



Departing the Compound, by Elzie Golden, pastel on paper, Iraq, 2005.
Art: Courtesy of the Army Art Collection, US Army Center of Military History

Chapter 16

THE SECURE RESIDENTIAL PSYCHIATRIC FACILITY: PROCESS, DESIGN, AND RESULTS FOR BEHAVIORAL HEALTHCARE

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SUMMARY

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INTRODUCTION

Behavioral healthcare providers provide care. Architects, engineers, and contractors make buildings. Effectively integrating the expertise of those who provide, support, and receive behavioral healthcare services with the efforts of those who design and construct the facilities is vital to developing a high quality, efficient, and effective facility that supports care and healing. Making the most of the process that results in a new or renovated forensic facility is, therefore, crucial. Decisions made and opportunities captured—or missed—will affect patient quality-of-care, medical outcomes, staff quality-of-life, and facility operational efficiencies for decades after construction is complete.

Yet most individuals involved in patient care and treatment are never involved in the design of the new or renovated facilities. If the opportunity does arise, it typically occurs only once or twice in a career. After the specific project is over, the lessons learned about the process and details of facility design either fade significantly before the next opportunity or are simply never used again.

Most large organizations, including the US military, have in-house capability dedicated to the development and renovation of facilities. This capability exists at

the organizational level and sometimes at the facility level. These in-house groups typically understand that meaningful, appropriate, and effective participation by caregivers and other facility users is central to the success of a given project. To that end, it is useful for those involved in providing care to have a basic understanding of the issues to be addressed, processes, terminology, and approaches associated with the design and construction process.

This chapter provides an overview of the challenges of secure psychiatric facility design, an introduction to the design process, and suggestions on how facility staff can most effectively participate in that process, along with some discussion and specific examples regarding behavioral healthcare facility design.

It is intended primarily for those who are new to the design effort and whose expertise—traditionally viewed—lies elsewhere. It may also be useful as a refresher course for those who have been through the process at least once and are about to receive a new opportunity. The goal is to ensure that all individuals working on the design or renovation of a behavioral healthcare facility are informed, effective, and efficient participants.

EXHIBIT 16-1

ADDITIONAL RESOURCES

Beyond the project specific team, various military and nonmilitary resources for information on the design and operation of behavioral healthcare facilities exist. Although some are within the federal government or the military, others are state agencies or associations of caregivers with similar interests or missions. Some provide standards, or at least preferences, for design and operation. Some do both. These standards change and evolve over time, and occasionally conflict. They can present valuable starting points for research. Some notable sources include the following:

- Department of Defense, Unified Facilities Criteria (UFC) Design: Medical Military Facilities (www.wbdg.org/cdb/DOD/UFC/ufc_4_510_01.pdf)
- Borden Institute, US Army Medical Department Center & School, Textbooks of Military Medicine (www.cs.amedd.army.mil/borden/Portlet.aspx?id=82200b57-a7a4-4160-bb51-4a086dd6ccce)
- Department of Veterans Affairs, Office of Construction and Facilities Management (www.cfm.va.gov)
- Facility Guidelines Institute, Guidelines for the Design and Construction of Health Care Facilities (www.fgiguidelines.org)
- National Institute of Building Sciences, Whole Building Design Guide (www.wbdg.org/design/psychiatric.php)
- Joint Commission on the Accreditation of Healthcare Organizations (www.jcaho.org)
- National Association of State Mental Health Program Directors (www.nasmhpd.org)
- Individual State Mental Health Departments (listing at NASMHPD website shown above)
- The Center for Health Design (www.healthdesign.org)
- National Association of Psychiatric Health Systems (www.naphs.org)
- *Design Considerations for Mental Health Facilities*, American Institute of Architects Committee on Architecture for Health, American Institute of Architects Press, 1993

At the same time, this is not an exhaustive treatise. The existing design support, literature, and standards that the military brings to bear on facility development should not be undervalued. Outside resources exist that complement those assets (Exhibit 16-1, Additional Resources). Each project presents a unique set of issues, challenges, and opportunities. Finally, the size and complexity of individual projects affect both the process and the range of relevant issues. As an example, an overview of the specific process and

results associated with the District of Columbia's Saint Elizabeths Hospital is included at Exhibit 16-2, The New Saint Elizabeths.

As a simple aspirational goal, one should not put anyone in a place where he or she would not put his or her spouse, child, or family member. Anyone includes staff, patients, visitors, and the community. Frankly, this simple directive serves as a threshold test for proposed solutions to any questions that will arise during the design of a behavioral healthcare facility.

EXHIBIT 16-2

THE NEW SAINT ELIZABETHS

Introduction

The District of Columbia's Saint Elizabeths Hospital is an example of how the process ideas described generically in this chapter affected a significant, real world project. The challenges, processes, and solutions at Saint Elizabeths may be instructive to individuals or teams embarking on their own behavioral healthcare project. The new Saint Elizabeths is a 293-bed facility housing both forensic and civil patients. The District of Columbia's Department of Mental Health operates Saint Elizabeths as a recovery-based facility, and it is an integral part of the city's overall mental health efforts.

Background and Challenges

Saint Elizabeths is the oldest federal psychiatric hospital in the United States. Established in 1855 at the urging of mental health advocate and pioneer Dorothea Dix, the 362-acre campus was originally known as the Government Hospital for the Insane of the Army, Navy, and the District of Columbia. Dix had suffered a breakdown while living in England and was cared for by Quaker advocates of "moral treatment." They argued for the intrinsic human dignity of patients and their respectful treatment by caregivers. Dix recovered, was impressed by her care, and wanted to import moral treatment ideas to the United States.

Saint Elizabeths was the site of a military hospital during the Civil War. Recovering soldiers—reluctant to say they were staying at an asylum—used the name of the original land grant. The name stuck and became official in 1916. The east campus was conveyed from the federal government to the District of Columbia in 1987, although the District continued to use and maintain both the east and west campuses. As mental healthcare changed and the residential population grew, Saint Elizabeths also expanded. Buildings were added for patient care, staff residence, and research. The last major addition completed in 1959 was the John Howard Pavilion, which housed forensic patients. As late as the early 1970s the patient census exceeded 7,000.

With evolving models of care, the introduction of drug therapies, cars, and development that allowed staff to live off campus, and especially the deinstitutionalization movement of the 1970s, Saint Elizabeths' population decreased dramatically. By 2000 the residential population was roughly 600, and the District was faced with a tremendous mismatch between the hospital's mission and the existing facilities. Budget realities made operating an oversized and antiquated facility difficult. Legacy locations left programs in more than 40 buildings spread across the east and west campuses. Aging buildings and infrastructure diverted limited resources away from the hospital's core mission of patient care. Deficiencies in facilities made needed improvements in care difficult or impossible, and planning efforts in the late 1990s made it clear that neither continuation of existing building usage and operations or rehabilitation of existing facilities presented an appropriate long-term solution.



Saint Elizabeths' Exterior at Dusk

Architecture communicates values. It affects residents, their families, and the military and civilian community by making clear the commitment to and importance of what occurs at the facility. It can also support staff recruitment, retention, and morale. Courtesy of Ron Solomon © 2014

(Exhibit 16-2 continues)

Exhibit 16-2 *continued*

The reduced census, the overabundance of aged and inappropriate space, and the inability to reuse existing space effectively led to the District's decision to create a new consolidated forensic and civil hospital. That decision included a commitment to creating an extraordinary recovery-based facility that would communicate the importance of mental healthcare and the value of all the city's citizens.

Process

The Saint Elizabeths' design and construction effort generally paralleled the process outlined in this chapter. At the same time, as with any real world project, initial and ongoing adjustments dealt with project specific realities. An all-day work session in December 2001 included more than 50 representatives of the Department of Mental Health, Saint Elizabeths Hospital, the architect and its consultants, and the construction manager. Facilitated by the architect, the effort was an important initial opportunity to establish relationships among team members. Project goals were discussed along with methods for communication. A preliminary project schedule with milestones was established.

Anecdotally, it is worth noting that as the session started, the beepers of hospital participants began to buzz. Center for Medicare & Medicaid Services reviewers had arrived on the campus. Although not unanticipated, this visit required some staff to return to the hospital, quickly assigning others to represent their views in the meeting and arranging later briefings. It also made immediately clear the complexity of carrying out a major project requiring significant senior staff input while still operating a large mental health facility. The kickoff meeting also established a core work group to track and address overall project issues. Officially labeled the Owner / Architect / Construction Manager Workgroup, it was quickly dubbed the easier-to-say "Troika." The three-member team included leads from the Department of Mental Health, the architect, and the construction manager. Ad hoc members were added as needed and the group ebbed between three and six.

Importantly, the Troika process was not responsible for the daily minutiae of the work (although members were intimately involved throughout design and construction). Programming and design meetings, construction meetings, subcontractor meetings, and myriad necessary tasks occurred in parallel. The Troika was instead charged with both stepping back to monitor and addressing project level issues. The duality of this position, a willingness and requirement to speak honestly and act collegially, and members with authority to take action allowed a quick and effective response throughout design, construction, move-in, and occupancy.

Subsequently, two days of structured, facilitated brainstorming sessions provided a wide-ranging forum for input from staff, caregivers, advocates, and residents. The emphasis was less on specific answers than on the characteristics of a successful new hospital. A consensus formed around what was important. The goal was a light-filled, recovery-based facility, modeling the behaviors and rhythms of the outside world, dedicated to the dignity and safety of residents, staff, and visitors. Environmental sustainability and operational efficiency would be incorporated to focus current and future resources on the hospital's mission of care and recovery. That consensus was documented and shared to allow design and operational options to be rationally evaluated against these popularly agreed upon desires.

Campus Consolidation

The consolidation addressed the inefficient dispersal of staff and programs across the campus. A dedicated subgroup within the architect/engineer project team carried out this effort, which allowed quick response to immediate needs without affecting the larger project timeline. The architect's project executive and lead medical planner and the department's lead participated with both groups to ensure coordination and capture of decisions that would affect the larger project. In some cases, processes and space needs identified as part of the consolidation served as a starting point for discussion and development of long-term solutions. In effect, the consolidation effort became a training and practice ground for hospital and department participants in what would be an enormously larger and more complex exercise for the new building. The consolidation group looked at both reusing existing occupied space and renovating unoccupied space. The result used a mix of both, moving operations from more than 40 buildings on the east and west campuses to a more compact 10-building core on the east campus near the site of the new hospital building.



