

Managing Methods for Projects Medical Equipment, Design and Procurement

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Abstract

Managing the medical equipment is a vital component to any challenging healthcare project. It requires a balance of expectations for decisions, clarity of responsibilities among a host of resources and proactive measures to plan, procure and install owner furnished medical equipment. This session will highlight three distinct approaches to dividing responsibilities and provide a sample matrix to use during the project team assembly phase.

Equipment Planning – Managing Change and Decisions

During planning the key to successful management is managing change - equipment will change over the course of a project and over the life of the building. Owners are asked to provide decisions regarding models of major imaging equipment during planning for example, and that may be too early for these procurement decisions to occur to ensure the latest and greatest technology. To proceed in the absence of known decisions requires stewardship through the planning and procurement process to successfully negotiate between the needs of the planning and construction team and the desires of the clinical staff. Managing this gap is the key to keeping the design and construction teams moving while preserving the ability for medical institutions to stay at the forefront of care.

In addition to managing the decisions during the gap, there are successful infrastructure strategies that can be put in place to plan appropriately for change. Flexibility does have higher first costs to invest in infrastructure that can support the largest, tallest, heaviest pieces of equipment as well as having additional electrical and cooling capacities. These early investments do pay rewards in reducing change orders, and providing the owner with a building that can adapt to a wider range of models in the future.

Owners can unintentionally find themselves being pressured to provide answers about final procurement decisions that the institution is not ready to make. This pressure can result in the owner identifying a resource whose primary role is to assist with prioritizing decisions to avoid construction delays while also preserving the clinician's preferences to purchase the latest and greatest models.

Owners and architects often use experienced medical equipment planners who act as owner's advocates. They can compare viable products and provide planning and construction teams with enough information to influence the building's infrastructure. They provide schedules indicating when these final procurement decisions must be reached in order to allow time for procurement, submittals, lead times, and installation.

To illustrate the balance of procurement decisions that will need to be made on a project is to prioritize any products that are considered architecturally significant equipment (ASE) such as surgical booms, procedure lights, headwalls, and imaging systems. ASE equipment comprises approximately 30% of the total asset on most large expansion projects and many of these systems have parts that must arrive early in construction. Although major medical equipment often comprises the largest share of the equipment budget (70-80%) it represents a much smaller portion of the overall assets. The largest share of procurement work is in the non-ASE which include many of the hospital standard products such as carts, hampers, beds, wheelchairs, benchtop equipment, etc. The non-ASE orders will account for 70-80% of the volume yet only

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comprise about 20-80% of the equipment budget. These orders can have building implications if products bought are bigger than the space allows (refrigerators) or they have different power or data requirements than planned. Proactive planning to verify products will fit and plug in is an essential element to procuring these items and can be overlooked if a resource is comparing only features and pricing of a product.

Defining Resource Needs

The case studies used in the presentation are large healthcare projects ranging from 250,000 to 900,000 square feet. On large projects there is a need for a surge of resources to manage the equipment planning, procurement and installation that may be beyond which most hospitals can manage and fit into the day to day operations. There are different breaking points for exceeding internal resource capabilities and the case studies will show how each institution defined their limits and at what point additional resources were added. How and when these resources are identified varies. Improvements in the timing and recognition of needing resources is evident in the number of major healthcare projects that have equipment planning firms providing full planning, procurement and installation management services. Fifteen years ago equipment planning consultants primarily were hired to prepare equipment lists and assist with providing cut sheets. As projects grew larger in scale and complexity, experienced project leaders recognized the need to bring these specialists in earlier in the process and expanded their role to provide services to supplement internal hospital resources. Earlier information to help size, cost, and guide technology options has brought equipment planners into the project as early as programming and schematic design to be fully engaged by start of design development.

Defining the scope of services still varies greatly from project to project and is largely based on supplementing the owner and the architectural team's needs. When the decision is reached to look for a consultant the process the range of consultants and services vary from firm to firm. To understand why there is variance is to understand that the field of medical equipment planning is one of specialization. The field is unlike architecture, engineering or construction where there is a clear career path, and degree, and professional associations that align professionals along a common set of credentials and registration requirements. Equipment planners bring a blend of professionals with specialized degrees, certifications or training in one of three fields primarily: biomedical engineering, architecture, and procurement/supply chain management with an extension to clinical staff such as nurses, radiology or lab techs who bring specific expertise.

