# The Role of the Architectural Environment in Community Health: An Evidence-Based Initiative

Stephen Verderber and Joseph Kimbrell

This discussion reports the status of a 12-year program administered by a statewide health agency to strategically assess, redevelop, and monitor the architectural and facility management performance of its network of community-based public health care facilities. A protocol, the Strategic Facility Improvement initiative, has directly resulted in significant improvements to the major share of a network of over 100 community clinic and clinical support facilities in the State of Louisiana. The SFI initiative provides oversight with respect to the allocation of public health capital improvement infrastructural resources and has guided completion of 55 facility replacement or renovation projects to date. Its administrative mission, organizational structure, and field methodology is presented as a vehicle to significantly improve the architectural condition of clinical and clinical support environments for underrepresented patient populations. The SFI process is discussed as an evidence-based means to foster greater systemic success in capital improvement efforts within public sector health agencies in the United States and in international contexts.

**KEY WORDS: architecture, community public health clinics, evidence-based design, strategic facility planning**

The art and practice of constructing a building has often been described as an act of optimism. Throughout history, architecture has been viewed by advanced societies as symbolic of the highest of aspirations. Florence Nightingale, in many respects the first modernist health care facility planner, viewed the layout, aesthetic appearance, and upkeep of the patient's physical environment as possessing essential therapeutic benefit—exerting a profound influence in the treatment of sickness and disease. Her core principles for the design of the health care environment were disregarded during the halcyon era of modern architecture, but have recently been rediscovered by a generation of postmodern architects. Among her many contributions, Nightingale advocated communality between the patient and the natural environment and the importance of human scale in health care settings.

Despite admirable intentions, the efforts of the most highly qualified and assiduously dedicated community health caregivers are too often thwarted by architecturally dysfunctional conditions experienced in hospitals, outpatient clinics, and in any setting where medical and nursing care is administered. Anecdotal evidence in history points to the symbiotic relationship between architecture and health care, and recent empirical evidence points to the significant therapeutic role of architecture in relation to human health and well-being. Research within architecture and its allied environmental design disciplines, however, has generally overlooked the therapeutic and related affordances of the architectural care setting with respect to community public health milieu. Meanwhile, the deleterious effects of poorly planned, overcrowded, ill-kept clinical environments for the dissemination of public health care routinely remain overlooked or entirely dismissed. Meanwhile, the harmful effects of these conditions upon health and well-being remain undetected, often, for decades.[1] The key role of the health care architectural environment, therefore, warrants its systematic

The authors thank Kevin Frank and Jessica T. Gramcko, of the Tulane University School of Architecture, for their invaluable assistance in the preparation of this manuscript. The first author is indebted to Joan Bostick, Ph.D., Kay Burton, MA, Sylvia McKee, MSW, and Darlene Smith, MA, of the State of Louisiana Office of Public Health, for their essential support and guidance.

Corresponding author: Stephen Verderber, MArch, ArchD, NCARB, C/O School of Architecture, Tulane University, New Orleans, LA 70118 (e-mail: sverder@tulane.edu).

**Stephen Verderber, MArch, ArchD, NCARB,** is a Professor, School of Architecture, and an Adjunct Professor, School of Public Health and Tropical Medicine, Department of Health Systems Management, Tulane University, New Orleans, Louisiana.

**Joseph Kimbrell, MA, LCSW,** is Chief Executive Officer, Louisiana Public Health Institute, New Orleans.

*J Public Health Management Practice*, 2005, 11(1), 79–89

appraisal within the community public health care equation.

Health care organizations in the public sector have, unfortunately, infrequently adopted leadership positions in terms of learning how the physical setting can help them attain their core goals. Frequently, architectural variables such as a building's aesthetic and spatial qualities—its composition, scale, height, site planning characteristics, daylighting, color, air quality, wayfinding amenity, staff and patient flow patterns, aesthetic ambiance, and overall suitability to the dissemination of health care, remain unconsidered. Measures of the quality of care, worker morale, productivity, and the measurement of health outcomes understandably are core concerns, although taking cognizance of the performance of the physical setting in relation to these factors can reinforce both. There appears to be the need to do so in the United States at this time, particularly with respect to organizations serving underrepresented patient populations.[2] The dilemma of disjunctively focusing on the delivery of services apart from the condition of the health care setting where these services are delivered has become highly problematic. In light of the many studies published on closely related aspects of community care such as the social aspects of public health, the relationship between income level and the quality of patient care received in community-based clinical settings, and issues centered on the growing inaccessibility to health care for an increasing number of Americans, more research is needed on the functions of the architectural environemnt.[3] Unfortunately, the potentially direct, instrumental role of architecture as a medium of positive intervention in public health remains overlooked.[4]

It is well known the extent to which the health care needs of underinsured and uninsured patient populations in the United States have increased dramatically in recent years. Roughly 50 million Americans currently receive some level of assistance from the federal Medicaid program. Compounding matters, the condition of the public health architectural infrastructure is diminishing precipitously in the United States. Unfortunately, no national statistics exist on this trend. Despite these trends, the dwindling percentage of increasingly scarce taxpayer resources allocated for capital improvements to the public health infrastructure in the United States is likely to reach a crisis stage within this decade. New initiatives are needed to address and inventory the declining condition of buildings devoted to community-based public health care. Although no such information exists at the present time, a national facility performance database would be a valuable assessment tool in strategic planning at the federal, state, and local level. In the past decade, an area of research in the environmental design fields known as *evidence-based design* has emerged in the United States.[5] This approach is centered on the systematic appraisal of the performance of a care setting from the standpoint of the physical setting, as well as the systematic assessment of its occupants. This information is then translated into architectural recommendations and guidelines for incorporation in subsequent capital improvement initiatives. Evidence-based design is a means to avoid costly, entirely avoidable mistakes and is no different in principle from the evidence-based design movement in the health sciences. The work reported within this article represents a major empirically based, multiyear effort to extend knowledge on this subject.