Saint Elizabeths' Patient Unit Panorama

Proper layout allows casual observation of each patient accessible door and the secure unit garden. Appropriate finishes, careful furniture selection, and accessibility to light and the exterior help to avoid an institutional appearance. The larger unit can be subdivided into smaller communities with their own social amenities. Courtesy of Ron Solomon © 2014

(Exhibit 16-2 continues)

Exhibit 16-2 *continued*

In general, resident patients were left in place to minimize disruption while office functions were relocated to improve efficiency. The high costs of relocating some specific functions like the facilities group and the medical laboratory led to these functions being left in place. Although a greater geographic short-term consolidation was possible, it was not justified by a disproportionate use of capital without long-term benefit.

As noted above, the consolidation effort was carried out in parallel with work on the larger project. Solutions were short-term fixes for functions that would relocate again. This condition argued for and produced relatively inexpensive schemes that took advantage of existing conditions wherever possible and minimized new construction. The effect was to immediately improve efficiency of the hospital's operations, creating a more compact and vibrant center of campus activity. "Face-lift" aesthetic improvements like new paint and ceiling tiles were incorporated throughout new and existing spaces.

Goal Setting and Programming

Portions of the Saint Elizabeths' process were shaped by some unique characteristics of the project, the client, and the local government structure. The District of Columbia Department of Mental Health system included only the single large inpatient facility, with the most recent building, the John Howard Pavilion, constructed in the late 1950s. The need for a new and different facility, therefore, came before an owner without extensive experience in addressing that specific challenge. The first effort included developing project goals as a starting point for design decisions. Space programming followed. Iterative meetings with every department within the hospital occurred in tandem with regular briefings and input at the department level. This effort involved a challenging integration with an evolving administrative and organizational plan for an intensely new model of care. Changes in staffing levels and structure as well as operational changes from food service to laundry to materials



Saint Elizabeths' Patient Room

In patient rooms materials, furniture, and finishes can suggest familiar residential or dorm-like living. Highly secure windows avoid visible screens or cages. Carefully selected furniture and door hardware help prevent barricade situations while allowing unobtrusive observation. Courtesy of Ron Solomon © 2014

management to staff and resident daily schedules became part of the conversation. Even the bed count of the facility was unsettled at the start.

At the end, a structure and general space program were established for a 293-bed integrated facility housing parallel civil and forensic programs. A commitment was made to make differences in treatment and facilities only where necessary. A forensic unit would look like a civil unit and vice versa. Administration and support would be shared. Operations would be flexible to allow hospital use to evolve with demand and changes in care and population.

Given the age and historic importance of Saint Elizabeths Hospital and the ambitious program of the new facility, the space program included some unique spaces. A small museum provided a place to display and demonstrate the facility's history. A rare books room within the staff medical library housed the collection of Willard White, the hospital's second superintendent (including first editions of *Alice in Wonderland* and *Alice Through the Looking Glass*). A 250-seat auditorium was located to support the hospital, District of Columbia, and community functions with high-level acoustics and capacity for distance learning and broadcast. Historic furniture, art, and artifacts dating back to the start of the hospital in 1855 are



Saint Elizabeths' Garden with Labyrinth and Trellis
Accessible, observable, and controllable garden space provides access to nature and connection to the outside world. The garden trellis and carefully spaced chairs can be used for formal therapy sessions or informal outdoor meals and other activities. A walking labyrinth supports contemplative healing exercise. Courtesy of Ron Solomon © 2014

(Exhibit 16-2 continues)

Exhibit 16-2 *continued*

displayed throughout staff and public areas. Exterior greenhouses and horticultural planting rooms at the treatment malls (eventually renamed therapeutic learning centers or TLCs) provided light, respite, and space for popular patient training programs. Trellised arbors located at secure garden spaces between residential units were planned to support casual use and act as locations for individual and group therapy.

The program continued to evolve during construction. Slower than anticipated development of the remainder of the east campus led to creation of a staff and visitor cafeteria from space on the main public corridor near the auditorium. A meditative labyrinth was added to a garden to support stress reduction and contemplative activity by staff and residents.

Government and Community Input

Community input and support were central to success. The hospital established a community-based advisory group that included mental health advocates, community leaders, and even some detractors of the hospital's previous operations. This group was regularly updated and appropriate comments were incorporated into the project. Importantly, those incorporations were shared with—and pointed out to—the group in subsequent briefings.

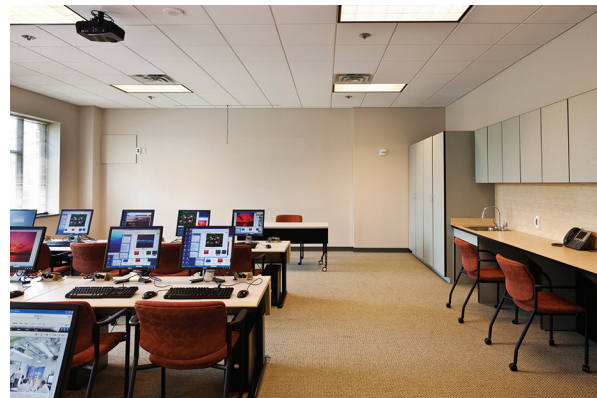
The District of Columbia Office of Planning and Zoning, DC's Historic Preservation office, and community organizations were involved throughout the project. Relationships established very early in the process and ongoing conversations built support for a complex and often poorly understood project type. As an example, it was discovered that the site had received no District of Columbia zoning designation when conveyed from the federal government. This situation required protracted discussion with the Office of Zoning, a group charged with overseeing redevelopment anywhere in the city and understandably concerned about 180+ acres of land without designation. Concurrently, roughly 11 acres were zoned and subdivided from the site for construction of a new District emergency services center, leaving just over 170 acres unzoned.

The result of the discussions was a "planned unit development" designation setting development parameters for the specific and carefully delineated area of the hospital. The remainder of the east campus remained unzoned pending further decisions by the District as to the direction of redevelopment. It has since become part of an ongoing city sponsored master plan focused on revitalization of the historic neighborhood and coordination with the Department of Homeland Security to be housed at the west campus.

The District also has a community-based structure of elected advisory neighborhood commissions. These groups serve as conduits of community sentiment on projects and issues throughout the city. Briefings and presentations were held at hours convenient to advisory neighborhood commission members and residents. Saint Elizabeths was generally viewed positively as a long-term neighbor and local employer. At the same time, a project of this size needed to be regularly shared with the community if only as a part of rumor control efforts. Advisory neighborhood commission members, along with members of the advisory group cited above, became both advocates for the project at a local and city level and sources of "rumor control" in the community.

Most community concerns were neither architectural nor operationally focused. Issues of construction and long-term employment opportunities, traffic, and redevelopment of the soon-to-be unused acreage and buildings were raised. A District-sponsored study from the Urban Land Institute looked at possibilities for the site and developed a "framework plan" for redevelopment.

Finally, in addition to the city and neighborhood level players, work in the "Federal City" is subject to unique review processes. These processes include both the presidentially appointed Federal Commission of Fine Arts and the National Capital Planning Commission. Both have broad authority regarding any project that affects their areas of responsibility or concern. Again, early meetings with staff, informal briefings and formal presentations, and appropriate responses to suggestions and feedback led to a remarkably efficient approval effort given the size of the project. The project cleared review with both entities in the minimum number of presentations.



Saint Elizabeths' Classroom

Properly sized and carefully configured rooms allow for short-term changes and long-term evolution of use. Relocatable furniture supports conversion of a classroom to group therapy or less structured instruction. Courtesy of Ron Solomon © 2014

(Exhibit 16-2 *continues*)

Exhibit 16-2 *continued*

Schematic Design

An early decision to configure units “like an open hand” allows casual observation down corridors, a view of every patient accessible door from a single point, small communities within the larger unit, and lots of natural light throughout the unit. A desire for ready access to green areas both on and off units affected the layout and helped bring light through otherwise long uninterrupted corridors between units. A variety of unit level configurations were developed and tested, and the overall building layout was fit on the site. Placing two units at the forensic side and two at the civil side avoided affecting small Navy radio buildings from World War II and reduced costs by lessening foundation and roof areas.

The site organization was developed in general terms, including the building, parking and circulation, deliveries, service areas, and security perimeters of varying levels. A decision to use “bioswales” (engineered areas with vegetation that absorb and hold water) to address storm water runoff reduced costs, lessened impact on the municipal storm water system, and allowed for significant landscape at the site. A memorial to past patients was added. Throughout the design process the construction manager provided input on the availability, schedule implications, and relative costs of various solutions. Although the cheapest and/or fastest to implement was not always selected, it was important to have this information available to inform decisions.

Cost estimates were prepared throughout the process and the plan adjusted. Once a budget approach was identified and the plan was reasonably solid at the layout level, the project proceeded formally to DD.

Design Development

Deeply detailed space data sheets were developed in meetings with users for each space type. At Saint Elizabeths the result was a very useful and often consulted 3-inch binder. The process was time consuming and inevitably tedious at times. But developing and capturing this information led to better discussions, improved understanding by staff of the challenges faced, and a buy-in on the solutions developed. Discussions ranged from the specifics of the new cook/chill food preparation and delivery system to how to best ensure security of food and supply containers packed off unit and brought onto the unit (addressed in part by a team member’s discussion with stewards on a commercial airplane flight about their security) to how to maintain the safety and supervision of patients in single occupant toilets while allowing privacy. Finish materials, furniture types, and locations for types of light switches, data outlets, and power outlets were identified. Some issues associated with operational procedures could not be solved at the time, and they were carefully identified and assigned to specific staff for resolution.

Concurrently, detailed and sometimes overlapping discussions were held regarding building engineering and security systems. These discussions included a variety of participants as appropriate. For example, a discussion of security systems included input by administrators, nurses, psychiatrists, other clinicians, patient care technicians, food service personnel, housekeeping, campus police, materials management, and even groundskeeping staff.

At this point the construction manager became intensely involved in planning the construction and phasing of the work. The new building would be built on an occupied and operational site. New utilities needed to be run to serve the new building and old ones relocated to serve some existing facilities. Issues of security, construction worker training, and monitoring tools and equipment unique to a psychiatric facility were addressed. Again, after verification of the estimated cost and formal client signoff, the project proceeded to the next phase.

