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Medical Facility Planning 101: A Primer for Administrators and Others

Abstract | ***Article***

This paper will address the issues for the hospital administrator who faces the unknown in the planning of a new facility or major renovation. It discusses performance problems, regulatory compliance, capacity, obsolescence, and components for planning and design—in short, planning for a successful project. It gives advice on putting together the internal design team; selecting the project programming team; and selecting the project architect and contractor or construction manager. It also presents suggestions for the development of the functional and space program and discusses long-term considerations such as the budget and mock-ups during the design phase.

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Seek knowledge to avoid performance problems
For most hospital administrators, a significant addition or a totally new facility is a once-in-a-lifetime event, so a thorough knowledge of the complete process is not always available to them. They need a lot of help, and it is abundantly available through their staffs; hired assistants knowledgeable in the design and construction process; and, most of all, architects, engineers, and contractors experienced in health facilities design and construction. In general, hospital administrators do not tend to share their experiences with others well, so "lessons learned" are hard to come by.

Visiting other facilities that are pertinent to your project is important to study the latest designs and ask questions about how the facilities are functioning and how the architects and contractors have performed for those projects. In addition, consult some of the many magazines that illustrate the latest and best in the healthcare field. Modern Healthcare, in particular, shows the winners of an annual healthcare design competition judged by hospital administrators and architects. As an administrator you should always encourage and support your staff to perform due diligence in researching projects that are similar to the one you are about to embark upon.

Some performance problems may arise from modifications or changes that have been made over the years without benefit of authority having jurisdiction (AHJ) compliance, particularly regarding electrical systems or fire and other life-safety issues that can arise in a facility due to lack of knowledge about the regulatory system or in some emergency situations.

Don't cut corners on regulatory compliance
A number of regulatory agencies may affect your project. It is vitally important to coordinate your project through the proper channels so that there are no surprises in the middle of the project or at the end. Among these channels are the statewide health agency for licensing the facility and/or the AHJ. In California, for instance, the AHJ is the Office of Statewide Health Planning and Development (OSHPD). This is the agency that will review your construction documents, issue your building permit, approve the construction process, and issue a

certificate of completion for final occupancy. Also to be considered are your local planning and/or zoning department, conditional use permits (CUPs), local and statewide flood control agencies or state water resources quality control boards, the U.S. Corps of Engineers, the U.S. Department of Fish and Wildlife, and your local fire and police departments. Other California authorities that must be consulted are the Public Works Department, the California Environmental Quality Act, and the Coastal Commission if your facility is within the coastal area.

Plan strategically for future capacity
The capacity of the existing facility as well as any future work will depend on both a strategic plan and a long-range master plan process. The strategic plan will concern itself primarily with long-term goals of the hospital as well as fiduciary concerns. The master plan will provide a road map indicating directions for the institution to accomplish over a given time frame. Simply put, a strategic plan is deciding what and where you want to be when you grow up, and the master plan will show you how to get there. Capacity for the future should be determined only through a thorough marketing study, taking into account the demographics of the service area, anticipated market share, competition for market share, current planning of the competition, and anticipated future demographic shifts, among other factors.

Most hospitals that are 20 to 30 years old or older are suspect obsolescent facilities. Most were built with two or more beds to a room; they do not reflect the current trend toward single occupancy and are difficult to retrofit to accomplish that goal, including private toilet facilities. The older facilities were planned and constructed predominately for inpatient use, while today's hospitals combine inpatient use with a large percentage of outpatient or ambulatory care. The advent of computer technology also has changed the complex interrelations within a hospital, permitting decentralization of services that were not possible when the original plans were conceived.

Components of planning and designing a successful project
1. Assembling the internal design team
To be most successful, the internal design team should be as inclusive as possible of representatives from all departments that participate in the facility's operations or service. Inclusiveness will ensure consensus on both functional and space planning. Make a special effort to selecting team members who are open minded and can think outside the box, who are not stifled by maintaining the status quo, and who will not be intimidated by other members of the team. It is important for the team members to develop a sense of ownership in the process and to become shareholders in the final product. Potential members of the design team include

- ***Medical director***
- ***Intensivists***
- ***Nurse manager***
- ***Nurse staff rep (techs and physicians)***
- ***Medical facility programmer***

Hospital administration rep (one who can make decisions)
- ***Operating staff engineer***
- ***Environmental engineer***
- ***Infection control specialist***
- ***Patient safety officer***
- ***Biomedical technician***
- ***Housekeeping rep***
- ***Pharmacist***
- ***Central sterile supply and processing rep***
- ***Central supply rep***
- ***Information technology rep***
- ***Respiratory therapy rep***
- ***Project architect***
- ***Medical planner***
- ***Interior designer***
- ***Last, but not least, former or current patients and families***

Others will come to mind as you begin to explore the potentials of the process.