## Background

In the fall of 1990, the State of Louisiana Department of Health and Hospital's Office of Public Health (DHH-OPH) embarked upon a strategically oriented, evidence-based facility planning and design initiative to assess, redefine, and redevelop its network of 132 program sites. This network consists of administratively coordinated region offices, laboratories, and community public health clinics. This network of program sites is structured into 9 regions, administratively. A protocol, referred to as the statewide Strategic Facility Improvement initiative, or SFI initiative, was developed. The SFI protocol has been recognized nationally for its innovativeness.[6] From the dual perspective of innovatively encompassing public health policy and architecture and its longevity, the SFI initiative in Louisiana remains a unique example of evidence-based design in the United States.[7]

The need for the SFI arose over many years. In the years following the demise in the early 1980s of the federal Hill-Burton program for hospital and community clinic construction, the DHH-OPH lacked a strategy to guide the planning, design, and construction of its inventory of facilities. Practically from its origins, in the aftermath of the great Mississippi River flood of 1927, the system for building public health facilities in Louisiana was inconsistent and at times highly contradictory. This was in part due to a pattern of unscrupulous political dealings dating from the era of Governor Huey P. Long in the 1920s. To his credit, however, Long championed the construction of a number of parish health units in communities that had been ravaged by the Great Flood, with the support and guidance of the Red Cross, the US Public Health Service, and the Rockefeller Foundation. In 1974, a state constitutional convention mandate reaffirmed the requirement of Louisiana's 64 parishes to provide at least one public health clinic within its jurisdiction. The 1974 document constitutionally reaffirmed these be operated by the

DHH-OPH. With the programs provided by the state and the buildings built by, paid for, and maintained by the parish, by 1990, the absence of a consistent, codified policy for OPH-operated facilities had resulted in an extremely uneven and jagged patchwork quilt of clinics and regional support sites largely based on a pattern of independent invention. In the worst cases, adjoining parishes embarked on capital improvement projects for their parish health unit in virtual ignorance of a neighboring parish's efforts, sometimes when both were constructing a facility at the same time.

As of November 1990, 66% of all OPH facilities had been operating in their present quarters for 30 years or longer. The vast majority of the facilities themselves suffered from years of deferred maintenance and programmatic obsolescence. The continued use of dilapidated and overcrowded facilities had been due, in many cases, to a combination of sheer lack of knowledge on the part of local elected officials about what to do, administrative ineffectiveness on the part of the agency to provide sustained leadership, and an inability to stimulate genuine grassroots interest within the parishes to rectify the situation. Among staff and patients, a climate of learned helplessness frequently set in—a situation not dissimilar from the "environmental docility" syndrome employed to describe the plight of the institutionalized aged in nursing homes in the United States.[8] Local communities opting to build a new facility often did so with only cursory involvement of agency personnel. This had contributed to the chronic underfunding of new building projects. Lacking meaningful, sustained oversight by the agency a parish was "flying blind," proceeding in the absence of neither reliable, evidenced-based information nor minimum facility performance criteria. With so little coordination and consistency within the network, it had become a somewhat haphazard proposition to implement new programs with the hope of any reasonable success.

A consulting research-based design (R-D) team (directed by the first author, under the direction of the second author) distributed a survey completed by clerical, nursing, and environmental health staff at 25 representative program sites statewide. Following this, a full-scale survey of all 132 program sites was conducted using a case study technique commonly referred to in the field of architecture as a *post-occupancy evaluation*. Data were obtained on each facility's age and appearance, condition, maintenance and repair records, annual operational costs, patient utilization levels, staff composition, parking amenity, public transportation availability, and the Americans With Disabilities Act (ADA) compliance/noncompliance. Additional data were obtained on occupant satisfaction with respect to a broad range of architectural issues, including patterns of daily use and environmental comfort. In so doing, minimum (and beyond) facility planning and design criteria were articulated to ensure network consistency and to reverse the deteriorating condition of the facilities.

Subsequently, a compendium of 140 evidence-based facility planning and design guidelines were created. As a means to demonstrate the validity of this lexicon, a prototype hypothetical clinic was designed as an adaptive use of a vacant building. A 5-volume report was accepted for implementation by the agency, which has since been updated annually. The first author has coordinated the implementation of the recommendations since 1991.[9] Collaboration occurs with local DHH-OPH staff, region administrators, local architects (in cases where one is contracted by the client-parish), and the contractor. Planning and design services are provided on a consultative basis including site selection, preparation of program briefs outlining space and equipment requirements, design reviews of ongoing projects, post-occupancy evaluations of existing as well as replacement facilities, and sick building syndrome risk-assessment analysis. These services are provided at no cost to each parish. The SFI program is funded and administered by the agency's central office.