Although the District opted not to build mockups of spaces, there was extensive review and testing of patient furniture. Given the size of the project, it was possible to have modifications to basic designs for beds, chairs, and other



Saint Elizabeths' Auditorium

Facility community activities are a necessary part of any medical facility. Amenities shared with the larger community can provide opportunities for education, raise the level of utilization, and help destigmatize mental healthcare. Entertainment, instruction, religious services, and other group functions can occur in a single properly equipped location. Placement outside the secure perimeter and a separate entry can simplify these extended functions. Courtesy of Ron Solomon © 2014

(Exhibit 16-2 continues)

Exhibit 16-2 *continued*

furniture to address staff concerns and experience. One important decision that arose from these discussions was to avoid selecting furniture for patient areas based on the worst possible behavior that might be anticipated. As a result, a very limited number of spaces was planned with a less attractive fit out, and the majority had much more residential character, although carefully selected, furnishings.

Construction Documents

Documentation of the design, not atypically, takes the largest individual chronological piece of the design effort. At the same time, it is the least visible to facility staff. This situation can be an issue when staff members perceive a loss of momentum. It was aggravated at Saint Elizabeths when a year-long deferral of construction funding delayed groundbreaking. Care was taken, therefore, to regularly brief staff on the status of the work. Updates on the work were part of regularly scheduled all-hands staff meetings. Presentation drawings and a site and building model developed during design were transferred to the hospital and prominently displayed.

The owner took advantage of the delay and opted to have a “constructability review” of the documents done. The review looked at both technical quality and the potential challenges of assembling the work across all construction trades. A wholly independent group within the construction manager’s company conducted the review. The feedback received was extremely positive and comments, where appropriate, were incorporated into both the documents and the construction team’s planning.

During the construction document process, the construction manager both monitored the anticipated construction cost versus a changing market and performed a series of cost estimates to ensure that the project as drawn stayed on budget. In addition, the construction manager continued to provide feedback to the architecture and engineering team about the anticipated availability, cost, and schedule impact of various material and system options.

Bidding and Construction

Construction of the roughly 453,000 gross square foot facility took roughly 44 months from start to occupancy of the main building. This resulted in no small part because the size and complexity of the project required a phased construction approach. Three formal phases were required with groundbreaking on December 19, 2006. Phase one provided utility infrastructure and basic site work for the new facility along with temporary infrastructure to support a construction site with more than 500 workers. Phase two included the vast bulk of the work, constructing the new hospital and the site work to allow the new building to operate. The new hospital opened its doors in April 2010. Some site engineering and parking were located at the area occupied by the existing and occupied John Howard Pavilion. Demolition of the John Howard Pavilion was impossible until its residents could be relocated to the new hospital building. Phase three demolished the John Howard Pavilion and completed the site work after occupancy of the new building. This effort included primarily parking areas and landscape. A de facto phase four arose during construction. The initial plan saved a concrete walled outdoor exercise space, The Yard, associated with John Howard and the forensic program. Although the location was not ideal and some upgrade would be necessary, it was difficult to justify relocation of a major program element.

Schedule delays led to increased deterioration of the existing facility. At the same time the District identified the Yard location as the site for a national mental health memorial. The result was development of a new highly secure but far less institutional outside activity space dubbed The Park. Located closer to the new building and with better amenities, it officially opened on May 6, 2012.

Both before and during construction, conversations were ongoing within the department and with various city agencies, particularly police, medical emergency, and fire departments. It was crucial to ensure that efficient access to the correct location was maintained for emergency and police services throughout construction. Making the permanent switch to the new facility for these groups at the correct time on the correct day culminated a long and ongoing effort.



Saint Elizabeths’ Security Fence

A taut wire system, modified to eliminate barbed wire, is connected to closed circuit cameras and a central monitoring station. Pressure on any wire automatically orients at least one camera to view the contact point and simultaneously notifies the central security station. Courtesy of Ron Solomon © 2014

(Exhibit 16-2 continues)

Exhibit 16-2 *continued*

Security During Construction

Every construction worker on the site was required, in addition to typical safety training, to participate in a session on the unique realities of working on the site of a psychiatric hospital. This session included criteria and instruction on interacting with patients and staff. In addition, a preconstruction briefing was held for the contractor's senior staff. The intent was to ensure that they understood the reasons for the layout and construction of the building and to enlist them in observing the work as it was constructed. As examples, the importance of anti-ligature protection and consistent use of tamper-resistant connectors was emphasized.

The entire construction site was isolated by a 6-foot temporary fence with a limited number of supervisable and gated access points. Identification badges were issued and carried by all construction and supervisory personnel. All personnel were required to wear construction hardhats, safety glasses, and fluorescent vests at all times within the site to make it easy to identify and approach individuals who should not be on site.

The entire site was fenced and patrolled and monitored during off hours. This effort, carried out by the construction manager and contractor, was coordinated with the department's own campus police.

Security at the New Saint Elizabeths

Access in the new facility fostered a protracted and complex discussion. The "old" Saint Elizabeths had included massive rings of seemingly identical keys to be carried by senior and even line staff to provide access to various rooms that had different security requirements and/or had been rekeyed over the years. Loss of a key or the termination of a worker could lead to expensive and slow changes.

The new hospital combines a mix of electronic card access and traditional keys. Electronic keys are combined with staff identification badges. A highly secure central security room can monitor, track, and retrieve the activity of an individual card or a specific door. Electronic access by a given card can be disabled remotely in a matter of minutes, and the accessibility of a given space can be expanded or restricted. Electronic control is typically used at exterior doors, doors to major groups of spaces (eg, therapeutic learning centers, residential units), or high security spaces (eg, medication rooms, computer labs, record rooms). Traditional keys are used at individual spaces such as offices, storage rooms, and patient activity and sleeping rooms.

The project goal was to have each staff member carry no more than three keys to include the electronic key / identification card, a large key for doors to which he or she was allowed access, and a smaller key for cabinetry. The list increased for some staff. It proved impractical to have the necessary variety of small keys. Drug safes and similar functions needed to be keyed separately. The number of spaces and complexity of security required some separate keying at the door level. In all, however, the new system is greatly simplified and allows greater flexibility and monitoring.

Beyond keying of individual spaces and ubiquitous opportunities for important casual observation, the hospital also includes more traditional and high tech security systems. The forensic/intensive side of the facility includes a clearly delineated secure perimeter. Internally this includes a mix of building partitions and supervised "man traps," double-doored or gated. These penetrations of the perimeter can be controlled and supervised by staff within secure control rooms. At the exterior a combined fence system includes no-climb and "taut-wire" fencing. The taut-wire system identifies points where the fence is deformed by contact and (a) notifies the central security station and (b) automatically reorients external closed circuit television cameras to allow remote viewing of the event.

Closed circuit television is distributed throughout the building, including each residential unit's staff station, to allow remote viewing of essentially the same view as that provided to the supervising staff member. Fixed panic buttons at enclosed offices and wearable panic / staff down buttons that can be automatically located when activated increase security for isolated staff.

To the extent possible, mechanical and electrical equipment and systems requiring maintenance are located in areas that are both patient inaccessible and accessible to workers without entering patient areas or crossing the security perimeter. The goal is to both significantly reduce the need to vet and then assign escorts to each worker doing maintenance in



Saint Elizabeths' Green Roof

A 23,000 square foot green roof and onsite bioswales (rain gardens) reduce the costs of storm water management on the site by slowing and limiting runoff to the municipal system while lowering construction cost. Courtesy of Ron Solomon © 2014

(Exhibit 16-2 continues)

Exhibit 16-2 *continued*

the building and eliminate opportunities for potentially dangerous contraband items to become available to residents. Finally, the importance of incorporating opportunities for casual and ongoing observation cannot be overstated. These opportunities are provided throughout the building and include carefully planned sight lines throughout and windows between spaces such as corridors and hallways to suites, gardens, offices, and activity areas. Classrooms are oriented so that the teaching station can be seen from the corridor. Unobservable recesses are avoided, and common areas (such as resident lunch areas) are laid out to allow a single staff member to view the entire space with his or her back to a wall, and have a view to a corridor.

Design Outcome: Specific Solutions and Lessons Shared

The programming, design, documentation, and construction of the new Saint Elizabeths Hospital produced a solution unique to the challenges provided by the individual project. At the same time, those responses can certainly be adopted, in whole or part, at other facilities where they will support high quality care during and after construction. Seemingly small items make big differences. In addition to items mentioned elsewhere, some lessons learned included the following:

Construction Phase Security: The entire site was fenced and patrolled and monitored during off hours. This effort, carried out by the construction manager and contractor, was coordinated with the department's campus police.

Leveraging the Gymnasium: The two gymnasiums became prosaic but important symbols of the integration of goals in the building. High secure windows provide daylight and a view to the sky at all times. The therapeutic benefit of views to the exterior is appreciated along with the capacity of natural light to help patients regulate their internal biological clocks. Sunlight also makes the gyms fully useable for the vast majority of the day without artificial lighting, satisfying goals for sustainable design and reducing energy usage and utility costs. Finally, the more accessible gymnasium was offered as a potential neighborhood amenity in off hours (with hours and uses subject to hospital approval) to maintain Saint Elizabeths' long relationship with the neighborhood and continue to reduce the stigma of a psychiatric facility.

Light, Views, and Access to Nature: Almost every interior corridor has natural light at both ends so that movement is always to a lighted space and orientation while in the building is maintained. Long corridors are interrupted by secure, accessible adjacent garden spaces. Those same spaces are visible from second floor units, offices, and corridors. Ground level units have secure garden/activity spaces directly accessible from the community space and observable from the central staff station. The result is an almost constant opportunity to view the natural world coupled with ongoing casual observation of activities at these green spaces.

Site Development: The new building and parking covered more than 200,000 square feet that had previously been grass. Even with demolition of the John Howard Pavilion and associated parking, there was significantly less area to absorb sudden rainfall and runoff from roofs, plazas, and parking. Bioswales (mentioned in the Schematic Design section) and a 23,000 square foot green roof slow water runoff and improve its quality. Care was taken to avoid even small areas of temporary standing water. A memorial to past residents was developed and included a time capsule to be opened in 50 years.

Stuff Happens: As noted above, a small staff and visitor cafeteria was added during construction when development of accessible eateries was delayed. The hospital changed its organizational approach to populations from forensic and civil to intensive and transitional. The exterior exercise yard was relocated and rebuilt. Saint Elizabeths was designated as the location for a national memorial to those who had died unrecognized in mental health facilities across the United States. Staffing and organizational changes during construction required the repurposing of spaces including the creation of a significant conference and collaborative space overlooking the main entry from what had been open plan administrative workspace. In each case the necessary and potentially disruptive change was treated as an opportunity to refine the design to better serve the hospital's needs and mission.

