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Bringing Your Cancer Facility

Design and Renovation in a Cost-Conscious Era

by Marsha Fountain, R.N., M.S.N., and Laura E. Potts, Ed.D., F.A.C.H.E.

Today in the United States, more than 1,500 cancer programs and 6,000 hospitals[1] have approval from the American College of Surgeons (ACoS). With the aging population, an increase in new cancer cases, and the trend toward less inpatient and more outpatient cases, many of these institutions will be adding cancer services or updating their existing ones. Most likely, the cancer program's administrator or medical director will be responsible for implementing and overseeing design and construction. For many, this will be their first foray into the world of cancer center renovation and construction.

The options for any facility include new construction, major renovation, or a "facelift" (minor cosmetic renovation). When determining which one is best, planners should consider all options available, including closing the inpatient areas, renovation of existing space, partnering with other facilities/physician groups, or consolidation of offices, with a closing of some locations. While some of these options may seem drastic, all must be considered to survive in today's market as well as in tomorrow's.

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WHY RENOVATE?

Hospitals and facilities are looking for renovation or new facilities for a variety of reasons, most notably, growth. Many programs simply outgrow their existing facility. With mergers and networking, facilities must often consolidate or integrate to avoid duplication. In addition, many cancer care executives want a greater and more prominent presence in the community. Marketplace competition often prompts renovation or new construction. The decisions to undertake cosmetic renovation may also be driven by the desire to improve the facility's patient-friendly environment, making it more therapeutic and healing. Indeed, the environment of a health care facility is an important indicator of quality. Patients are demanding more convenience and one-stop shopping, with access to all services in one location.

Technological changes also contribute to the need for renovation. Radiotherapy equipment may not be accommodated in an older vault. Outpatient treatments are becoming more complex and longer term. The use of biologicals can affect the way treatment is given. As more care is delivered in the outpatient setting, inpatient care becomes more intense and may require changes to the rooms. Cancer centers also prefer easy access to ancillary services such as the positron emission tomography (PET) scanner, computer tomography (CT), and magnetic resonance imaging (MRI). The health care arena is also changing. There is a growing trend toward more interdisciplinary care in the treatment of cancer patients. Finally, reduced reimbursement affects how care is delivered.

Compliance and accreditation issues are also factors that bring about change. The Joint Commission on Accreditation of Healthcare Organization's (JCAHO) requirement on privacy as well as accessibility to resources and education calls for dedicated spaces. Accessibility to meet the requirements of the Americans with Disability Act (ADA) may also contribute to justifications for renovation projects. Billing issues such as "incident to" billing, Stark regulations, and the risk of Medicare fraud and abuse may support a change in the physical environment.

Facility designers have long understood the need for consolidation of services. "A one-stop approach makes for efficient, less stressful treatment, creating a sense that energy is being directed toward addressing the disease (cancer) rather than bouncing the patient from one hospital department to another," wrote R. Miller and E. Swensson in *New Directions in Hospitals and Healthcare Facility Design*.[2]

Studies have shown that the environment in a health care facility is an important indictor of quality. In a study by Ware and Avery in 1978, elements of patient satisfaction included a clean, aesthetically pleasant environment.[3] As early as 1896, Florence Nightingale wrote "Mortality and morbidity are related to defects of hospital construction, sanitation and poor public health. The convalescence of patients would be hastened if hospitals were built to afford them fresh air, sunlight, calm and quiet,

into the 21st Century

views of nature and a setting filled with beautiful objects, especially of brilliancy of color."[4]

WHERE TO START

In any project, the teachings of Frank Lloyd Wright might serve as a guide: "Form follows function." Prior to starting any project, the administrator should have a strategic plan, a *system/facility master plan,* and *a facility space plan.* All personnel should be included in the strategic master and space plans: physicians, clinical and support staff, as well as those in information technology, housekeeping, counseling, and anyone who will be in the facility. The *facility master plan* provides a strategic plan for future growth and can assist in determining departmental and service-line needs. The *facility space plan* provides a site and facility assessment. It will identify entrances and exits, evaluate traffic and circulation patterns, indicate site deficiencies or areas affecting future construction, and identify climatic conditions, which can affect the environment and operations.

Functional space programming is the next step in any renovation and design. At this stage, the project size is defined, and all existing and anticipated spaces are identified. Meetings with departmental staff are held to develop space and service-line needs, and determine projections for project costs. Staff should be provided with a questionnaire of volumes, units of service, and space needs. A determination should be made, for example, if the existing building is adequate for new services such as new linear accelerators.

In the phases of *functional space programming* and *schematic design*, the ability to reuse existing space is critical. The first rough sketches that outline possible design solutions are the schematics. These sketches are based on information gathered during the programming phase of the design. Alternative concepts are created to meet the needs and requirements of the specific project. This phase may include preliminary cost of alternatives. For example, in the schematic (page 22), a new accelerator would fit in the existing space, but be very

The clinical staff at this center wanted privacy for each patient. The center was initially designed with individual rooms. This chemotherapy suite is at Hoag Cancer Center in Newport Beach, Calif.