## Procedural Steps in the Strategic Facility Improvement Process

The SFI consists of 14 separate steps. These are illustrated in Figure 1. The steps are interdependent and are generally linear in the order with which they occur. Seven core components emphasize, first, the program's background rationale and structure. The fundamental aim is to improve the health status of the residents of all communities in Louisiana through the use of evidence-based planning and design knowledge in the renovation and construction of community-based public health facilities (step 1). Second, it is important to convey to all parties involved the nature of the SFI team's long-term role, from a project's inception to completion, in working with in-house agency staff in a consultative capacity (step 2). The sustained support and administrative oversight provided by DHH-OPH is critical in terms of providing administrative leadership and in establishing capital improvement priorities (step 3). The solicitation of the involvement of community advocacy groups and interested local citizens in the capital improvement process is equally important to the success of the SFI (step 4). Effective internal and external communication channels need to be established at the outset with in-house liaison agency committees as well as effective communications with parish-based elected officials (step 5). The creation of a project review team to assist local elected officials and other concerned parties in

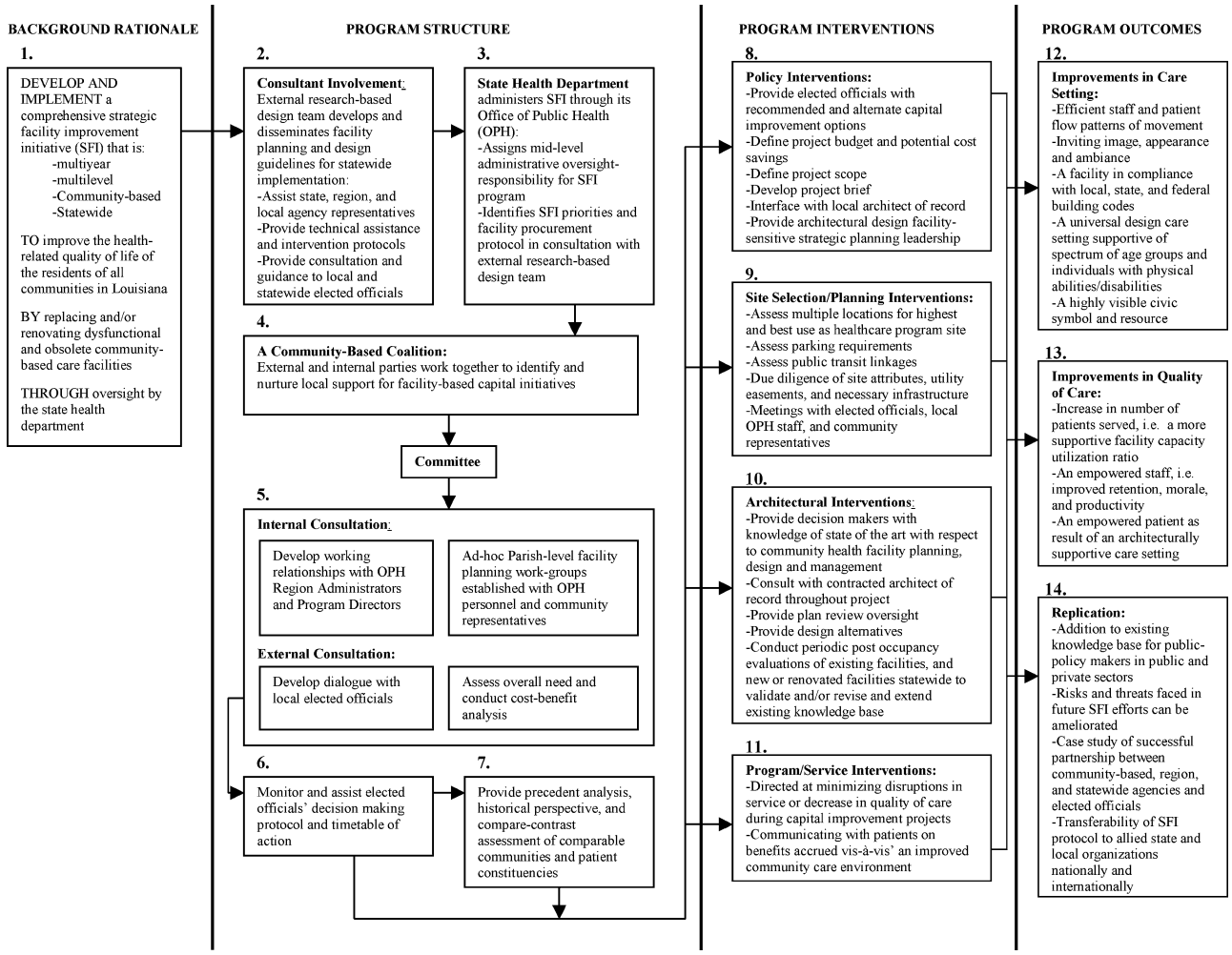



**FIGURE 1.** The Strategic Facility Improvement initiative protocol.

the implementation phase can be of great assistance and result in a much more successful architectural outcome and more timely completion of the construction project than would otherwise likely be the case (step 6). It has proven useful to communities to be able to compare and contrast within-state trends and to assist them in developing their facility improvement strategies locally (step 7). The ability to compare alternative exam room layouts and equipment options, for example, or the most effective signage system for way-finding in a clinical setting can save a great deal of time and effort later on in unnecessary, costly retrofitting of a newly completed building.

Components 8 through 11 consist of key interventional steps, each focusing on the importance of policy interventions that identify alternative capital improvement options. It is important to conduct cost-benefit tradeoff analyses of the benefits of new construction versus alternative strategies (ie, renovation) and to provide general guidance and architectural consul to local elected officials and agency personnel (step 8). This step also includes the development of functional space program briefs. In defining a project's mission, size, and scope, it is essential to identify and select the most suitable site for a replacement facility. The highest and best use of a given site must be assessed, including selecting a site in close proximity to public transportation (step 9). In many cases the consulting team is called upon to provide schematic design services as well at this point. It is essential to maintain oversight of the entire SFI process, including scheduling, areas of responsibility, the monitoring of change orders, owners representative obligations, and frequent review of the construction budget. A post-occupancy evaluation may be necessary at the outset to determine whether to build new or to renovate (step 10). Regardless, every reasonable measure should be taken to minimize the degree of disruption typically caused by a construction project. Similarly, every reasonable effort should be made to keep things running smoothly in an uninterrupted manner during the period of construction, which may last as long as 15 months (step 11).