Using the New Facility



Saint Elizabeths' Gymnasium

Access to natural light reduces the need for artificial lighting, and the accompanying utility cost, while supporting ongoing connection to the world outside the facility. Courtesy of Ron Solomon © 2014

(Exhibit 16-2 continues)

Exhibit 16-2 *continued*

The process of relocating staff and residents was carefully planned and executed. Tours were held regularly for both groups (as well as for outside groups such as the Department of Veterans Affairs and the National Building Museum). Updates on progress were shared regularly at staff meetings. An internal contest named the new residential units. In several cases the names of historic buildings on the campus were used and signage from those buildings was relocated to the new facility. Administrative and facility staff occupied the building ahead of patients to ensure operation of systems and familiarity with layout. Because of the abundance of space pre-move, some staff members were reluctant to relocate to smaller or less private workspaces. Symbolically, the hospital chief executive officer moved to a smaller and less private space as part of the initial move.

After much discussion, residents were relocated on a single day. New furniture was already installed at the new facility, which simplified the relocation task. Residents had been repeatedly informed of and prepared for the move by staff well in advance. On moving day each resident was given a container for favorite personal effects that he or she could choose and pack. Those containers were relocated to the residents' new rooms during daily activities and residents returned to their new units to be greeted by their materials and donated "goodie bags" assembled by hospital staff.

There was some real concern about the impact of major change on the patient agitation and recovery. Although hospital staff and administration did report that some increase in disruptive activity occurred directly after the move, within roughly 2 months incident levels had dropped to significantly below pre-move levels. Anecdotally, the change is attributed to a mixture of factors including better casual observation, changed resident and staff perception of the improved environment, layouts that allow agitated individuals to remove themselves or be guided away from conflict situations, and higher levels of daily physical activity by residents.

During construction of the new building, Saint Elizabeths changed the basis for housing of patients. Previously, unit residency was established by program (civil or forensic). Hospital administration opted to modify this to center on the level of care and security required for a given patient (intensive or transitional). Because the building was designed to model both "sides" identically with similar layouts, finishes and amenities, and readily flexible levels of security, the change was easily carried out. Importantly, it also made it simpler to move staff or residency assignments across that administrative line.



Saint Elizabeths' Administration Arrival:

The arrival and waiting space is located outside a lockable door. The high glass enclosure at the stair maintains views across the site and deters inappropriate or self-destructive behavior. The suspended artwork at the stairs, commissioned by the city through a competition, is installed too high to be reached, and designed with resident inclusion in the design process. It is worth noting that furniture is periodically rearranged to meet current need.

THE CHALLENGE OF BEHAVIORAL HEALTHCARE FACILITY DESIGN

Inpatient behavioral healthcare facilities are fundamentally different from acute healthcare facilities. The unique nature of secure psychiatric facilities, including the fact that the patients are potentially dangerous, adds another layer to that separation. Differences in mission, operations, and healthcare delivery affect the site development, infrastructure, architecture, engineering systems, and the therapeutic and logistical operation of these facilities. Although overlaps in the design of the two facility types exist, the unique and specific concerns of behavioral healthcare treatment must be considered as building design and operational

planning are implemented.

At an admittedly oversimplified level, traditional medical facilities serve high functioning, low mobility patients who are often supervised using technological monitoring. Behavioral healthcare facilities serve lower functioning, higher mobility patients typically requiring a high level of ongoing visual supervision.

Behavioral healthcare facilities are also enormously complex. This complexity is not often as obvious as in a more traditional healthcare facility. Many of the issues addressed by this branch of healthcare are interpersonal rather than technical, relative to traditional

healthcare facilities. The solutions are an integrated mix of technical and operational. The building becomes one tool for staff and residents to use in delivering care.

In this chapter “architectural” is used to describe the entirety of the physical facility including the bricks-and-mortar building, the engineering and other systems necessary to its operation, and the site. The intent is to improve readability, but more importantly to emphasize the absolute necessity of the integration of these systems into the whole.

In the same way, “design” and “design process” are also broadly defined for this chapter. The words

include both the development of the physical project and the planning of its operation and long-term interactions with those who will live and work there.

Architecture communicates values. People understand—both consciously and intuitively—messages about themselves and their relationships with others in no small part because of the spaces that they occupy. In the words of Winston Churchill, “We shape our buildings and afterwards they shape us.”¹ Decisions made during the design process are critical to communicating the facility’s goals and supporting the staff and residents in achieving them.

PATIENT POPULATIONS

The basic architectural concerns noted above must be integrated with the unique physical and operational requirements of two specific populations. The first are forensic patients who are committed for evaluation or treatment as a result of illegal behavior. The second are high-risk patients who are committed based on the potential for danger to themselves or others. Although evolving legal and operational differences in planning facilities for the two groups exist, they share a significant overlap in architectural and operational requirements.

In some cases the requirements across the two populations are near enough to be considered identical, as in the case of requirements for mechanical and food service systems. In cases such as security

systems and procedures, the differences can be a matter of the degree of intensity. Where this second condition occurs it is important to consider long-term flexibility. Security and similar requirements will evolve based on patient population mix, short-term behaviors, changes in approaches to treatment, and other factors.

Even without that inevitable evolution, the appropriate architectural and engineering systems and operational planning at a given facility will vary over time. The anticipated length of stay and approach to treatment, the mix and acuity of patients, the legal and formal requirements for security and control, and the level of flexibility required will affect the solution for a given project.

PROCESS

Design Approach, Staff Inclusion, and Project Success

The creation of a high quality facility requires a mix of effective process and appropriate solutions. Both will include some combination of what has been done before and what is developed specifically for the project at hand. Some thoughts on specific issues, approaches, and space types are shared below.

There is a common and understandable inclination to view decisions in the design process as either/or propositions. As examples, patient privacy and security, patient/staff safety and patient independence, dignity and observation, and comfort and ease of maintenance can seem to be at odds. They are often treated as requirements that exist in direct competition with one another.

As a result, achieving “balance” among nominally conflicting demands is often cited as an approach or even a solution, and especially true regarding issues of quality of patient experience and patient/staff safety. Although

superficially appealing, this approach can be problematic. Even if one assumes an initial perfectly balanced solution, a change on either side of the design demand equation will lead to imbalance and failure to optimally meet some crucial caregiving goal. Therefore, it is more useful to think in terms of “integration” in developing and evaluating solutions that resolve the inevitable tensions among programmatic demands. The preferred solution then is “both/and” rather than “either/or.”

To be clear, integration in no way diminishes the importance of individual programmatic requirements. It does challenge caregivers, design professionals, administrators, and other stakeholders to search for and create holistic solutions. Although this is a more difficult task, the result is facilities that will operate better for all those who use them, both individually and collectively. In the end, like any military operation, the behavioral healthcare design, construction, and operational process includes a cycle of strategy, tactics, mission definition, execution, success, postmission evaluation, and refinement.

User Inclusion and Integration

It is useful to think of the project design team in broad terms. The term is often understood to include only those formally trained in architecture, engineering, and related fields, and perhaps individuals assigned to address the contractual and administrative issues associated with the work.

On a behavioral healthcare project this view fails to integrate and leverage the hands-on expertise provided by clinicians, front line, housekeeping, security, facilities staff, and even resident patients, outpatients, and patient families. The more constrained approach limits the quality of the eventual solution by failing to take advantage of the full range of knowledge and expertise available.

It also ignores the crucial opportunity to build institutional and staff support for the eventual design solution and the operation thereof. The military is inevitably and justifiably a hierarchical organization. At the same time, experience shows that appropriately integrating users into the process significantly raises both the likelihood and level of buy-in relative to the process and the completed design. It also provides the opportunity for users to build a long-term culture that embraces the best of the design at the “boots-on-the-ground” level. People are far more likely to support that which is done *with* them, rather than *to* them. This does not suggest that individual process participants or even groups should expect to get everything that they desire, which is especially true of idiosyncratic requests. The process cannot be a free-for-all, and appropriate structure is crucial. Time constraints, project complexity, and other issues will affect the feasibility and appropriate extent of the collaborative process. The structure to support this process can vary but should include the following:

- venues and methodologies for meaningful input from a wide range of stakeholders;
- identification of a trusted and credible core group to consult with shareholders on a formal and ad hoc basis (to act as conduits for feedback and be a de facto “rumor control team”); and
- clear communication of the process and decisions as the work progresses.

Design Process and Vocabulary

Design is inevitably an iterative process that combines clear milestones and opportunities for formal review and comment with ongoing discussion, refinement, and documentation. At the same time, the

complexity of the process and its resultant product can vary greatly. Renovating a group of three rooms is far different than developing a 300-bed facility.

The process outlined below is described as neatly linear, creating a definable and useful product within a fixed period via a series of discrete steps. However, like any complex and worthwhile endeavor, it includes the iterative component referenced above. That iteration, while sometimes frustrating, can provide a solution that is more integrated, better coordinated, and better adapted to new ideas and information that arise as part of the process itself and are more effective in the end.

At the same time, it is important to finalize and enforce decisions wherever possible, providing a solid basis for further progress. Where physical or operational issues are unsettled, they should be clearly identified, along with the portions of the work that they may affect.

Like healthcare providers and military organizations, the design and construction professions have their own terminology, culture, and processes. There is no reason for healthcare providers involved in a design project, particularly front line staff, to become experts in design and construction. It is useful for them to have a general understanding of the process and terminology commonly used by architects, engineers, planners, contractors, and others involved in design and construction.

That process, and even the definition of individual terms, can vary among projects. Terms are typically defined formally in the owner’s contract with the architectural team and/or in standards relevant to construction or the project type. Shared terminology exists that is commonly used to describe the design and construction process.

The following is a very basic outline of the typical current chronological process and relevant terms. Language and process may be modified by individual organizations and for specific projects. Telescoping, combination, and compression of tasks are not uncommon on small, less complex, or fast track projects. No matter the precise process or terminology, appropriate staff and user involvement is crucial throughout the process, particularly in the earlier stages.

New technologies are beginning to affect the traditional design, documentation, and construction process. See Exhibit 16-3 for more information on building information modeling and integrated project delivery. Formal milestone estimates and informal ongoing discussions construction costs occur throughout the design and documentation process. See Exhibit 16-4 for more information on understanding construction cost. Building and system commissioning can be integrated into the design and construction effort to

EXHIBIT 16-3

BUILDING INFORMATION MODELING AND INTEGRATED PROJECT DELIVERY

New design and construction process technologies are changing the historically typical process. The meaning of the process terms is evolving with the increased use of two interrelated approaches to design, documentation, and operation of facilities. These approaches are building information modeling (BIM) and integrated project delivery (IPD).

