Planning and Designing Health-Care Facilities for Maximum Patient Value
by David W. Goff, FACHE

As one enters an American hospital built within the past 10 years, the appearance is that of a high-tech, state-of-the-art temple of healing that is dramatically different from its older counterpart. While much is different from the old, the basic departmentalization and space configuration of the hospital facility has not changed substantially. However, more dramatic design changes will be required in the future as lower operating costs become incr4asingly necessary.

The intent of this paper is not to infer that all capital expenditures for new and renovated hospital space have resulted in sub-optimal result, nor to offend everyone who has been involved in projects over the past several years. The intent rather is to challenge those contemplating future capital projects to re-examine the traditional process of space planning and to define more clearly the required end product.

To achieve substantial change in operating costs and functionality in new space, the traditional planning process must be dramatically changed. From the onset, those involved must focus intently on the role space design and configuration play in the efficient processing of patients through the health-care process.

For the purposes of this discussion, assume that all the reasons for contemplating a replacement facility or significant new space are legitimate. It is at this point that the organization's leaders must clearly define realistic—and extremely challenging--performance objectives for the project if the financial investment is going to be economically viable in a future of severely limited operational resources.

The primary challenge for the organization's leadership is to focus on future clinical and economic requirements of health-care delivery, rather than existing facility shortcomings. If the leadership does not shape the discussion firmly in the beginning, the process that follows may be driven by a "replacement" mentality. The process described herein will lead to a nontraditional structure that *may* cost more initially, but will more than offset its higher first cost through reduced annual operating expense.

First, leadership should establish a goal of identifying verifiable operating cost savings that offset increases in debt service and depreciation expense associated with the capital project. Although identifying this kind of savings may not always be possible, management should always be challenged to do so. .Historically, significant innovation in design and organization to reduce operating cost has not been a standard practice. It has been easier to justify cost increases and identify ways to pay for them; however, the payers of health care will not allow this pattern to continue in the future.

Key decision-makers (senior management, boards, and physician leadership) should consider adopting a clear process for planning major space changes—such as the one below--*before* there is any announcement of a decision to embark upon a major building program.

Preplanning process

A. *Formally define- in detail--all reasons for deciding that a new facility or space, or a renovated space, is the best option to follow*. This may appear to be a redundant step,

but it is necessary as a part of this overall pre-launch exercise. It requires more than simply listing all the problems with existing space.

B. *Define the future*. Any building constructed today is expected to be in service for at least the life of the financing mechanism used. Medical advances anticipated over the next 20 to 30 years definitely will affect the type of space needed to deliver services. In addition, administrative requirements will change as much or more than clinical requirements.
C. *Look back.* Reflect upon the changes in medicine over the past 30 years, particularly as they have affected the organization's physical facilities, and calculate the cumulative cost of building and maintaining space over its useful life. Learn from past mistakes as well as from successes in space design. A detailed analysis of this historical data will prove extremely educational to the leadership as they begin to define the goals and objectives of the new project.
D. *Summarize data collected in Steps A, B, and C. and re-evaluate the original decision to build new space*. Going though this formal process in advance of an announcement of a major new project will inevitably affect the goals and objectives that the leadership will adopt for new space.
E. *Define goals and objectives of new space*. Realistic, clearly defined economic returns on capital investment established in the initial phase of the process will shape the process that follows. The financial goals adopted for the project will likely direct the leadership to consider a significant departures from traditional spatial layouts and, thus, from the facility-planning process. This increases the opportunity to evaluate innovative alternatives that may reduce space requirements and reduce operating expenses.
F. *Follow the "cost per case" principle*. Teams of hospital employees and managers to plan the new space should be assembled following this "cost per case" principle, rather than the traditional "by department" approach to space design. The leadership may also want to consider making organizational changes in staff to reflect the importance of "cost per case" rather than the more traditional departmental focus.
G. *Develop the formal planning process that will best meet those goals and objectives*.

Today's sobering reality is that economics require operational savings to accrue from the creation of new space. With a clear definition of the financial as well as clinical objectives of new space, the creative talents of the entire staff can be unleashed with the greatest probability of delivering the desired result.

Design concepts

Once the pre-planning phase is complete and a conceptual and financial framework is established, the organization can identify key design concepts to be evaluated. Identifying and evaluating very different approaches to the physical environment can generate for staff an excitement in the project's design phase project that might otherwise be missing.

Although this evaluation process may be undertaken by internal staff only, often there is merit to selectively obtaining outside assistance. Although assistance can come from one consulting firm, consider contracting with a variety of consultants who have

expertise in specific areas--clinical care delivery, organization, energy consumption, automation, computerization, wireless technology, etc. The key to success in this strategy is selecting consultants who accept the project goals and objectives and have demonstrated ability to deliver innovative solutions in similar settings. Experienced input from other sources assures the leadership that all reasonable efforts were made to identify and evaluate alternative ways to develop a facility that operates as efficiently as possible for the life of the building.

Although the following examples refer primarily to acute-care facilities, the framework is the same for any type of health-care facility. (This listing is not meant to be all-inclusive, but rather means to present types of facility characteristics that make a difference in both capital and operating expense categories.)