Components 12 through 14 consist of postconstruction interventions to ensure the completed project's

successful performance over time. These measures consist of the assessment of improvements made following a 3 to 6 month "shake out" period, during which fine-tuning and various facility management modifications typically occur. Also, the facility must be in full compliance with local, state, and federal building codes on an ongoing basis, and the needs of physically and cognitively challenged patients must be fully supported (step 12). It is important to assess the extent to which the new or renovated facility yields an increase in the number of patients served daily, weekly, and monthly. Replacement facilities have been found to contribute to staff greater retention and morale, lower absenteeism, increased productivity, and in turn, a healthier community (step 13). Similarly, it is important to inculcate in clinical and related program staff and in parish officials responsible for site and facility maintenance a willingness to function as the stewards of their own facility. Stewardship, combined with effective communications between staff housed at different program sites, has had an empowering effect on communities embarking on similar capital improvement projects because they know they do not need to reinvent the same wheel countless times over (step 14).

## Results

A statistical overview of the SFI is presented below, together with a discussion of its strengths, limitations, and suggestions for improvement. A summary of the capital improvement projects completed as of December 2003 is reported in Table 1. A total of 55 projects were completed during the 12-year period (1991–2003). Of these, 38 resulted in completely new replacement facilities, 8 in renovations or expansions to existing facilities, and 9 resulted in adaptive re-use of a "new" existing building for use as a community public health care clinic. The average project-planning phase from project inception to groundbreaking was 13.0 months. The average length of time required for actual construction from groundbreaking to opening day was 11.1 months.

With respect to the amount of construction activity across the 9 administrative regions, the average size of a new facility has been 9,224 square feet. This represented 364,705 total square feet in new construction. Other building projects, consisting of renovations and adaptive re-uses of existing buildings, averaged 5,928 square feet per project. This represented 121,874 total square feet in this category. With respect to fiscal expenditure, the average capital improvement project was $897,899 (unadjusted for inflation). Total capital improvement expenditures during the period reported across the 9 OPH regions totaled $53.4 million. Despite a considerable volume of construction activity during the 12-year period, it is noteworthy that a total of 25 program sites were closed outright or consolidated with existing program sites during this period (due to administrative restructuring efforts and state budget reductions imposed by the state legislature).

**TABLE 1 Statewide Strategic Facility Improvement initiatives (1991–2003)**

| Region* | Completed projects | Replacement facility (Y/N) | Renovation (Y/N) | Adaptive† use (Y/N) | Planning‡ phase (months) | Construction§ phase (months) | Square feet‖ | | Expenditure¶ |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | New construction | Other | |
| 1 (12) | 5 | Y (1)# | Y (3) | Y (1) | 8.4 | 11.3 | 12,250 (12,250) | 8,881 (44,404) | 780,240 (3.90M) |
| 2 (9) | 5 | Y (4) | Y (1) | N (–) | 14.8 | 9.6 | 7,513 (30,050) | 3,000 (3,000) | 750,000 (3.01M) |
| 3 (11) | 7 | Y (4) | Y (1) | Y (2) | 10.9 | 11.7 | 9,900 (49,500) | 4,067 (12,200) | 610,127 (6.71M) |
| 4 (17) | 6 | Y (6) | N (–) | N (–) | 12.2 | 12.8 | 8,328 (49,970) | — (—) | 1,100,177 (6.60M) |
| 5 (10) | 6 | Y (4) | Y (1) | Y (1) | 20.7 | 10.4 | 10,837 (54,185) | 3,940 (3,940) | 1,288,571 (9.02M) |
| 6 (11) | 4 | Y (2) | Y (1) | Y (1) | 9.7 | 10.2 | 9,320 (37,280) | — (—) | 898,213 (4.49M) |
| 7 (14) | 5 | Y (2) | Y (1) | Y (2) | 10.3 | 10.7 | 7,800 (15,600) | 10,593 (31,780) | 587,857 (4.12M) |
| 8 (12) | 9 | Y (8) | N (–) | Y (1) | 14.1 | 13.6 | 10,178 (81,425) | 3,250 (3,250) | 875,909 (9.63M) |
| 9 (11) | 8 | Y (7) | N (–) | Y (1) | 15.9 | 9.6 | 6,889 (34,445) | 7,767 (23,300) | 1,190,000 (5.95M) |
| Total (107)** | 55 | 38 | 8 | 9 | 13.0 | 11.1 | 9,224 (364,705) | 5,928 (121,874) | 897,899 (53.4M) |

*Project data reported through 12/31/03. Number in parentheses denotes total freestanding program sites in region (with exception of school-based clinics).
†Certain projects involve combination of either new and/or renovated or adaptive reuse strategies.
‡Mean across projects reported (in months).
§Mean across projects reported (in months).
‖"New Construction" data reported as Building/Gross Square Feet (BGSF). Number in parentheses denotes total BGSF. "Other" category consists of renovation and adaptive reuse projects. These data are reported as Departmental Gross Square Feet (DGSF). Number in parentheses denotes total DGSF.
¶Mean total project cost, including land acquisition, site improvements, parking areas, access drives, signage, landscaping, furnishings, equipment, and building expenses (in millions). Number in parentheses denotes total capital expenditure in Region (in millions).
#Y denotes decision to replace community public health facility since 1990–1991 Fiscal Year (FY). Number in parentheses denotes total number of replacement facilities built in Region.
**A total of 25 program sites have been closed or consolidated with existing DHH-OPH facilities since FY 1990–1991.