The ongoing and evolving changes are transformative. At the time of this writing, these changes are beginning to affect the way projects are carried out. In much the same way as electronic medical records will affect care, BIM and IPD are expected to develop exponentially as the technology evolves and these processes become more widespread and integrated in design, construction, and operations. At the simplest level, BIM allows the development of a digital “proto-building” with live digital linkages among the building components. This development is more than a 3-D computer model. The current software effectively meshes a database with the drawings. Programming and operational data can be linked to individual spaces or components, enriching short- and long-term utility.

As an example, software allows the proto-building to be tested for “clashes,” locations where building components conflict and prevent installation. Although not uniformly available at this point, building components (doors, windows, boilers, light fixtures, furniture, etc) can have digitally associated attributes that allow the team to insert a virtual window into the designed proto-building, rather than just a picture or symbol for a window.

BIM’s goal is better, earlier, and more accessible information. The BIM model is a tool shared across the owner / architect / constructor team. The result is first, the ability to understand and test options during design, and concurrently to produce a better coordinated basis from which the contractor can proceed most efficiently. From a practical standpoint, it “shifts effort left” on a typical timeline of the design process outlined above. The result is that decisions can—and must—be made earlier.

At the user level, the technologies allow three-dimensional visualization of both finished spaces and technology system components such as piping and ductwork, which makes the implications of decisions more accessible to those not familiar with interpreting the graphic conventions of architectural and engineering drawings.

IPD is a process that integrates the previously adjacent but often functionally and culturally isolated design, construction, and operational teams during the design effort. This approach both allows and demands a higher level of collaboration throughout the project and for significant decisions and effort to be achieved earlier in the process than has been typical. In essence, the owner, architect, and constructor act as a single collaborative entity for the purposes of process.

After design and construction are complete, BIM and IPD represent the potential for an interactive and updatable tool for the operation, use, and modification of the facility. In reality, at this writing, a variety of hybrid and evolving versions are used, but there is clear movement toward increased use of these approaches.

double-check and test design decisions and ensure compliance of the finished product with the design intent. See Exhibit 16-5 for more information on the commissioning process.

Programming

Programming is often referred to as space programming and misunderstood as simply developing a list of required spaces for a given project. More expansively and accurately, programming defines the question that the project will answer. This process begins with development of a vision, goals, and criteria for the project. These factors, in turn, guide the design effort and allow consistent and rational evaluation of alternatives.

Facilities and organizations, including the military, often have design standards that address requirements for space; building systems including heating, ventilating, and air conditioning systems; and process. Used appropriately, these standards can significantly shorten

and simplify the programming effort. In parallel, care and/or licensing-based standards may inform and affect the design. These internal and external requirements should be identified early and incorporated with available standards.

Once vision and goals exist and ruling standards are identified, the physical requirements of the project can be defined. That description will include the names, uses, sizes, and quantities for each space in the project. To the extent possible, individual space requirements and the functional and proximity relationships between individual spaces and functional groups of spaces are also documented. The programming process can also identify unique spaces relevant to the particular project. Although these spaces can be functionally driven, they can also provide opportunities to celebrate the history or culture of the institution and its mission. Spaces and functions complementary to nearby facilities and communities can share demand and increase utilization and efficiency.

EXHIBIT 16-4

UNDERSTANDING CONSTRUCTION COST

Determining and monitoring project cost can be a complex effort, which is further complicated by the effects of design decisions on operational costs (eg, less insulation may save money initially but will raise energy costs for years). Better early planning can be more complex and raise the overall project costs with operational benefits later. Enormous effort can go into quantifying and verifying those factors and they can seem—and in fact are—sometimes overwhelming to those outside the design and construction community.

Simply understood, however, military healthcare projects must typically be constructed within some essentially fixed budget. At the macro level it is useful to understand construction cost issues in terms of a simple algebraic formula:

$$\text{Cost} = \text{Scope} \times \text{Complexity} \times \text{Quality}$$

This approach does not require intimate knowledge of material or labor costs, markups, owner and contractor contingencies, and the like. It does provide the members of the behavioral healthcare team a framework to discuss costs and changes in an evolving design. Keeping this simple formula in mind can help avoid significant cost increases that arise from “scope creep,” the accumulation of seemingly insignificant changes, and can suggest reducing a counterbalancing item(s) in a fixed-price scenario.

Changing any factor in the equation above requires one or more of the others to change. It is not possible to increase scope, quality, or complexity without affecting cost and/or reducing another factor. Increasing the scope, quality, or complexity of the work will—all other things equal—cost more. Reducing the scope, quality, or complexity can allow an appropriate increase in one or both of the others and/or a decrease in cost.

Formal estimates of probable construction cost are typically prepared at project milestones. If the estimate exceeds available fixed funding, a “value engineering” exercise can identify changes that will realign the work with the budget. This exercise can be disruptive, time consuming, and disappointing because one or more of the scope, complexity, and quality is reduced. Although sometimes difficult, it is preferable to monitor and align decisions with the available construction budget as decisions are being made.

Finally, design and construction contingencies are amounts typically held separate from the construction budget, and they are used to account for the uncertainties inherent in the earlier stages of design and changes that may be required during construction. These allowances can sometimes be reduced as design or construction proceeds and the level of uncertainty decreases.

If applicable, the program addresses the building site. This definition can include built elements such as gardens, plazas, greenhouses, and parking along with infrastructure issues such as access from adjacent roadways and public transit, and the availability and adequacy of utilities such as water, power, natural gas, solar, and telecommunications.

Programming identifies and documents at least preliminary requirements and approaches for engineering systems, along with other legal or operational requirements for the facility. These requirements and approaches may include approaches to heating, ventilating, and air conditioning; food service; materials management; and other patient and staff services, along with functional relationships with outside communities, educational institutions, or local governments.

Detailed programs may have room level data including finishes, the location and types of engineering services, equipment and furniture lists, and basic and special engineering requirements. These decisions

should still be reviewed during the remainder of design for applicability to the individual project and layout.

Finally, programming should identify external stakeholders whose inclusion may be useful or necessary to success including local government planning boards, review agencies, police or fire departments, advocacy groups, state or local highway or transportation groups, and local utilities.

Schematic Design

Schematic design (SD) lays out the basic organization of the building and site. It provides evaluation and approval of that general organization. It shows the size and shapes of rooms and their arrangement in the building along with the overall building configuration. Some more detailed development of significant or complex internal spaces and of the general external appearance of the building should be available.

EXHIBIT 16-5

BUILDING COMMISSIONING

Commissioning (sometimes abbreviated Cx) is a process that seeks to optimize the technical assembly and performance of building systems during design, test and verify optimal assembly and performance during and after construction, and correct operational shortcomings. It is typically carried out by a specialized entity independent of the design and construction teams and formalizes and expands on traditional quality assurance procedures. Most often, the focus is on the design and operation of engineering systems.

Ideally, commissioning is incorporated throughout the design and construction process. Sometimes it is compressed and included only in the later stages of the effort, or focuses solely on testing and correction in the construction and occupancy phases. The breadth and depth of the review can vary, along with the systems and components to be tested.

With the exception of facilities personnel, facility staff members are unlikely to become deeply involved in commissioning. It may, however, be useful to include at least some critical care, life safety, and security items in the broader commissioning testing and review plan before and after occupancy.

Drawings and written materials that are the SD product are—as the name implies—preliminary, and they document progress to a point in time. They are a tool to allow further refinement of the ideas that will become the new facility.

Design Development

Design development (DD) builds on the SD. The building layout and interior and exterior appearance are refined. The site layout is further developed. Major elements of building engineering systems are typically laid out in a manner at least sufficient to allow sizing of major equipment.

In a programmatically and functionally complex building like a secure behavioral healthcare facility, space data sheets or other approaches are developed. These sheets are based on the project specific layout and allow verification, refinement, and documentation of requirements at the individual room level. This process provides a focus on the minutiae of decisions that will have long-term impacts on the safety and operation of the building. Although sometimes tedious, the collective development of these materials can facilitate deep early thinking about the design and minimize expensive and time-consuming redesign efforts later. By the end of DD only a very limited number of clearly identified issues—if any—with limited impact elsewhere in the project should remain unresolved.

Creation of large-scale digital or physical models and life size mock-ups can be a part of the SD and DD. These models are used to test appearance and function of construction or spaces that are complex or will be repeated many times in the project. Examples include patient rooms, offices, typical work staff stations, or large public spaces. The process can also allow testing of furniture layouts and construction details.

Construction Documentation

Construction documents create a tool for the construction of the building. The decisions finalized in DD are encapsulated in a mix of graphic presentation (drawings) and written materials (specifications or “specs”). Limited user input is required because this phase focuses on documenting decisions already made. The product can be used to price the work, and it serves as the basis for construction by the builder.

Bidding and Award

The bidding and award process develops the work and awards a contract for construction. Multiple methodologies for this task include design/bid/build, design/build, and various other forms of construction management. For the purposes of this discussion, these methodologies are typically beyond the concerns of operational staff.

At the same time, it is worth understanding how the work will be carried out on a given project. Implementation methodology can affect the general process outlined here, including the ability, manner, and relative difficulty of making decisions or changes during both design and construction.

Construction

The actual construction of the work is often the longest part of the overall effort. The owner and designer portion of the effort is typically referred to as construction administration. End user input is typically limited during this phase of the work. However, when work takes place in or near occupied buildings, staff can have valuable input on the planning of construction relative to ongoing operations.

Behavioral healthcare facility security concerns are paramount (eg, restricting patient access to contractor work areas, tools, and equipment). It may be worthwhile to require formal training for construction staff regarding interactions among construction personnel, staff, and patients. Medical privacy requirements need to be addressed. The typical hours of a construction workday may need to be modified to accommodate facility activities or quiet times. Higher than normal levels of worker security review and onsite identification may also be necessary and appropriate.

Site clean-up standards during and after construction are also important. Small and incidental debris such as nails, screws, small glass pieces, metal scraps, or even stones may be at worst unsightly on a typical project. At a behavioral healthcare facility debris is potential contraband and presents a possibility for aggressive and self-destructive behaviors. Although interior construction areas are typically cleaned fairly thoroughly, it is far less common for landscaped areas to be treated as carefully during or after construction. Items concealed just an inch or two below the ground surface are readily accessible over time.