2. Selection of the project programming team
Talented, independent medical facility programmers are available throughout the country and should not necessarily be part of an architectural office. If the programmer is part of an architectural office it is important that the programmer not be part of the medical facilities planning team, as it tends to skew their thinking during the programming process. The project architect should be brought into the programming process near the end of the programming process when important issues are discussed and finalized, so that the final program is reflective of his or her ideas.

3. Selection of the project architect
The selection of the project architect can be one of the most important decisions during the entire project. The selected architecture firm should be communicative and compatible with your corporate mission or philosophies. The firm should have sufficient staff who are well trained in the medical facility field and who will be employed until the end of the project. Certification from the American College of Healthcare Architects (ACHA) will help assure you of their competency. A list of potential candidates can be developed by referrals from other CEOs, contractors, from trade magazines, and from conferences and trade shows such as those of the American Society for Healthcare Engineering or the AIA Academy of Architecture for Health. It is normal for the firms on the list to be honed down to five or six firms and asked to submit a Request for Qualifications (RFQ). From the submitted RFQs the owner will invite a short list of firms to make a presentation to the board to select the project architect. Be sure to develop an evaluation form for use during these interviews (see AIA Document B431, the Architect's Qualification Statement).

4. Selection of the contractor or construction manager
The second most important decision is the selection of the

project-delivery method you wish to pursue. There are many options, and that choice will be determined by the amount of participation and control that you and your facility wish to maintain. Some of the options include a prime contractor, a construction manager (CM), a design-build arrangement, or some alternative of these. You can take steps similar to those stated above for the architect. It could also be a decision to hire the contractor or CM at an early date to be involved in the planning process in conjunction with the architect to ensure constructablity and cost containment. See AIA Document A305: Contractor's Qualification Statement.

5. Development of the program, the functional program, and the space program
The first steps toward a successful project are in the programming process. In the excitement of anticipating a renovation or new healthcare project such as a CCU or a new facility, too many owners are impatient to see "lines on paper" if not the actual beginning of the construction process. Neglecting the programming process often exacts a heavy price for ill-conceived and poorly executed facilities. Current health facilities are increasingly complex and enormously costly. To omit the programming process would be imprudent; it will eventually cost dearly to correct deficiencies that are almost certain to follow.

The real secrets of successful projects, as noted above, are twofold: (1) Involve as many of the participants in the process as possible because these are the people who must make the unit work; and (2) Do as much work as possible up front, prior to the start of drawings and construction, as this is where you will make the most significant cost and operational decisions in the entire life span of the project.

There are two distinct aspects of the total design process. The first is the programming phase, in which we seek out the uniqueness and the requirements of the project. We also call this the analysis phase, during which we break down the project into its essence in simple, creative terms. Then there is the design phase, which also can be called the synthesis phase, during which all elements of the programming phase are put back together to form a meaningful whole. Programming is problem seeking, and design is problem solving. The latter phase is where we will start to draw lines, but this should not begin until the first phase is completed and signed off.

The programming phase of a healthcare project is generally divided into seven distinct yet related parts or steps. The first five basic steps are these:

1. ***Establish aims and goals***
2. ***Collect, organize, and analyze facts***
3. ***Uncover and develop concepts***
4. ***Determine the needs***
5. ***A statement of the problem***

The first four steps will lead to the statement of the problem in terms of function, form, economy, and time, as these are the elements on which architecture is ultimately

judged. Function implies "what's going to happen in your facility" concerning activities, relationships of spaces, and people. Form considers the physical environment, the quality of space, and construction. Economy will deal with the initial budget, the quality of construction with considerations of operating costs, and life-cycle costs. Time is considered in terms of past, present, and future.

The statement of the problem should be a joint effort between the programmer, the design architect , and the owner and staff of the facility as well as the contractor if he or she is involved at this point. The statement of the problem is the interface between programming and design and should include at least four, but less than 12, statements in terms of function, form, economy, and time.

Step 6 is the development of the functional program and involves written descriptions of all of operational aspects of the facility, including patient profiles, policies and procedures, admitting to discharge processes, pharmacy, material and food distribution systems, communications, and information handling systems as well as medical equipment and furnishings systems.

Step 7 of this preliminary process is the development of the space program, which reflects all of the aspects of the functional program, provides space for each individual and for each function described, and is based on a realistic budget. The development of an accurate staffing analysis must be part of this process and may uncover any deficiencies in available staffing resources for future operations.

Long-term considerations
Budget
The budget for any project should be established early in the project. The architect and owner should realize that the budget has two major aspects: cost of construction and total project cost. The cost of construction is normally about two-thirds of the total project cost, so be sure that the architect and the owner are talking about the same item. It is too late for the architect to suddenly realize that the owner was talking about total project cost when his or her design is based on that cost and not the cost of construction.