The number of firms nationally who practice medical equipment planning and procurement are limited – especially those that can provide the level of services needed on large healthcare projects. No formal association of medical equipment planners exists and no consistent set of definitions exist for establishing expectations of what clients, architects, contractors, or engineers will receive as deliverables. Without a baseline from the professionals the selection and definition of the scope of services is largely left to the project managers and hospitals to determine when and where they need help.

The RFP selection process is the catalyst for what services and deliverables are expected of the team. A sample scope outline will be distributed and reviewed during the presentation to prompt owners and project managers to consider the tasks and verify internal vs. external resource assumptions. Equipment planning firms all produce equipment lists. Some have proprietary

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software and others subscribe to systems that owners and vendors can access. Depending on the software options and limitations, the planning firm may be able to make customized reports, or sort data differently to meet the needs of the A/E team. Owners often request to have the data released in a sortable excel format if internal resources are handling the procurement. Most have technology that is accessible via the web but features vary.

With the staple being equipment lists, and cut sheets, equipment drawings may or may not be part of the scope of services unless specifically requested. Vendors provide drawings for some equipment planners for the major imaging or procedure rooms or a typical inpatient room. Drawings that encompass all rooms including staff lounges, nurse stations, meds rooms, are more typical of the expectations that contractors have to see where the major ASE is located. Having the medical equipment planner and the architect collaborate on the drawings is one of the best methods to ensure that equipment will fit and be coordinated with all rough-ins. Equipment plans are supplemental to the construction document set and show the equipment tag and legend for responsibilities of owner vs contractor furnished and installed items.

In addition to project wide drawings there is a need for specific equipment drawings from vendors during planning. Defining who on the team will request and review the vendor drawings is important. Complex rooms such as OR's or hybrid rooms often have two or three different vendors who all provide separate drawings that must be reviewed and coordinated into a single plan that allows the moving booms, c-arms and fixed elements to all work in harmony. Owner provided equipment such as sterilizers, headwalls, or other ASE vendor submittals will arrive and need review and approval prior to fabrication. As responsive as vendors can be, at times submittals do come back not matching the plans or provisions and if approved can cause delays and change orders when these items arrive in the field. Someone on the team or the owners side needs to review the submittal for infrastructure and clinical needs and work with the vendor to resolve discrepancies, routing final copies to the owner, A/E team and the contractor.

The definition of the scope of procurement and installation management services is often very loosely defined with words like "coordinate procurement" which can vary greatly from simply providing a manufacturer and model as the basis of purchasing to performing all the services expected from point of specification to sourcing, expediting, and invoice approval. Deliverables of preparing requisitions, obtaining quotes, preparing bid specs, and providing tracking reports of orders and deliveries are the highlights of this phase of services and the details can add up on projects with over 1,000 different items to order. Most major projects have in excess of 10,000 items – of which that can translate to 300 to 400 orders assuming products are consolidated into packages to gain advantages for quantity discounts. A large project often is a prompt for the hospital to review standard products and gather this information into a consolidated list.

To enable project managers to better define services and resources that relate to medical equipment, the scope of services matrix is provided to be used as a checklist for discussion with the hospital. The continuum of services from programming and planning through construction, procurement and installation and relocation are listed with columns to determine who (owner, architect, project manager, equipment planner, etc.) will be responsible for each task. These types of detailed discussions that walk through each phase help integrate hospital resources and add resources where needed.

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Resource Options:

Managing the medical equipment procurement and installation process can be accomplished through a variety of methods including: 1) Hospital provides complete services utilizing internal biomedical, facilities or procurement staff or 2) A blended mix of internal and external resources each providing services within their area of expertise, and 3) a full turnkey approach to outsourcing a large project to a medical equipment planning firm. This presentation will show case studies of large scale projects that have been handled differently, yet all successfully. Each method has pros and cons and results from feedback from the architect, contractor, and owner will be presented in summary form.