A similar level of concern should be applied to the selection of plant materials. Vining plants such as ivies or easily broken tree limbs can be used as weapons. Some common plants and their fruits such as American Holly and Cotoneaster are mildly to severely toxic.² Finally, dense ground covers such as *Pachysandra* are difficult to search and present a risk of contraband concealment and transfer.

Pre-Occupancy

Near the end of construction a punchlist process occurs. Punchlist is an archaic term that refers to identifying and documenting incomplete or substandard construction, missing paperwork (such as equipment warranties or technical data), and open contractual issues. The process includes backchecking the completion and correction of those items and making a formal signoff documenting that verification. Punchlisting is typically carried out at substantial completion of construction, typically defined as the point at which the new work can be “used for its intended purpose.” A higher standard can reasonably be required in behavioral healthcare facilities relative to what may be assumed by the building trades and others involved in the construc-

tion assembly. Issues that seem minor in commercial office space or residential construction (missing or loose air duct grilles or switch plate covers, loose floor tiles, minor door hardware deficiencies, and the like) are major issues in behavioral healthcare patient care areas.

One important staff-driven task in the pre-occupancy effort is reviewing existing and new operating procedures and protocols, which can be time consuming, and this effort starts *de facto* during design. At the simplest level, reviewing the activities of a typical day or week and testing multiple what-if scenarios should occur.

Move-in and Occupancy

At some point the facility takes formal possession of the new construction, which often includes installation of furniture, fixtures, and equipment not supplied as part of construction but necessary to operate the new space. In behavioral healthcare facilities, particularly in patient accessible areas, it is a good idea to plan an appropriate period for staff to test systems, including security, and become familiar with the new layout and relevant procedures before patients move in. Tours during construction to allow staff to build familiarity and comfort with new spaces should be considered.

Post-Occupancy

It is advisable to conduct reviews of the construction and operation of the facility at regular intervals after completion. Six, 12, and 24 months are common milestones that allow the facility to (a) operate through complete seasonal and budget cycles and (b) test responses to issues arising from initial reviews. These reviews should be completed in time to allow reporting of relevant issues within equipment and material warranty periods.

Often these review exercises focus primarily—or even solely—on the functional operation of the building’s constructed components. They can also provide a structured opportunity to consider how the building meets the day-to-day needs of staff and patients and to document those findings. Documentation can be used locally to improve internal operations and, at the organizational and healthcare community level, to inform subsequent design, construction, and operational efforts.

DESIGN STRATEGIES

The bricks and mortar is a common phrase used to describe the physical result of the design process. It is a convenient misnomer because the physical product is far richer and complex than the phrase

implies. Yet experience suggests that successful behavioral healthcare facilities present some common opportunities and possess some common characteristics.

Building Components, Engineering Systems, and Operations

Users are familiar with the visible components of the facility. Walls, windows, floors, doors, ceilings, and roofs are common concepts. However, a host of less visible building systems in the completed and operational facility exists. Not all systems will be affected by every project (particularly small-scale renovations or where little or no work is associated with the site). Staff should still be conscious of the potential number of systems to be resolved. The list can seem overwhelming, but it provides clues and structure that can lead to better solutions as individuals and groups integrate needs beyond their normal and obvious areas of responsibility.

The unique nature of behavioral healthcare facilities can require greater capacity at systems than might initially be proposed. As examples, evacuating and appropriately relocating residents and staff is extremely difficult and some residents may be unable to self-regulate body temperature due to medication. The result is that higher levels of air conditioning and emergency power are likely required in terms of both quantity and duration.

A listing of significant basic systems/issues for a behavioral healthcare facility may reasonably include the following:

Exterior to and Serving the Facility

- Onsite development (landscape, storm water management, roads, and parking)
- Utilities (water, sewer, natural gas, fuel oil, electricity, Internet, telephone, cable, etc)
- Site amenities (formal and informal outdoor activity, recreational, and public spaces)
- Public access (patient and visitors, law enforcement, fire and emergency services)
- Integration with public transport systems and roadways
- Onsite and perimeter security (physical, technological, and human)

Integrated in the Building

- Building materials (structural, enclosure, and partition systems; interior / exterior finishes)
- Mechanical (heating, ventilation, and air conditioning systems, equipment, and controls)
- Plumbing (systems, equipment, and controls)
- Electrical power (systems, equipment, and controls; emergency power)
- Electrical lighting (systems, equipment, and controls)

- Life safety (fire sprinkler systems, alarm systems, and emergency notifications)
- Security (building and personal)
- Food service (staff, residents, patients, and visitors)
- Telecommunications and information technology

Points of connection and overlap exist between these two lists. Each of the items has both physical and operational implications that will be part of the design discussion. Informed input from users regarding existing and anticipated operational processes and standards is crucial.

Operational Systems and Facility Operations

Operations of the new or renovated facility are almost certain to require development of new procedures and modifications to existing ways. At the very least, existing standards and procedures should be reviewed relative to the new configuration. On larger projects this task may require a dedicated team and a significant amount of time during both design and pre-occupancy.

Tasks as mundane as delivering meals and linens or as high risk as building evacuation or staff support in assaultive situations should be considered. Seemingly minor items, such as changes in availability of backup keys or the travel distances between activities, storage, and support staff, can have real consequences on operations, particularly in emergencies or when events occur outside fully staffed hours. An informal approach can be as simple as reviewing the typical 24-hour day's activities in a given space (eg, a patient unit) and then doing the same for worst case scenarios. Workdays, weekends, and holidays should be included.

Patients with both behavior issues and significant medical needs present a unique challenge. How and where will sick or injured residents be treated? After acute treatment is complete, can the patients be appropriately and safely returned to the behaviors and potential tumult of a typical residential unit? This issue is particularly relevant to postoperative patients (eg, postappendectomy or those with casted limbs) and those with nominally controlled but easily communicable conditions (eg, methicillin-resistant staphylococcus aureus or tuberculosis). It may be that the solution is extended stays outside the facility. That approach, however, results in a significant staffing impact to address 24-hour off-site security and treatment requirements.

The same concerns apply to building engineering systems. Facilities and food service staff may be dealing with new and unfamiliar systems and processes. Even if there is initial comfort, new layouts require a

backcheck of existing procedures. Whatever the level of change, it is important to allow the necessary resources and time for sharing the new information. Formal training may be appropriate and necessary instructional, learning, and practice time should be scheduled.

Behavioral healthcare facilities have a slim margin for architectural and operational shortcomings. Unlike retail establishments or commercial office buildings, behavioral healthcare facilities must operate fully from day one. On-the-job-training is a suboptimal approach. Physical modification after occupancy is difficult, disruptive, and expensive. Walkthroughs by staff to allow reflexive familiarity with new surroundings can be useful. Staff tours of near complete areas before move-in can identify issues and raise comfort levels with changes. These tours can occur during construction and on multiple occasions. This activity is critical at patient accessible areas.

Building Organization

This chapter assumes that care is recovery based, even for long-term forensic residents. To that end, the facility architecture and operations that directly affect residents should model and support appropriate outside behavior to the extent possible, which includes the rhythm and the quality of daily activities. Items as small as eating in small groups or individually create a different feel to the therapeutic day. Coincidentally, they can also allow for smaller eating areas and therefore lower construction costs.

The building's organization is often a concrete manifestation of attitudes, policies, and organization. Although staff familiar with "intent" may overlook unintended messages, residents and visitors may perceive them. Finish materials, furniture, and quality of space "tell" residents, staff, and visitors about the facility. At some point architectural decisions become interwoven with decisions about operations and procedures.

As an example, high security, steel-framed window screens mounted inside patient accessible spaces provide security, and the intention is almost positive. But the appearance of these massive, institutional looking units will undercut any attempt to create a welcoming environment or create a community of trust between residents and caregivers. The challenge then is to integrate the security requirement into the window in a less overbearing way.

Even something as seemingly innocuous as ready access to staff amenities can create issues. If patients are on restricted diets and the staff coffee bar sits visible in the staff station or staff drink coffee on the unit, while charting, and so forth, a "we-and-them" (or even worse—"we-versus-them") message may be perceived. Architecturally and therapeutically speak-

ing, intent does not matter.

A strong relationship exists between building organization and security, and a clear definition between secure and unsecure spaces is necessary. At the facility level, a clearly defined secure perimeter is required. The penetrations of that perimeter should be limited and remotely controlled so that they cannot be passed through with stolen keys or coerced staff. A more detailed discussion of security occurs below.

Care should be taken in locating public and quasi-public functions. It may be desirable to have an auditorium outside the perimeter and administrative offices within it even if some inconvenience to visitors or staff occurs. Staff and patients needing to cross the bright line between secure and unsecure on a daily, hourly, or more regular basis becomes an issue for discussion. Ready public access to some areas may be desirable even if they are used occasionally for patient activities. If this kind of use occurs, provisions for security sweeping and securing these areas before patient use are necessary.

At a macro level, organizing the building to afford regular views to the outside is encouraged. These views may range from views of the sky through windows looking onto secure or unsecure garden or natural spaces. These views should be carefully considered for issues of privacy and appropriateness and may range from views of the sky through clerestory windows or skylights to controlled views to the outside. At least some exterior spaces should be accessible to residents. Research supports the positive impact of contact with nature on recovery and on the efficiency and morale of staff.³ Views to public space should be carefully arranged to maintain patient privacy, confidentiality, and dignity.

Finally, it is a challenge to collocate a behavioral healthcare unit in a multistory acute healthcare setting. Besides operational issues, building layout, column layouts, utility distribution, and other factors associated with the "typical hospital floor" will inevitably pressure the layout of the behavioral healthcare areas. Special care must be taken to maintain the unique functional and experiential qualities in the behavioral unit relative to adjacent medical units.

Security

Security inevitably and quickly rises to the top of concerns at behavioral healthcare facilities. By definition, patients are potentially a danger to themselves and others. At the same time, providing that necessary security can be a double-edged sword. Although providing security for staff and patients is necessary for providing care, it can interfere with the effectiveness of that care.