PHOTO BY GREG WEST, SAN DIEGO, CALIF.

PHOTO BY MICHAEL LYON, DALLAS, TEX.

Patient focus groups used in the design of this center preferred chemotherapy suites in "pods" with seating of more than two but less than 10 people (so they didn't feel obligated to interact with others). Based on this, pods were designed with four chairs, which could expand to five chairs when volume increased. This chemotherapy suite is in the Klabzuba Cancer Center at Harris Methodist Fort Worth in Fort Worth, Tex.

confined. Schematic design should take two to four weeks (more for large projects).

Patient focus groups can also provide valuable insight during this time. Patients in a cancer center have a variety of needs.[5,6] Among these are:

- Varying needs for privacy
- The option of being sociable, yet also wanting visual, physician, and acoustic separation
- Assurance that the nurses and medical staff are readily available
- Assurance that rooms are convenient, spacious, and comfortable.[5,6]

Another tip when designing is to ask clients about their specific needs. It will be very helpful in your design.

Design development is the stage when final decisions are made. Detailed drawings, down to each room, are prepared to illustrate all aspects of the proposed design. Components such as equipment, finishes, medical gas outlets, data and electrical outlines, and interior finishes are elements of design development.

Weekly meetings with the architects, engineers, key hospital personnel, and users help to refine the drawings. This is the time to look at everything in the space, including plug placement, height of workspaces, lighting, equipment needs, *everything*. Remember that changes to orders made during construction are very expensive and may affect the timeline.

Construction documents are then prepared from the plans, and construction begins. This phase includes detailed drawings and specifications that the contractor will use to establish actual construction costs and to build the project. These documents serve as the sole point of reference during the bid and construction phases and include every detail. Usually included are room-by-room details of equipment needs and finishes.

For construction to go smoothly, one person must be designated as the decision-maker. Now is *not* the time for management by committee. While suggestions from all users are necessary, the final decision must rest with one person. During construction, weekly or biweekly meetings should be held to discuss any problems or unforeseen conditions, which may arise. Decisions need to be made immediately to keep the project on time.

HOW OFTEN IS RENOVATION NECESSARY?

Generally, a building is outdated in 10 years. Therefore, many facilities choose to do renovation. The cost is usually less expensive than new construction. However, that may not always be the case if the renovation is extensive.

The downside of renovation is that the phasing of the work can cause some disruption and interruption of ongoing services. With renovation, installing the latest technology in older buildings might present problems due to the building's lack of adequate mechanical and electrical conditions for the new equipment. Space for duct and electrical work is also usually limited in older facilities. Prior to deciding on renovation, a complete assessment of the building is required to determine what limitations exist.

WHAT ABOUT COST?

The cost of renovation or construction can vary significantly. Keep in mind that the construction cost is separate from project cost. Project costs are, at a minimum, 1.6 to 2 times the construction cost, not including major equipment. Construction cost increases on the average 3 to 5 percent per year.

Costs for renovation/construction vary based on interiors, upgrades to engineering systems, and number of floors. Here are some estimates:

New Construction:

- Vaults: $275 to $325 per sq. ft.
- Clinical space: $100 to $150 per sq. ft.
- Shell space: $60 to $90 per sq. ft.

Renovation:

- Major with demolition: $60 to $85 per sq. ft.; $130 to $150 if inpatient setting
- Minor (cosmetic): $15 to $25 per sq. ft.

As shown, major renovation may be as costly as new construction. Don't assume that renovation will be a cost saver. For large projects, the consideration for new space should be an important one.

Costs include all items listed in Table 1. Moveable equipment as well as medical equipment adds up significantly. Calculate the costs for phones, cables, and all electronic networking, which are often overlooked until the last minute.

HOW TO SELECT AN ARCHITECT

When choosing an architect, consider these criteria:

- *Prior Experience.* The experience of the firm, as well as the experience of the personnel working on the project, are important. Review the resumes of those people in charge of the job. Someone with experience in your type of renovation/new facility will make life much easier. Don't be the training site for someone new.