The performance of the SFI program is reviewed annually, as is the performance of each facility. A composite facility performance rating is assigned, based on 3 types of data: (1) firsthand appraisals by its *end-user* occupants (patients and full-time staff), (2) the assessment of the region administrator, and (3) information acquired in the field by the SFI coordinator. Together, this information is translated into a 4-point scale to reflect the degree of architectural intervention required. This rating is based on 5 individual assessments: (1) the site context and neighborhood, (2) its aesthetic appearance, (3) the degree of functionality from the standpoint of internal patterns of use and occupant and materials flow, (4) the ability to adequately maintain the facility, and (5) the condition and operation of the building's environmental control systems (heating, ventilation, and air conditioning, and electrical systems). This information is compiled into a statistical profile. With the opening of each replacement or renovated facility, a given program site's score typically diminishes from the level of urgent priority to no architectural intervention required at this time. The 4 levels of ranking for priority improvement are: (1) urgent priority, (2) high priority, (3) moderate priority, or (4) no change. In Figure 2, a between-region (R1-13R9) before/after rating of each clinic and program support site in the network is reported at the twelve-year interval. The *before* rating, therefore, is the *pre*-intervention rating (1990) and the post-intervention rating is cumulative as of December 2003. This method of evidence-based facility review has been consistent and has proven effective. From a longitudinal perspective, the architectural quality of OPH facilities has markedly improved across the entire state during this period, with the most significant improvements having been achieved in Regions 2, 4, 5, 8 and 9.

In Figures 3a-6d, 4 completed SFI projects are reported. Each is presented as a set of 4 images, reading from left to right. The first column contains the floor plan, and the second through fourth columns contain exterior and interior photographs of representative spaces. These case studies illustrate some examples within the broad range of floor plan configurations that are feasible within the framework of the 143 evidence-based design guidelines. The first example, a 12,000 square foot replacement facility built in West Monroe, completed in 1994, was configured as a series of bandwidths, with an emphasis on the architectural expression of each examination room as a distinct "house" (Figures 3a–3d). The second example, the 8,000 square foot replacement facility built in Columbia, completed in 1995, was configured around a courtyard. The staff requested a building easy for patients to navigate, one that would provide many views to the exterior,

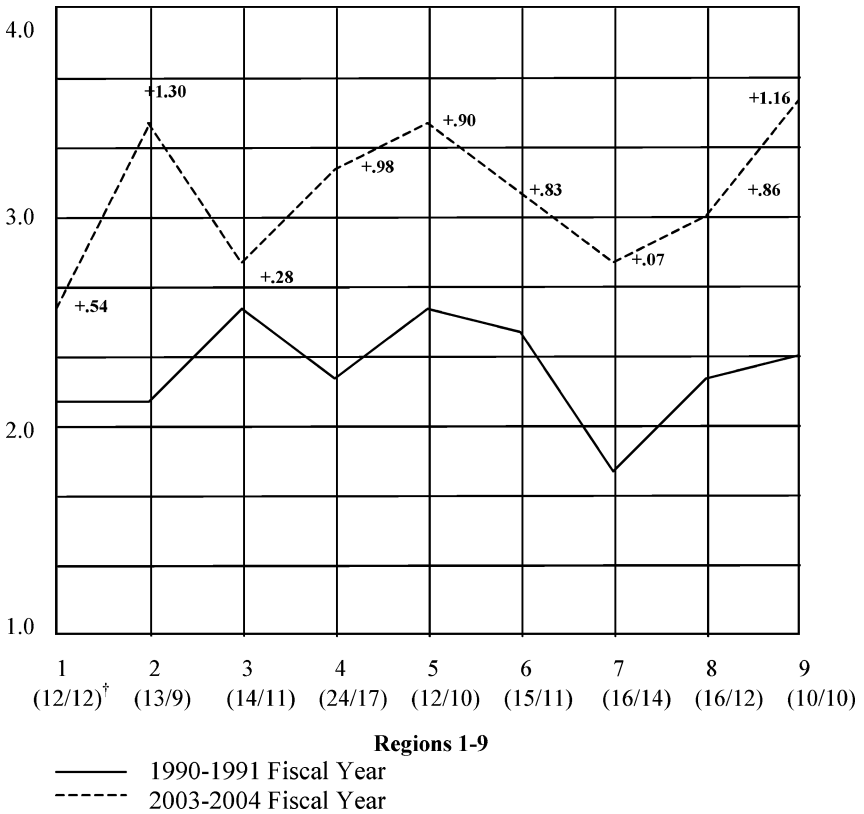


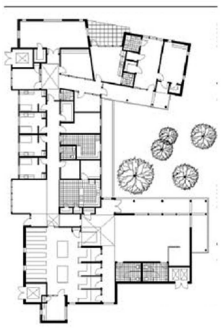

**FIGURE 2.** Statewide capital improvement priority rankings·* *Four-point assessment scale: 1 = urgent priority; 2 = high priority; 3 = moderate priority; 4 = no modification required at time of assessment. †First number in parentheses denotes number of freestanding program sites in region in 1990–1991 fiscal year (FY). Second number denotes number of freestanding program sites in 2003–2004 FY (figures reported do not include 16 school-based clinics).