Anecdotally attributed to the founder of the Menninger Clinic, the role of the head nurse on a residential psychiatric unit was once described as being “a mother in the kitchen.” The goal and imagery were—using the language of a different time—aimed at creating a safe (and safe feeling) environment for the unit occupants where the important tasks of daily living and healing could take place. Some specific approaches to support that goal include the following:

- Avoid unsupervised and/or unsupervisable blind spots in units and corridors.
- Provide opportunities for casual observation consistent with a regard for patient dignity.
- Provide natural light and views to nature.
- Develop spaces that support activities and schedules that maintain—or at least mimic and parallel—the rhythm of the day in the world outside the hospital.
- Include places that allow staff and residents to de-escalate or avoid conflict.

A series of decisions will determine the ability of the facility to make working and recovering there safe. A reasonable and predictable level of personal safety for staff, visitors, and patients is a prerequisite for effective care. Tools and systems are available that support this end, but they require careful discussion and implementation. Issues include the following:

- personal safety systems (“staff-down” systems, phones, alarm buttons, etc);
- closed circuit television with remote observation;
- pedestrian perimeter and internal security including personnel traps with interlocked door operation;
- general traffic and delivery security including sally ports for vehicle control; and
- keying and access control (electronic and traditional keys, identification cards).

Even the best of systems listed above are only as effective as their operation. Systems can actually raise risk by providing the sense that the technology itself is the solution. Procedures must therefore be developed, practiced, and enforced that support the interwoven goals of security and effective care including:

- monitoring and response;
- building maintenance task access and supervision; and
- risk avoidance and de-escalation training.

The issues around keying of locks, access, and monitoring are worthy of significant discussion during design. Easily understood, consistent, and simple-to-operate systems are likely to have higher compliance. Excessive or unwieldy security systems and inconvenience can make operations impractical or inefficient, and they are also more likely to be bypassed by staff in the name of “efficiency.”

Intended or not, the level of effort necessary to operate secure doors or move around the building conveys messages about the facility, the care provided, and the staff’s attitude toward patients. The number of digital and physical keys carried by staff should be minimized. Thought should be given about the speed with which electronic keys can be disarmed and locks rekeyed if physical keys are lost or stolen, or when staff members depart.

As noted above, development of a continuous secure perimeter is necessary at the secure facility. These secure perimeter penetrations are typically made at “mantraps” (the gender neutral but less simple to say “person traps” having not caught on) where pairs of doors or gates exist in sequence and are controlled and supervised by staff, typically electronically. Doors are controlled so that the first door/gate in a sequence must close and secure before the second opens. Similar “sally port” conditions exist for vehicles.

Operationally, crossing the secure perimeter should include a review of individuals and materials. Problematic materials from cigarette lighters to pocket knives to cash should remain outside the perimeter. Staff and visitors will need locations such as lockers to store personal items. At the same time, these locations must remain under the facility’s supervision and control.

To the extent possible, deliveries of materials and the access and activities of maintenance personnel should occur outside the perimeter. This location lessens the need for supervision and escorts and avoids introducing tools, delivery carts, unopened boxes, and more into the secure environment that can compromise security. Intentional and accidental introduction of contraband is a real concern. Delivery of items such as food, office supplies, and linens across the perimeter should be carefully reviewed. There is often a temptation—and even pressure—to provide “back door” shortcuts, such as single or unsupervised doors through the perimeter for convenience. This condition should be avoided. Although it seems to be “preaching to the choir” in a military context, there is no such thing as a secure perimeter that is “mostly secure.”

Providing an easy route for some common, innocuous activity is tempting. Care staff and administrators will find it inconvenient to travel through security

points. The argument will be made: “How bad can it be if it saves dozens or even hundreds of staff hours over time?” A single lockable door directly from (unsecure) administration to (secure) treatment areas seems at most a minimal risk, and even operationally efficient. But in this scenario, everything and everyone in the administrative area are now potentially accessible to patients. Everyone with even short-term access to the administrative area now has potential access to residents and at least some secure spaces. The simple answer is that a secure perimeter with even a well-intentioned gap is no longer a secure perimeter.

Opportunities exist to develop the new or renovated space that support the goals above, particularly risk avoidance. These opportunities are general approaches that extend beyond the concrete requirements of the facility’s architectural program.

As a reminder of the aspirational goal proposed earlier, when dealing with security, one should not put anyone in a place where he or she would not put his or her spouse, child, or family member.

Residential Treatment Spaces

Residents and direct care staff will spend the vast majority of their time in either residential units or therapeutic activities. It is sometimes useful to think of the facility as a residential school, with residents as students temporarily housed onsite in pursuit of a specific mission through a variety of classes and activities along with more typical day-to-day activities. Again, the goal is to maximize resident freedom, independence, and dignity while maintaining and modeling the behaviors and rhythm of the world outside the hospital. Residential layouts should allow casual observation with a view of every patient accessible door from a single controlled and consistently staffed point. At the same time patient privacy and independence are encouraged at appropriate levels. Grouping rooms to create smaller communities within the larger unit can lessen a sense of institutional living. It also allows staff a method to address interpersonal conflicts and disruptive behaviors. A common area is useful for group activities, but additional smaller, more intimate areas associated with these smaller communities provide a sense of personal and defensible territory (and modeling of appropriate related behaviors) and the option for concurrent dissimilar resident activities. Recesses and other similar uncontrolled areas where staff and patients are out of sight should be avoided.

It is common to “flip” the plans of multiple residential units in the same way that left and right hands are mirror images. There is an appeal in this approach because it can help reduce the repetitive quality of much

healthcare design. Although the discussion is ongoing, some recent studies have indicated that “same-handed” units allow for better efficiency, a quicker learning curve, and at least arguably better response times in crisis situations,⁴ which is particularly true if staff will work on or support multiple units.

Spaces for various formal and informal interaction and introspection should be available to groups and individuals. Formal therapy spaces, clinician offices, furniture groupings, and garden benches provide unique settings for interaction. The layout should allow—and even encourage—residents to walk away and de-escalate conflict situations on their own initiative or with staff support.

Readily accessible and secure exterior green space is a tremendous asset. Residents are more likely to use the space if use does not require relocation by the entire unit population. With careful planning, spaces can be configured to allow various uses from quiet contemplation to gardening to recreation with minor or no modification. Covered space to avoid sun and rain is desirable.

Any resident accessible exterior space should be fully observable from the dedicated staff observation point mentioned above. Without that quality, staffing limitations and behavioral concerns are likely to result and access to and use of this exterior space becomes severely restricted. A view to a garden is nice, but if residents are not allowed to enter it can be infuriating and undermines the goal of reinforcing independence and self-determination.

The adjacent garden space is the most obvious way to bring natural light into residential spaces. The benefits of access to exterior views and natural light on healthcare outcomes continue to be well documented.⁵ In a behavioral healthcare facility this access is even more important. Access to the natural variation in external light helps maintain the individual’s biological clock and sense of time. (There is a reason Las Vegas casinos do not have windows.) In addition, that same changing light and views to the exterior reinforce connection to the world outside the hospital, combating institutionalization and isolation. Particularly at residences, views to and from the exterior should be carefully considered both for appropriateness and to maintain patient privacy.

Patient mix, acuity, behavior, and treatment requirements will evolve in both the short and long term. The use of the facility will therefore change over time. In that context, the goal of the design and construction process is to provide a safe and flexible tool for staff to leverage in supporting healing and recovery.

The nature of behavioral healthcare is such that a staff “break” while on the unit is difficult, if not impossible. The mobility of patients, the therapeutic nature

of ongoing staff/resident interactions, and the inevitable associated stress suggest a formal and physical separation of "on" and "off" times. It is ideal to place staff break areas readily accessible to but off the unit. Staff members who are on the unit are clearly working and those on break are clearly off the unit. This approach also allows staff to securely store personal items and conduct personal activities away from patients, maintaining staff privacy and safety. Properly located, these staff areas can be shared efficiently across units and should be close enough to allow staff to quickly provide support in emergencies.

Not all unit activity is structured. Formal therapeutic activities, the "classes" part of the residential school model suggested above, are often reduced or eliminated on weekends and evenings. At the same time practical everyday activities such as doing laundry, watching television, playing games, reading, and relaxing are part of the therapeutic milieu. The unit layout should allow for these activities while realizing that access to some activities and equipment may need to be restricted. As an example, a lockable laundry space with windows to the corridor and lockable door supports independent resident activity along with ongoing observability and appropriate control.

Patient rooms are the sole private space for a resident. Single rooms have become almost a default approach. It is, however, worth considering to include at least some larger rooms in the residential mix. Anecdotally at least, some patients do better with a roommate. A larger room can also allow for an extremely active patient to pace at night or a patient whose physical or medical needs require extra room for equipment and staff assistance.

As a matter of privacy, it is good to offset the doors to resident bedrooms along a corridor so that they face a wall rather than another door when open. This arrangement provides more privacy when patients are in their rooms and limits the possibility of disruptive behavior and inappropriate displays visible across the hall. This configuration also avoids a potentially unsafe situation where staff members standing at a given door have their back to another patient door and patient.

Large windows that provide significant light and views to green space are a plus. The ability to have secure natural ventilation mimics traditional residential construction. Internally mounted lockable screens with an outswing window sash are one approach. Operable windows also provide the ability to quickly air out rooms if necessary without relying entirely on the mechanical ventilation system that will tend to recirculate odors.

Care should be taken to prevent the possibility of patients barricading themselves in rooms. As discussed elsewhere, this approach requires a discussion of door swings, hardware, keying, and furniture selection, along with a method for staff emergency access through the patient room door or window.

An appropriately furnished and located visitation room allows family and advocates space to meet with residents without entering the unit. The goal is to minimize disruption and maintain patient privacy. Ideally, the layout should allow visitors and residents to be quickly separated if the need arises and for visitors to be moved off the unit. If properly located, the room can also serve as a meeting room for unit staff.

Toilets, Baths, and Showers

Although current healthcare facility standards require direct access to toilets from patient rooms, an exception is provided for certain behavioral healthcare facilities. That exception allows access to patient bathrooms from the corridor rather than from the room, acknowledging the need for higher levels of supervision.

Design of patient toilets typically includes discussion about single versus multioccupant ("gang toilet") facilities. In the case of single occupant spaces, it may make sense to separate toilets and showers to increase turnover and utilization of spaces. The solution to the single versus gang toilet question may vary between residential and therapeutic areas as it often does in the outside world between residential and public or commercial spaces. Multioccupant spaces are, by definition, less private and can feel institutional. Single occupant spaces may provide more privacy and a sense of safety for the user, but they may also present a higher possibility of dangerous and inappropriate behavior and be more difficult to casually supervise.