Option 1 – Internal Resources - Case Studies

Utilizing hospital's internal staff to plan, procure and manage the installation of medical equipment is accomplished through having a strong clinical engineering group with reliance on equipment standards and a formalized structure for evaluating new technology. The key to success is having the design team identify very specific deliverables expected from the owner and having the owner's team provide the equipment information, attend design meetings, and participate heavily in the planning process. Owners most often are well positioned to manage the procurement and installation management unless the volume of orders and capacity of receiving space exceeds internal logistics capability. Having an internal person to triage construction related equipment questions and plan for timely receipt of contractor installed equipment is vital to avoiding construction delays or change orders. This approach often places a higher dependency on the contractor to procure or install the equipment to reduce the logistics coordination by the owner.

Option 2 – Blended Approach – Case Studies

A blended approach to resources has been utilized often when internal resources are capable but where capacity is strained to handle the demands to follow a project from planning through procurement phases. Using a matrix of tasks to be performed in each phase, the presentation will highlight how different case studies shared responsibilities between internal and external resources and the resulting pros and cons of each approach. This approach can be one of the most successful approaches provided a proactive and detailed plan is devised to avoid gaps in services or an overload of responsibilities on one or more resources. In addition to the added impact of major projects, resources must also allocate time to their day to day responsibilities and acknowledge the time requirements for stocking, training, testing, asset tagging and other activation and transition planning.

Option 3 – Fully Outsourced Method Case Studies

A fully outsourced method is utilized most often when the design team, facility manager, or construction manager, or all of the above have experience from prior projects where they were short on resources or where gaps occurred in information. Issues cited include incomplete or late equipment information, or changes in models procured versus the models that were planned for, and resulting change order costs. Often a gap may have been experienced and these duties may have fallen through the cracks. An experienced equipment planning firm offers a single source of responsibility and is accountable for coordinating the comprehensive equipment list, floor

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plans, specifications, and is tasked with procurement and logistics to acquire the right products at the right time.

CONCLUSION

Projects can successfully be delivered using internal resources, external resources or a blended approach to managing the medical equipment planning, procurement and installation. The key to that success is proactively identifying tasks and resources and managing the timing of decisions for owner provided medical equipment.

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Case studies used in the presentation:

Option 1 (Internal resources)

Texas Tech University (Health Science Center Clinics opened 2007)

Scott and White University Medical Center; Temple, TX (New hospital opened 2007)

Texas Children's Hospital; Houston, TX (Hospital expansion 2000 + 3 current projects)

Methodist LeBonheur (System hospital projects + new major project in planning w/FKP)

Option 2 (Blended Approach)

Southwest Washington Medical Center; Vancouver, WA

University of New Mexico, Albuquerque, NM

University of Texas, M. D. Anderson Cancer Center, Houston, TX

Option 3 (Outsourcing)

University of Texas, M. D. Anderson Cancer Center, Houston, TX

Children's Medical Center; Dallas, TX

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Matrix

Using the table below to talk about the process of medical equipment planning, procurement and installation management and what resources will perform each task.

Budget estimate – initial equipment estimate.	
Planning – Develop comprehensive room by room equipment list matched to drawings.	
Planning -Evaluate existing equipment and integrated into the list, review line by line with users and obtain approvals.	
Planning - Meet with users to define needs, introduce and discuss new technology	
Planning - Provide drawings showing equipment using the architectural backgrounds	
Planning - Layout equipment placement options	
Planning - Construction Coordination– CFCI and OFCI equipment, scheduling early receipt of rough-ins, answering RFI's, attending const meetings	
Planning – Review submittals w/ plans and users and issue to A/E or GC	
Procurement – Develop specifications for bid, integrate T&C, review and tabulate bids on behalf of hospital.	
Procurement - Obtain quotes, validate options and accessories	
Procurement – Prepare requisitions with backup showing cut sheet, quote, locations	
Procurement – Vendor selection / negotiations	
Procurement – Review product to be sure it fits and will work with MEP or verify weight/egress to bring the item in.	
Expediting – verify delivery dates, contact vendors for installation	
Receiving – receive drop shipments, stage and store equipment (OFCI vs OFOI)	
Receiving - Storage – Shell space, owner space or off-site third party warehouse?	

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Installation - Assembly of shelving, carts, hampers, etc.	
Installation – in room placement, remove debris	
Installation - Equipment Acceptance – perform biomedical acceptance, asset tagging	
Procurement - Invoice Approval upon acceptance	
Relocation – coordinated plan for equipment to be prepped and relocated	