Table 1: Estimate of Probable Costs for Cancer Centers (Averages for U.S.)*

Building Cost	
Remodel/Renovation	$60 to $150 per sq. ft.
New Construction	$150 to $250 per sq. ft.
Vaults	$275 to $325 per sq. ft.
Clinical space	$100 to $150 per sq. ft.
Shell space	$60 to $90 per sq. ft.
Site Development Land Cost	5 percent of building cost (varies)
Fixed Medical Equipment	Varies based on equipment
Construction Contingency	10 percent of building cost (can vary significantly)
Construction Cost (Includes Building Cost, Site Development, Fixed Medical Equipment, and Construction Contingency)	
Moveable Equipment/ Furnishing Allowance (Includes furniture, interior finishes, artwork, donor recognition, signage, plants, telecommunications)	8 to 12 percent of construction cost (can vary significantly)
Professional Fees	8 to 12 percent of construction cost
Administrative Costs	3 to 5 percent of construction cost
Owner's Reserve	5 percent of construction cost
Total Project Cost	

*Note: Figures above exclude escalation/inflation and financing

■ *Consultants.* Engineers, interior designers, and accessibility experts are all part of the design team. Know whether these consultants are part of the company bidding on your job, and, if not, whether the team has worked together before. For interiors, make sure the interior designer is an expert in health care and, preferably, experienced in cancer care.

■ *Philosophy.* Make sure you are satisfied with the answers to these questions: Is the design team inclusive in their approach to your project? Do they tend to design, show, make changes and redesign, or do interactive design with you at the table? Are they more practical or "show" oriented? Be certain of your objectives. Do you want an award-winning design? Then, make sure an award-winning designer is on staff. Do you want a practical and useful building? Then, make sure medical planners, health care designers, and architects are experienced in the type building being designed.

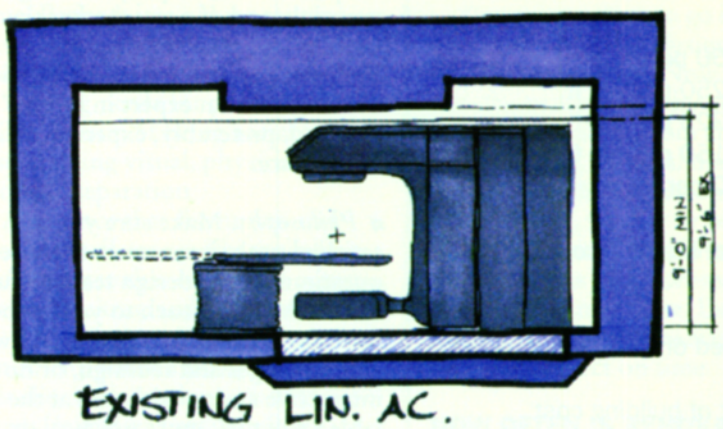
■ *References.* Check all references, including those for the company as well as for the team members. Ask to go to site visits of other facilities. If that is not possible, ask for presentations about other design work. The "gut" check is also a good indication. If you don't feel good about the people on the team, then walk away. You will be working closely with this team, and a *team* effort is required to be successful.

■ *Fees.* Although important, always look at fees last. Find the best fit for you and then negotiate the fees. You may have to pay a little more for someone with experience, but the extra expense will be

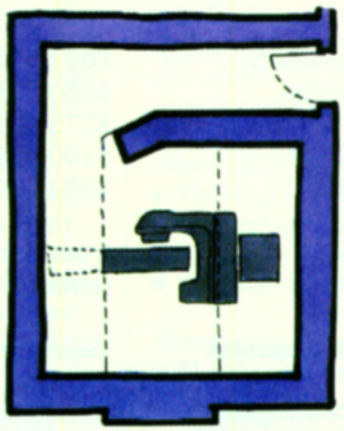
PHOTO BY MICHAEL LYON, DALLAS, TEX.

Accelerator vaults are usually imposing and may be frightening. Shown here is the use of a back-lit transparency, which mimics an outdoor garden (by Art Research Institute, Atlanta, Ga.). This and the use of silk plants in front of the transparency soften the feel of the room. This linear accelerator vault is at the Klabzuba Cancer Center in Fort Worth, Tex.

Schematic designs are critical to assure that new equipment will fit into existing space, as with this older accelerator vault.



Side View



Overhead View

Existing space will accept new linear accelerator, although it will be a tight fit.

saved in cost and time during the project.

SUMMARY

When designing either new space or renovation, here are a few key points to keep in mind.

- Be aware that the majority of patients will be older than 50 and have varying degrees of incapacity. Remember to keep their needs in mind during design.
- Design an environment that is homey, cozy, and convenient. Use natural elements such as wood, natural light, and fabric throughout the facility.
- Select bright primary colors with contrast, a preference of the elderly, who generally suffer from color starvation.
- Mark pathways, particularly in large centers.
- Design convenient parking to avoid a 15-minute walk to the facility.
- Design for access and other accommodations to assist those with disabilities.[7]

This article is not intended to discuss all design implications. A variety of resources are available to assist in the design and renovation of cancer centers. For example, the American Institute of Architects recently held a conference on the design of cancer centers. Their journal, which is online, has many articles related to cancer center design and construction. Visit the web site at www.e-architect.com/pia/acadjour/home.asp. Also, visit the web site of the Design and Construction Task Force of the Dallas Forth Worth (DFW) Health Industry Council (www.healthbuild.org). The site has been developed to assist clinicians in health care design and construction.

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