Regardless of the approach chosen for the specific project, these spaces should be configured, as in any residential facility, to respect the privacy and dignity of users. At the same time, doors and traffic in and out should be easily observed. Doors may be locked, but procedures to ensure safety must be in place. Spaces should be sized and equipped to allow staff to assist or remove patients, if necessary.

Therapeutic Spaces

Many of the design considerations associated with residential units also apply to other therapeutic spaces. It is assumed here that the majority of formal daily therapeutic activities will take place off the unit.

Although various names exist, and culturally appropriate naming at the facility level should be encouraged, these group learning, recreational activity, and therapy spaces are often referred to as treatment malls. The mix and nature of treatment mall spaces will vary according to the facility and the project. Again, to the extent possible, they should allow residents to model behavior outside the hospital. Classrooms should look like military or private sector classrooms. Lunchrooms should look like places that one might leave the office to lunch. Meeting rooms should look like meeting rooms.

Careful selection of furniture and finish materials can allow multiple uses for a single space if appropriate storage is provided. As an example, a cushioned floor might accommodate aerobics, cardiopulmonary resuscitation training, and staff instruction in safe “take-down” methods for combative patients in a single room along with more traditional meetings and instruction.

There are, however, unique considerations for this sort of educational facility. Capacity must be in place to allow staff to deal with both malingerers who refuse to participate and for those who—for whatever reason—cannot deal with a full day of therapeutic activities. Addressing these issues as part of the treatment area supports operational efficiency and can reduce required staffing. As with residential units, providing a clear delineation between therapeutic and staff break areas is highly desirable.

Opportunities for ongoing casual observation should be integral to the design, which is particularly important at spaces such as lunchrooms, corridors, and other large group gathering and social spaces. These can be as simple as locations where a staff member can stand with a back to the wall and both observe the entire space and make ready eye contact with a remote staff member. Vision panels at doors are useful in many cases, although care should be taken about their use at offices or rooms where individual and group therapy occur. Functional room layouts that locate staff to be visible through door vision panels can increase observation and safety.

Administrative, Public, and Support Spaces

These functions typically occur outside secure residential and treatment areas, and they can often be configured much like similar spaces at equivalent non-behavioral military healthcare facilities. At the same time, the general public and most visitors will have severely limited access to residential and treatment areas. As a result, these more publicly accessible spaces will often represent—to visitors and the public—the quality and character of care provided.

The secure behavioral healthcare facility may include formal hearing or courtroom space. Teleconferencing technology can address time, travel, and security concerns for judges, witnesses, and residents while meeting legal process requirements.⁶ Private meeting spaces for counsel, family members, and witnesses should be included near to but outside the hearing room. A separate and secure preparation area and office space directly accessible to the room for judges and similar functionaries may be useful.

Support spaces include functions such as materials management, food service, maintenance and grounds, and engineering equipment areas. To the extent possible, these spaces should be accessible without outside personnel entering the secure facility. They should allow—even require—the thorough review by facility personnel of any materials, equipment, or supplies entering or leaving the facility. Materials entering the secure area from the outside world need to be vetted before entry. The same is true of materials such as food or linens traveling within the hospital, particularly as they cross the secure perimeter or enter secure residential or treatment areas.

Finishes

A meaningful discussion of specifics of materials and finishes for walls, floors, ceilings, millwork, cabinetry and the special needs for secure doors, external and interior window glazing, flooring, ceiling systems, and more is beyond the scope of this chapter. There is a wealth of information and specialized information sources relative to components applicable to the building type (see Exhibit 16-1).

Maintainability and efficiency of operation should be integrated with aesthetic concerns in finish selection. This approach supports flexibility and evolution in the facility’s appearance over time. That flexibility should be a part of the design effort from the start. Properly planned, the updating can have little or no impact on otherwise necessary operational and maintenance costs. As a general rule, updating is best achieved by recognizing during design those things that are relatively easy to change, such as paint colors, fabrics, furniture, artwork, military command or unit displays, and even plantings. Many of these items will require replacement or modification as part of necessary and ongoing maintenance.

Glazing at interior and exterior windows, doors, and vision panels should be carefully reviewed at patient accessible areas. Various forms of high strength glass, laminated glass products, and polycarbonates (plastics) all have their place. Scratch and yellowing resistant polycarbonate glazing is not as hard a surface

as glass, but it does provide significant resistance to vandalism. The glazing solution should be carefully examined throughout because it may require discussion within the team and with code review officials. As an example, wired glass is the typical solution at fire doors that lead to exit stairs. It can, however, be broken by impact, producing broken glass pieces that are then available to patients.

Furniture

Furniture selection and maintenance is an issue for significant discussion. Furniture selection has a tremendous impact on how a space is perceived, and it is an excellent opportunity to consider the integration of conflicting goals and desires. As a general rule, furniture finishes and design do not need to be selected based on the most troublesome patient's behavior. Patients can be relocated between rooms, furniture can be moved, and different rooms and units can be furnished differently. Accessibility to or maintenance of a more desirable environment may even serve as appropriate positive behavioral reward or reinforcement. Removing a rug or a desk chair from a disruptive patient, or one who staff feels may become disruptive, seems preferable to denying these simple amenities to every residential patient.

At the same time furniture that will be available to residents should be carefully inspected and samples should be aggressively tested. Furniture that can be easily broken or disassembled is problematic. Parts such as bolts, screws, or braces that can be removed and concealed while leaving the furniture otherwise intact present a significant danger to staff and residents. Furniture that can be readily thrown, brandished in whole or part as a weapon, or used to barricade doors also presents real concerns. Creases and deep seams that can provide places for concealment or are difficult to clean and should be avoided.

These issues have typically been addressed by using furniture that is either (a) secured-in-place and/or heavy or (b) ultra-light and/or heavily cushioned. The first option is hard to move or throw, but less flexible in

layout. The second is less likely to be a useful weapon, but is often unattractive and can be a barricade assist. In either case, the level of available staff observation while the furniture is in use can affect the appropriate solution.

Furniture in common areas or classrooms has a relatively high level of supervision while in use. Moveable furniture may provide desired flexibility and a preferred appearance. However, this does not prevent selecting well-constructed and heavy furniture that lessens the likelihood that it will become a projectile. It does allow a somewhat more residential or at least dorm-like atmosphere.

Tough, nonporous, nonabsorptive fabrics (focused initially at the senior healthcare market) provide alternatives to shiny institutional vinyl. In any case methodologies, equipment, and materials necessary for care of any special fabrics should be coordinated with facility housecleaning staff along with more typical furniture. Patient room furniture, however, has long periods of unsupervised use. In addition to concerns about the furniture itself, it should be impossible to use the furniture to create a barricade situation. The immediate solution is often to affix the furniture to walls or floors. Aside from the perception of a room with a bed, desk, and wardrobe nailed in place, one practical problem with this approach is that it makes concealing contraband easier and searching a room for contraband harder. At treatment areas, carefully selected moveable and stackable furniture (and related storage) can allow variation in the use of a given space. If scheduling allows, this flexibility increases the efficiency of a building and can reduce the overall building area and cost of construction.

Finally, thought should be given to the relative appearance and selection of furniture used for similar activities across the facility. Use of similar items promotes interchangeability and simplifies maintenance. Where appropriate, it can signal the equality of staff across disciplines and the relationship between staff and residents. Yet, there are times where variation or hierarchy in appearance is appropriate.

SUMMARY

Developing good—and even great—facilities that support recovery is ultimately the goal, and it is a realistic one. A collegial process that includes a clear vision, incorporates appropriate input from knowledgeable stakeholders, centers on the integration of the complex demands of care, and incorporates the best of technical and creative ideas will produce a better, more flexible, and more efficient end product. At

the same time, no solution or building is ever perfect. Even if the ideal match of need and form somehow occurs at the outset, needs and uses change. The evolutions of demographics, treatment modalities, patient mix, staff mix, funding levels, technology, and dozens of other variables will reset the balance over time. The architect and engineer will not be there at two o'clock in the morning, in the snowstorm, when

the power goes out, and when a patient is in duress. The caregivers and the physical facility will be there, however.

With that caveat, the ideas and examples here are not presented to suggest that they are “the answer.” They are instead provided to support a talented and committed group of individuals and organizations as they best address an exceptionally complex, challenging, evolving, and fascinating task. Where these ideas are appropriate, use them. Where they are not, modify them to suit the specific need. The best results will arise from a shared framework for action, making the best use of the knowledge, expertise, and creativity of all team members, and leveraging that knowledge,

expertise, and creativity into a functional, flexible, efficient, and integrated solution. That solution will let staff and families provide the best possible care and the best outcomes. Successful solutions work at multiple levels for the people who will live there while they need to be there, and for those who care for them. That success extends well beyond the purely functional and communicates the quality of the care given and received.

In the end, the answer is not the building itself. The building is a tool. The goal of both the design effort and the completed facility is the potential to provide extraordinary behavioral healthcare and the positive outcomes of that result from that care.

REFERENCES

1. The Churchill Centre. *Famous Quotation and Stories*. House of Commons speech, October 28, 1943. <http://www.winstonchurchill.org/learn/speeches/quotations>. Accessed March 27, 2014.
2. Wikipedia contributors. *List of poisonous plants*. Wikipedia, The Free Encyclopedia. http://en.wikipedia.org/wiki/List_of_poisonous_plants. Accessed March 27, 2014.
3. Smith J. *Health and Nature: The Influence of Nature on Design of the Environment of Care*. A Position Paper for The Center for Health Design’s Environmental Council, 2007. <http://www.healthdesign.org/chd/research/health-and-nature-influence-nature-design-environment-care>. Accessed March 27, 2014.
4. Herman Miller Healthcare. *Patient-Room Design: The Same-handed, Mirror-image Debate*. Research Summary. http://www.hermanmiller.com/MarketFacingTech/hmc/research/research_summaries/assets/wp_Same_vs_Mirror.pdf. Accessed March 27, 2014.
5. Edwards L, Torcellini P. *A Literature Review of the Effects of Natural Light on Building Occupants*. Golden, CO: National Renewable Energy Laboratory; 2002. NREL/TP-550-30769. <http://www.nrel.gov/docs/fy02osti/30769.pdf>. Accessed March 27, 2014.
6. Price J, Sapci H. Law & psychiatry: telecourt: the use of videoconferencing for involuntary commitment hearings in academic health centers. *Psychiatr Serv*. 2007;58:17–18. <http://ps.psychiatryonline.org/article.aspx?articleID=97532>. Accessed March 27, 2014.