3a

3b

3c

3d



4a

4b

4c

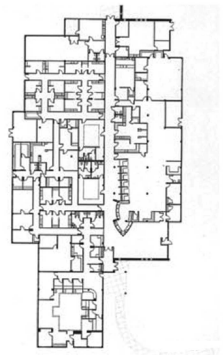
4d

5a

5b

5c


5d



6a

6b

6c

6d

**FIGURES 3a–6d.** Representative case studies.

thereby establishing a direct connection to its wooded site (Figures 4a–4d). These two facilities were designed by the first author's firm (R-2ARCH), in a joint venture with Hugh Parker and Associates. In both of these facilities, the staff requested large windows and a significant degree of transparency within the building, and between "public" interior spaces and the exterior environments. In the third case study example (Figures 5a–5d), the renovation of a 5,500 square foot, 2-level international style, modernist clinic in Metairie, completed in 2004, required gutting the entire interior and rebuilding it in a phased manner. The site was deemed too valuable to abandon, although the parish had offered to build anew on a site in an area remote from the core constituency of patients. This building will be eligible for placement on the National Register of Historic Places in 2012. The renovation was the work of R-2ARCH in association with Cusack and Cusack Architects. The fourth example is the replacement facility built in Lafayette, designed by Architects Southwest, based upon close consultation with the SFI team and the guidelines. This building, completed in 2003, is the anchor within a new 12-acre civic services campus, configured as a college campus in layout and its pedestrian scale. The building is configured as a "street" with various waiting and subwaiting rooms arrayed along a central circulation axis, leading from a main reception counter resembling a small vessel (see Figures 6a–6d).

The evidence-based findings drawn from the fieldwork and the guidelines may be summarized as a set of 8 provisos: (1) there is no single, optimal floor plan configuration, (2) clinical areas should be clearly separated from nonclinical zones and waiting areas should be zoned to centralize patient flow (including the random movements of children) and to minimize noise, (3) natural daylight is desired by patients and staff and was found to afford therapeutic amenity; views of nature were found to be highly preferred, (4) residential imagery is highly preferred and is perceived as creating an inviting atmosphere, (5) flexible spaces that allow for two or more functions at different times are highly preferred, (6) children should have their own spaces within the building and the on the site, with the entire facility designed to be attuned to their physical and sensory needs, (7) patient confidentiality should be maximized within the total care environment, and (8) clearly identifiable entrance, parking areas, and interior way-finding signage should be provided.

In 2000, the original statewide survey from 1990–1991 was re-administered with one significant modification.[10] This centered on expanding the survey respondent group: in 2000, the respondent group was greatly expanded to a total of 1,143 full-time DHH-OPH personnel. This longitudinal strategy made it possible to discern broad trends and, in many ways, reaffirmed the progress made across the decade. Also, these data have since been of use in consort with post-9/11 antiterrorism programs initiated by the Centers for Disease Control and Prevention in Louisiana and the recently created Federal Office of Homeland Security.

## Discussion

The SFI initiative has been a success from the standpoint of improving the delivery of care and the quality of the public health care architectural environment in Louisiana. Nevertheless, a number of public health clinics in Louisiana continue to urgently need major improvements, expansion, or total replacement. To date, no instances have been reported of the SFI protocol having had an adverse impact on the quality of or the untimely completion of any capital improvement project. In many respects the SFI protocol is not significantly dissimilar from a CDC-sponsored initiative developed to monitor and reduce diabetes in inner urban communities.[11] The SFI initiative, in the broadest sense, is therefore not dissimilar from related efforts to reduce the incidence of chronic diseases in communities, as it similarly endeavors to express the needs and aspirations of patients, their families, direct care providers, agency administrators, locally elected officials, statewide elected officials, and advocates for health improvements among disadvantaged populations.[12] A building's occupants, the end-users, possess an undeniable wealth of pragmatic knowledge acquired through experience. There is no way that an architect, acting alone, without meaningful consultation, can respond to an end-user's complex sets of functional needs. A second group, the building's intermediate-users, consist of individuals who may typically spend little or no time in the building on a regular basis yet may have a profound influence on matters of financing. This constituency includes local elected officials, agency administrators, and other policy makers. Given this situation, these constituencies may, knowingly or not, set conflicting agendas and policies. It is hoped that the SFI has contributed to an improved dialogue between end-user and intermediate-user constituencies. Regardless, some avoidable pitfalls are worth mentioning for the benefit of public health administrators elsewhere.

Early intervention vis-à-vis the SFI process has, by and large, yielded tremendous dividends.[13] This is because the establishment of the construction, furnishings, equipment and land acquisition budget, and the selection of the "best" site is a critically important decision and this typically occurs early on, often, before the architect is hired. The major decision that must be made prior to the determination of the project's

scope and budget is whether to *build* or *not to build*, or to *renovate*. Prior to 1990, in numerous instances, communities had prematurely opted to keep and renovate their obsolete existing building instead of adopting the more sensible strategy of total replacement. Similarly, deferred maintenance is seldom the best course of action over the long term. Secondly, develop policies to encourage the meaningful involvement of the end-users as well as the intermediate-users. Do not devote an excessive amount of attention to any one constituency at the expense of others. Everyone will benefit from open and unfettered communication. Imbalanced or biased communications usually results in a less than fully supportive care setting (ie, improperly sized rooms with poor adjacencies to one another, difficult to maintain wall surfaces, institutional-looking furnishings, and poor internal flow. Third, articulate the project's mission statement early on.[14] The necessary homework should be done by experienced professionals with regards to the establishment of the total budget, the definition of site amenities, and the incorporation of recent innovations in building design and technology (ie, assistive technologies such as redundant-cued directional and room ID signage for the visually impaired, new types of lighting, emergency egress systems, assistive systems for the hearing and visually impaired, and LEED certification [the US Green Building Council's program in Leadership through Energy Efficient Environmental Design]).[15] To date, the health care industry in the United States has significantly lagged behind other building types and their clients in this respect.

