noise, utility shut-down coordination and construction access are only a few of the disruptions during the renovation period.

The hybrid cath lab offers significant advantages in the concurrent diagnosis and treatment of patients requiring cardiac procedures — facilitating a rapid-response approach as never before. The design and construction of the hybrid lab requires extra care and planning, but will result in a more effective facility. To successfully manage the development of these new and innovative rooms, it is clear that communication and coordination among all disciplines — clinical, architectural, engineering, and strategic — is critical. ■

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A Look at Peer Evaluations in the Cath Lab

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We explore four areas pertaining to peer evaluations. These areas include a look at potential problems in an evaluation performed solely by management, the positive and negative aspects of peer evaluations, suggestions on how to implement a peer evaluation and a brief look at change theory. This article will help those interested in implementing a form of peer evaluation for the cardiac catheterization laboratory, taking into consideration how employees may react to the plan.

Problems That May Occur With Management-Performed Evaluations

In most facilities, management is solely responsible for doing annual performance evaluations of staff. This can lead to any number of problems and ultimately cause the staff member to reject the validity of the evaluation. An employee who perceives his or her evaluation to be biased, (accurately or not) may refuse to sign the evaluation, or go further and chose to pursue legal action regarding the bias. Following are some issues that can arise with management-only evaluations:

1. **Managers may make the mistake of comparing an employee's performance to their own, called the "similar-to-me effect."**¹ Setting unreasonably high standards is not fair practice. Staff members should not be compared to, nor evaluated against, the performance of management. The work a staff member does and the work management does are two different areas of practice.
2. **Personality conflicts can exist between management and employees.** These conflicts can cause a manager (consciously or not) to become biased in the evaluation, basing it on "like" versus "dislike." In this scenario, an employee's action that normally would not affect the overall evaluation has a negative impact. For example, because of

a personality conflict between management and the employee, the manager could focus on an employee's singular incidence of tardiness and fail to acknowledge positive contributions the employee made over the course of the year. This practice is known as the "horn effect."¹ The opposite of the horn effect is the "halo effect,"¹ when a manager takes one positive aspect of an employee and generalizes it into an overall positive evaluation.

3. **Managers often have limited contact with staff members.** When the manager is present, staff performs at their optimal level of performance.¹ What a manager may view one day may not necessarily be how the employee truly performs. Managers tend to evaluate from one perspective and omit aspects they do not witness. Such a performance evaluation may fail to recognize how a staff member reacts in an emergency, if the employee embraces the opportunity to teach others and if that employee works well in a team situation. All these are important in an overall performance evaluation. In being evaluated solely by management, the employee receives, in essence, an incomplete evaluation.

Positive and Negative Aspects of Peer Evaluations

A peer evaluation is a means of obtaining accurate information about an employee, based on the idea that peers will know the employee's work ethic and behavior better than management, and ultimately resulting in a more useful and accurate evaluation. Yet the concept of peer evaluations is not well studied nor is it well developed. Many organizations that have attempted to implement the practice of peer evaluation have found that it was met with low acceptance. Perhaps it is because employees find the process of evaluating a peer to be time-consuming and damaging to

personal relationships. Some staff members find the process places them in uncomfortable situations and it causes confusion as they wonder, "Am I a colleague or am I am judge?" Staff do not wish to be involved in taking on the role of evaluator for fear it will damage pre-existing relationships.² There is also the reality that (as with management) personality conflicts may exist. If a staff member is asked to evaluate the performance of a co-worker with whom he or she has an existing conflict, this will place both team members in an uncomfortable situation, as well as cause the evaluation to be subject to bias. An evaluation cannot be objective if one employee is out to sabotage the other.³ Some staff members view the idea of peer evaluations as political, increasing resentment. Others believe that evaluating an employee is the sole responsibility of management, noting that one reason management occupies the position it does is to perform evaluations and that no one except management should perform them. Peer evaluations also require training, necessary for staff to perform the evaluations in the correct manner. Those who oppose peer evaluations feel the training is time-consuming and that there is not enough time to tend to patient issues let alone learn how to evaluate the performance of others.⁴ Nursing is an example of a career where in a given selection of co-workers, there will be a wide range of years of experience among fellow nurses. Some have disputed the idea of peer evaluations by arguing that older staff members may have a difficult time accepting an evaluation from a younger peer.⁵ These cited objections generally lead the evaluation process to be completed by management.

Yet some do view peer evaluation positively, citing the benefits it may offer. A peer evaluation can be used as a tool for improvement and professional growth. This form of evaluation is also believed to promote professionalism. Having to evaluate a peer and be evaluated similarly can enforce staff accountability. By nature, people are predisposed to put less effort into a group task than an individual one, simply because individuals do not believe their efforts are being monitored.⁴ Known as "social loafing," one of the best ways to prevent it is to make each team member accountable for his or her actions.² Evaluations from co-workers (who are teammates) help to promote accountability.