The cost of construction should include such items as the actual cost of the building (total gross square area times the cost per unit of measurement, i.e. square feet or square meters); a contingency figure (usually from 10 percent at the early phase to allow changes in the scope of the work as the programming process proceeds, down to 2 percent to 3 percent at construction time to allow unforeseen situations and owner-requested changes); and the costs of furniture, fixtures, and equipment (FF&E) for the facility. Land costs, architects' and engineers' fees, legal fees, opening costs, and other items will be included in the total project cost.

The budget is closely connected with two other issues:

quality and quantity. If you change one, the others will change as in a triangular diagram. If you increase the quality, the budget will increase. If you increase quantity, the budget will increase. If you decrease the budget, either quality or quantity—or both—will have to decrease.

Mock-up designs
Mock-up rooms can prove to be the most valuable process performed during the programming and planning phases. This process will display all of the programmed items of any room and will be available for the entire staff, physicians, patients, and visitors to examine as an actual or simulated patient care experience and to utilize and approve the locations of all items prior the to the start of early designs and contract documents. Rooms that are repetitive—such as patient rooms, surgery rooms, and exam rooms—especially lend themselves to this process. Each proposed design should be constructed in metal or wood studs in a warehouse setting, complete with gyp-board walls and finishes. The final product should include all equipment and furnishings as well as the patient bed, lighting, medical gas locations so that the reviewers can adequately inspect, try out, modify, and approve the final design. Provide plenty of forms for the reviewers to make comments and recommendations.

This is a time when all of the critical issues can be examined for compliance to the functional program prior to incorporation into the final documents. It is the most practical expenditure of predesign funds that any hospital can make. Better to find the mistakes before construction than to spend funds correcting them after construction.

Construction-related terms
Inspector of record: A certified inspector (who may or not be employed by the owner or the architect) who is on the job every day and who will certify the day-to-day progress of the construction project.

Value engineering: Services normally supplied by a third party, working for the owner, to evaluate material quantity or quality or methods of construction.

Change orders: Change orders may be initiated by the owner (to request a change of scope, material quantity, or quality), the contractor (to request a product change, the scope of work, or in response to the architect's instructions that change the scope of work), or the architect for similar reasons.

Requests for payment: Requests for payment come from the contractor, normally once a month or at preapproved times, to request payment for work done during the prior period.

Final checklists: Sometimes called the punch list, the final checklists are drawn up by the architect and/or the contractor to identify any remaining or corrective work that must be done prior to the issuance of the certificate of final

completion and the final payment.

Certificate of substantial completion: This document allows the owner to take beneficial occupancy of the facility, starts the warranty period of all equipment and materials, and begins the period when the owner must start payment of utilities for the facility.

Certificate of final completion: This instrument, filed with the county recorder, starts the lien period for subcontractors and material suppliers.

Liens: The preliminary notice of lien, filed with the owner by the subcontractors and material suppliers, attests that they have supplied labor and/or materials for the project and reserve their right to file a lien on the project if they are not paid. The architect, in cooperation with the owner, is responsible for ensuring that the subcontractors and material suppliers are paid by requiring the contractor to supply lien releases with the monthly request for payment or by asking for dual signatures with all payment checks. Preliminary notices of lien are normal on each project and do not tend to be serious unless ignored.

Reference list of useful documents
Standard Form of Agreement Between Owner and Programming Services: Although there is no standard form for these services, AIA Documents C141™ or G605™ may be adapted for this purpose.

Standard Form of Agreement Between Owners and Architects: AIA Document B141™ is a generally accepted form for the selection of a project architect. See also AIA Document D200™, Project Checklist.

Standard Form of Agreement Between Owner and Construction Manager. AIA Document B801™CMa is a generally accepted form of contract between an owner and a construction manager who is not a constructor.

Standard Form of Agreement Between Owner and Construction Manager Where the Construction Manager is also Constructor: AIA Document A121™CMc

Standard Form of Agreement Between Owner and Contractor Where the Basis of Payment is the Cost of the Work Plus a Fee with a Negotiated Guaranteed Maximum Price: AIA Document A111™

Standard Form of Agreement Between Owner and Design/Builder: AIA Document A191™DB

General Conditions of the Contract for Construction: AIA Documents A201 and A201™Cma

Bid Bond: AIA Document A310™

Performance Bond and Payment Bond: AIA Document ™

A312 .

During construction you will become familiar with requests for information (RFIs), change orders, the application and certificate for payment, and the certificate of substantial completion as well as other daunting forms. Don't let them intimidate you.

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