The question may arise: "Don't all thoughtful and skilled architects who work in the arena of health care engage in evidence-based design?" Simply put, the answer is no. This approach requires the systematic assessment of precedent, a willingness to revisit one's past projects, and an investment of time and resources to learn what others have done. Perhaps it may come as some surprise, but relatively few architects in the United States or elsewhere have been trained to conduct this type of work and still fewer provide evidence-based design as a professional service. Does it cost too much? Absolutely not, particularly in the case of a large network of interrelated program sites operating under the umbrella of a single statewide or municipal agency. The knowledge to be gained from one community and one building can be applied to 40, or 100, or others. As mentioned, there is no need to continually reinvent the same wheel. Architecturally, actively learning from past mistakes as well as past achievements is, therefore, invaluable.

From an administrative perspective, remain cognizant of the time-tested adage *out of sight, out of mind*.[16] Be involved at key decision points. Fifth, persevere against the odds. The layers of bureaucracy in the public sector at times can have a paralytic effect on a capital improvement project. This is compounded by the sheer length of time required to plan, design, and construct—a process itself that can be slow and painstaking. Even a fast-tracked project may take two or more years from start to finish. Nonetheless, organizational resolve and determination are prerequisites to surmount political hurdles, intricate building code issues, and related concerns. Sixth, build upon the organization's past successes, establishing a track record of successfully completed capital improvement projects.[17] And finally, establish a culture whereby mechanisms are put in place so past costly architectural mistakes are not needlessly repeated.

A carefully sited, planned, and designed community public health care facility functions as a civic symbol, not dissimilar from the "civicness" expressed in the local public library. It functions as a source of pride and accomplishment, and this alone resonates throughout the entire community. However, its impact can be even more far-reaching. One effect in Louisiana has been a heightened appreciation of the value-added benefits of architecture as a meaningful part of the total palette of public health services. Over the course of the past decade, the quest to replace aged, obsolescent facilities has in fact become a part of the public health culture in Louisiana. Parishes in many instances have sought to "keep up with the Joneses." A new clinic facility in a neighboring community sparks interest. The construction of so many new community care program sites resulted in a positive ripple effect through the agency as more and more replacement facilities opened for the principal use of underrepresented and historically disadvantaged patient populations.

On a daily level, these renovated and new facilities have resulted in what perhaps might be best described as a "halo effect."[18] On average in Louisiana, replacement facilities have experienced an increase in utilization by patients of as much as 20% in the first year after opening. It no longer was acceptable to engage in ad hoc attempts to get by with doing less. The stark, windowless, industrialized metal clinics erected as recently as the late 1980s have became passé. A core aim of the SFI protocol has been to demonstrate how an evidence-based architectural standard is achievable without being prohibitively costly. With this said, the goal has been to do more than what is minimally required, architecturally, and to do so without significantly increasing construction expenses. This public policy position has itself reaffirmed the community care clinic's status as a genuine civic amenity, in a reprise of the status accorded these places in the aftermath of the Great Flood of 1927.

Some limitations of this process are worthy of mention. Critics may assert it is entirely too self-referential

(ie, based too much on a finite universe of possibilities that may exist only within Louisiana). In point of fact, similar outpatient community care clinics built elsewhere and examples of this building type published in professional journals, are a continual source of information. Programmatically, it has been modeled in many aspects upon *Healthy Communities* national program initiatives, although these precedents are not "architectural" per se. A second limitation is the impossibility of asking the occupants to rate their new facility against their old one without invoking some version of the Hawthorne Effect. It is plausible to expect this type of halo effect whereby one's new quarters engender a lingering positive biasing effect on one's impressions of it. It becomes impossible to completely divorce, isolate, or cognitively separate the old from the new in one's consciousness. It has been found that after a period of one year of completion the occupants are significantly more adroit in realistically comparing their old to their new environment. A third limitation is the problem of obtaining a representative occupant sample of the post occupancy assessment of a given facility's performance. This is largely due to staff turnover, busy work schedules, and at times a *laisez faire* attitude that since one now has new quarters, one need not feel obligated to share this knowledge with others elsewhere who can genuinely benefit.

## Conclusion

Increasing the value-added amenity of architecture is a worthwhile civic investment. This will, however, require the establishment of a learning curve in the public health policy-making arena. Administrative leaders within state and local public health agencies are well advised to make site visits to recently opened clinics within their purview prior to embarking on a new project. Agency representatives and local elected officials are encouraged to hold town hall meetings to ensure broad community input. Agency representatives and consulting professionals need to meaningfully engage local civic advocacy groups.[19] Such meaningful and sustained engagement in the planning and design of civic institutions, public health facilities notwithstanding, can result in a heightened sense of common purpose.[20] In Louisiana, a state which chronically ranks at or near the bottom in national health statistics, it has been possible to establish for the first time a consistent evidence-based yardstick to measure the performance of each community public health program site. This has occurred in light of at times divergent regional political agendas within a state fiercely proud of its local cultural traditions. Architecturally, the SFI initiative has actually respected and sought to further this cultural diversity by treating no two projects or communities alike.