1. *The efficient and effective processing of patients through their treatment regimens* must be the dominant guiding principle for space configuration in acute care hospitals. The spatial layout of inpatient clinical units should show that treatment protocols are considered a fundamental building block of quality patient care. Space configuration must be geared towards maximizing the actual time professional caregivers spend carrying out those protocols. This probably translates into allocating a greater percentage of the total building space to the patient units.

2. *Horizontally oriented buildings*, where possible, should be pursued. Each acute-care bed level should include 80 to 160 essentially identical private rooms. These rooms should be bigger than the codes require, and, if the past is prologue, they should be designed to handle today's ICU patient effectively. Patient room layout should allow maximum flexibility in patient assignment by diagnostic grouping so that ever-changing subspecialty groupings can occur routinely. In smaller facilities, the arrangement will work equally well with no geographic grouping of patients. The current pattern of grouping patients strictly by clinical subspecialty will have to be modified to increase operational efficiency. Modifications may be as simple as grouping more clinical subspecialties in an area, with the goal of approaching 100 percent occupancy on all functioning units. Closing and opening clinical units strictly based on need day-by-day should become routine. To make a sufficient economic impact on the cost per patient stay, occupancy levels must become much higher, and nursing productivity levels much more consistent. Physicians and nurses will be challenged to develop alternative care models that deliver equal--if not better--clinical care at lower operational expense.

3. *Reducing or eliminating non-clinical staffing* should be seriously considered at every opportunity, and the architect should design the space accordingly. Upwards of one-third of any hospital's payroll is allocated to non-clinical jobs, and establishing somewhat arbitrary reduction targets may be the best way to encourage innovative/creative thinking. Working with insurers and physician offices, redundant processes for registration/admission, insurance verification, and pre-certifications can be eliminated, saving space and payroll dollars. Likewise, using technology more

efficiently and working with insurers to streamline current patient accounting functions can result in significant reduction in staffing and space expense.

4. *Generous ancillary support space should be provided on the same geographic level as acute care beds* to increase the efficient processing of patients through a defined protocol. Moving patients to equipment and staff is acceptable only when it lowers the aggregate cost per stay for the patient. And cost per stay--rather than departmental efficiency--should be the dominant criteria for decisions. Hospitals must take advantage of the technological trend towards miniaturization of medical equipment and computerized linkages that allow economically feasible decentralization of services close to the patient.

5. *The movement of people and materials within hospitals must become much more efficient* through improved space aggregation as well as by more liberal use of escalators, elevators, moving sidewalks, automatic supply elevators, pneumatic tubes, computerization etc. The goal is to reduce time lost through people and supply movement and through inefficient patient protocol execution.

6. *Maximum flexibility* must be designed into new space to accommodate the inevitable medical and technological changes. Examples include larger spans and fewer columns, fewer fixed walls, ample plumbing and electrical/computer cable chases, provisions for much more wireless technology, etc. Space for non-clinical functions should be planned after the most efficient configuration for clinical space is determined`. Creative use of technology and supply distribution systems must be incorporated into the design to improve efficiency of non-clinical functions.

7. *Allowance for the computerization of the clinical care process* must be designed into of any new space. In the future, organizing, recording, scheduling, and monitoring much of the clinical care process will be computerized, and the spatial configuration of facilities must reflect this reality in ways that reduce space requirements and operating costs. The application of computerization will operationally and spatially affect every function of the efficient patient treatment process.

8. *The concept of integrating ambulatory patients into the acute care setting must be closely examined--and possibly abandoned*. Such designs have always created a dilemma for hospitals and negatively affected service efficiency and satisfaction for both categories of patients. Traditionally, the thought was that inpatients were a captive audience, and could be fitted into a schedule around ambulatory patients. Such an approach results in inefficient processing of inpatients through a treatment regimen and, concurrently, ambulatory patients getting “bumped” by emergency patients--creating dissatisfied customers who can avoid the problem by going to freestanding clinical centers. For those designing new facilities, the solution will be to recognize that a phasing from a dual service area to separate areas for each is likely.

9. *Plan the entrances and exits of the new facility to reflect the reality of how today's patients arrive and are matriculated for services.* Today's patient flow pattern is vastly different that of 30 years ago. Patients may arrive at the health-care facility:
    A. In trauma (generally brought to the facility by ambulance.)
    B. Sent from physician's office for evaluation and possible admission
    C. Sent from physician's office for direct inpatient admission
    D. For surgery the same day
    E. To receive some type of outpatient procedure
    F. Because they felt they had an emergent health need that could not be met any other way
    G. As an elective patient to be admitted that day.

By designing space to enhance the processing of these various patient groups, entrances into the building and the adjacent spaces will be very different from those in typical American hospitals.

Summary

By establishing a focused planning process as a precursor to launching a building program with clearly defined objectives, the leadership of an organization can more effectively shape and predict the outcome of the process. By communicating a clearly defined objective of new space to those responsible for planning and operating it, the organization can maximize its opportunity to design a building that accomplishes those objectives. By following this process, space utilization, configuration, and design can be major tools through which management can increase the efficiency and quality of the hospital operations in financially austere days ahead.

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