In for-profit health care organizations the patient is increasingly viewed as a health care consumer. Intense competition now exists between institutions operating in the same market. This results in costly marketing, public relations, and media campaigns. One by-product of patient-centered, consumer-focused health care has been an increase in capital expenditures on architecture with the aim of attracting more patients and high quality staff personnel. The outpatient community care facility is seen now more than perhaps ever before as a marketing tool and as a means to achieve this. By contrast, not-for-profit public health agencies have traditionally not been subjected to these types of competitive market forces because they have not been forced to do so.[21] The underlying reasons for this situation are too numerous to discuss here, although in recent years, it has been the exception rather than the rule for the public governmental sector to take full cognizance of the potential contribution of a well-designed architectural environment. It has been demonstrated that well-designed outpatient care environments can improve the delivery of community public health care.[22] Unfortunately, too many underrepresented patients and their caregivers continue to receive and provide care in overcrowded, dysfunctional clinical environments.[23]

With this said, capital improvement challenges faced by public health care agencies in the coming years portend to be no less daunting than at present. The pressure exerted on public health leaders to curtail expenditures will likely continue to escalate in the future.[24,25] The problem of chronically under financing buildings built for public health is, therefore, also likely to escalate, particularly in underrepresented communities where fiscal resources make it is nearly impossible to build at all in the first place. A breaking point will be reached as more and more states and local jurisdictions face critical budget shortfalls. Despite this less than rosy scenario, a sustained commitment to the building of high quality, evidenced-based architecture for public health care is needed more than ever at this time. Due to their training as problem-solvers serving, by professional definition, the "public health, safety and welfare," architects are ideally positioned to help society attain its highest aspirations as more and more architects receive university-level training in evidence-based design. This call to action on the part of the architectural profession not coincidentally parallels current widespread calls for an evidence-based medical and allied health professional landscape.[26] A genuine spirit of architectural advocacy in public health in the United States and around the globe can yield tremendous benefits in the coming years as the world's population continues to increase dramatically.

## REFERENCES


1. Carpman JR, Grant MA. *Design That Cares: Planning Health Facilities for Patients and Visitors,* 2nd ed. Chicago, IL: American Hospital Publishing; 1994.
2. Farbstein J. The impact of the client organization on the programming process. In: Preiser WFE, ed. *Professional Practice in Facility Programming*. New York: Van Nostrand Reinhold; 1993.
3. The Commonwealth Fund. Low incomes often mean poor health and poor health care. *The Commonwealth Fund Quarterly.* 1997;3(2):1–2.
4. American Anthropological Association. Social and cultural aspects of health. *Public Policy Briefing Sheet*. Available at: http://www.ameranthassn.org/pphealth.htm. Accessed February 14, 2000.
5. Hamilton DK. The four levels of evidence-based practice. *Health care Design.* 2003;3(4):18–27.
6. Verderber SF, Refuerzo BJ. Empowerment on main street: implementing research-based design. In: Feldman RM, et al, eds. *Power by Design: Proceedings of the 24th Annual Conference of the Environmental Design Research Association*. Oklahoma City: Environmental Design Research Association; 1993.
7. Verderber SF, Refuerzo BJ. On the construction of research-based design: a community health center. *Journal of Architectural and Planning Research.* 1999;16(3):225–241.
8. Lawton MP. The elderly in context: perspectives from environmental psychology and gerontology. *Environment and Behavior.* 1985;17(4):501–519.
9. Refuerzo BJ, Verderber SF. *Architecture for Community Public Health care: Research-based Design, Volumes 1–5.* New Orleans, LA and Los Angeles, CA: Tulane University, the University of California at Los Angeles, and R-2ARCH; 1991.
10. Verderber SF, Refuerzo BJ. Research-based architecture and the community health care consumer: a statewide initiative. *Journal of Architectural and Planning Research.* 2003;20(1):57–67.
11. Goodman RM, et al. The formation of a complex community program for diabetes control: lessons learned from a case study of project DIRECT. *Journal of Public Health Management and Practice*. 2001;7(3):19–29.
12. Patton M. *Utilization-Focused Evaluation,* 2nd ed. Beverly Hills, CA: Sage; 1986.
13. Editorial. Clean up mess at health unit. *Baton Rouge Sunday Advocate*. November 9, 2003; 12B.
14. McConnell C. *The Effective Health Care Supervisor*. Rockville, MD: Aspen Publishers; 1993.
15. Hemmes M. *Managing Health care Construction Projects*. Chicago, IL: American Hospital Publishing; 1993.
16. Wasserman B, et al. *Ethics and the Practice of Architecture*. New York: John Wiley and Sons; 2000.
17. McLarney M, Chaff LF, eds. *Effective Health Care Facilities Management*. Chicago, IL: American Hospital Publishing; 1991.
18. Becker FE. Evaluation. In: Beck M, Meyer T, eds. *Health Care Environments: The User's Viewpoint.* Boca Raton, FL: CRC Publications; 1983.
19. Fullinwider RK. Civil Society and Democratic Citizenship. *Report from the Institute for Philosophy and Public Policy.* 1998;18(3):2–4.
20. Hill J, ed. *Occupying Architecture: Between the Architect and the User*. London: Routledge; 1998.
21. Kellerman B. *Reinventing Leadership: Making the Connection Between Politics and Business*. Albany, NY: State University of New York Press; 1995.
22. Hargraves JL, et al. Using patient reports to measure health care system performance. *Clinical Performance Quality Health Care.* 1993;1:208–213.
23. Day K. The ethics of care and women's experiences of public space. *Journal of Environmental Psychology.* 2000;20(1):103–124.
24. Hatch CR. *The Scope of Social Architecture*. New York: Van Nostrand Reinhold; 1984.
25. Heldring MB. Collaborative family health care: community and compassion. *Families, Systems, and Health.* 1997;15(3): 333–336.
26. Landro L. Six prescriptions for what's ailing US health care. *The Wall Street Journal*, December 12, 2003; A1, A10.