Good Health Care by Design
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Four essays on how health care design benefits patients and hospitals.

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Evidence shows that changes in the architecture, design, and decor of health care facilities can improve patient care and in the long run reduce expenses. These essays detail the state of the research, look inside two hospitals that put some of these innovations into practice, and consider how design fits into the moral mission of health care.

Fable Hospital 2.0: The Business Case for Building Better Health Care Facilities

BY BLAIR L. SADLER, LEONARD L. BERRY, ROBIN GUENTHER, D. KIRK HAMILTON, FREDERICK A. HESSLER, CLAYTON MERRITT, AND DEREK PARKER

Despite deep and vocal disagreements over health care reform, virtually everyone believes that the current system is not economically sustainable. We are spending too much and getting too little in return. This recognition has spurred health care leaders to examine every aspect of hospital operations. But what about the health care building itself, the physical environment within which patient care occurs? Too often, cost-cutting discussions have overlooked the hospital structure. Changes in the physical facility provide real opportunities for improving patient and worker safety and quality while reducing operating costs.

The “Fable hospital,” an imaginary amalgam of the best design innovations that had been implemented and measured by leading organizations, was an early attempt to analyze the economic impact of designing and building an optimal hospital facility.1 The Fable analysis, published in 2004, showed that carefully selected design innovations, though they may cost more initially, could return the incremental investment in one year by reducing operating costs and increasing revenues. Reactions to the Fable paper varied. Many felt it presented a compelling case and stimulated health care leaders and architects to think differently about balancing one-time building costs with ongoing operating costs. Others voiced skepticism about whether the benefits were as great as described and asked for more evidence.

Today, the Fable hospital is no longer imaginary. During the past six years, numerous hospitals have implemented many of its attributes and have evaluated their impact on patients, families, and staff.2 Several are members of the Center for Health Design’s Pebble Project, a group of organizations that apply evidence-based designs to improve quality and financial performance. Two Pebble hospitals are featured in essays accompanying this article. These and other pioneering organizations and their architecture/design teams are introducing such interventions as larger single-patient rooms, which reduce the incidence of health care-associated infections; wider bathroom doors, which reduce patient falls; HEPA filtration and other indoor air quality improvements, which reduce health care-associated infections; appropriate task lighting in medication dispensing areas, which reduces medication-related errors; hydraulic ceiling lifts in patient rooms and bathrooms, which reduce patient and staff lift injuries; and art and music, which reduce anxiety and depression and speed recovery.

Since 2004, much has changed that affects decision-making about health care construction and design. It is time for a fresh look at the Fable hospital. Drawing on the latest design and health care knowledge, research, the 2010 health reform law’s emphasis on value and quality improvement, and our collective experience, we present Fable hospital 2.0.

The Changing Health Care Landscape

Five major health care trends are relevant to our analysis: the growth of evidence-based design, the safety/quality revolution, pay for performance and increasing consumer transparency, sustainability and green design, and access to capital.
The growth of evidence-based design. The Center for Health Design's definition of evidence-based design is "the process of basing decisions about the built environment on credible research to achieve the best possible outcomes." That evidence is much more abundant. In 1998, a review found fewer than one hundred solid studies. A 2004 analysis found more than six hundred worthy studies. In 2008, a team found twelve hundred methodologically sound studies.

Facility design guided by credible research has become the standard for architects and designers, as witnessed by conferences focused on evidence-based design and the appearance of new publications. More than five hundred health care and design professionals have been accredited by the Center's Evidence-Based Design Accreditation and Certification program, which was launched in 2009. Although the growth of evidence-based design has provided considerable guidance, other evidence comes from management, finance, computer science, human resources, ergonomics, supply chain distribution, and conservation.

The safety/quality revolution. Two landmark Institute of Medicine reports, To Err is Human and Crossing the Quality Chasm, documented that thousands of patients were dying unnecessarily in American hospitals and presented powerful recommendations for reducing that number, sparking a widespread reexamination of care processes. In addition, the 2010 health reform law provides for developing a national quality improvement strategy. The safety/quality movement has also been stimulated by some collaborations led by the Institute for Healthcare Improvement. The 100,000 Lives Campaign and the Protecting 5 Million Lives from Harm Campaign mobilized more than four thousand hospitals to implement changes designed to reduce events that harm patients. Evidence-based design helps hospitals pursue the quality goals contained in the IOM reports. When combined with process improvements and cultural change, it can measurably enhance an organization's safety and quality goals.

Pay for performance and increasing transparency. Payers are no longer willing to pay for poor performance. They are adopting a new concept, called value-based purchasing or pay for performance, in which payment is based on performance or quality measures. Under the health reform law, Medicare is scheduled to adopt a pay for performance approach beginning in 2012. This new payment system will have a profound impact on the business case for quality improvement.

The Centers for Medicare and Medicaid Services (CMS) and the National Quality Forum have identified a list of “never events,” errors that are largely preventable and should never occur in hospitals. Medicare will no longer reimburse for the incremental costs incurred by certain preventable errors. Medicaid and commercial payers are beginning to follow suit. It seems reasonable to assume that within three years, few payers will reimburse hospitals and physicians for the costs of preventable harm. Building designs that help reduce preventable harm are becoming key elements in a hospital's survival strategy.

In this age of transparency, patients increasingly have access to hospital performance data concerning patient outcomes and service quality. Since October 1, 2008, the CMS has required hospitals to give all Medicare patients the opportunity to complete a survey (Health Care Attitude and Patient Perception Survey) about their care experience. Hospitals that are safe, pleasing, and comfortable are likely to be rated high by patients, potentially influencing hospital choice, market share, and bottom-line results. In addition to specific questions about noise and cleanliness, the survey concludes with a “willingness to recommend,” the response to which is likely to be influenced by the hospital environment.

Sustainability and green design. Environmentally sensitive design strategies are becoming standard practices in health care organizations, leading them to improve the health and safety of building users, reduce operating costs, and demonstrate corporate social responsibility. In a 2007 survey of health care leaders planning capital projects, 90 percent said they were incorporating or planning to incorporate green concepts despite the perception of higher capital costs—clearly indicating that sustainable design has become integral to this generation of health care construction. Capital cost premiums related to green design strategies differ among projects. In one survey, the incremental costs ranged from zero to 5 percent.

The benefits of sustainable design include improved indoor air quality, reduced consumption of energy and potable water, and staff satisfaction and retention. Energy efficiency is generally the first place that health care executives look for a measurable return on investment. In the 2007 survey, leaders of thirteen projects certified by LEED, a green building certification program, predicted average annual energy demand reductions of 22 percent.

A limited but growing body of evidence links indoor air quality to health status. Measures to reduce indoor pollutants include the use of paints, adhesives, and other materials that emit little or no volatile organic chemicals like formaldehyde. These measures are becoming mainstream and cost-competitive.

Access to capital. It is an overriding tenet of capital investment in building projects that demonstrating financial sustainability with economic and investment returns sufficient to pay capital providers will generate access to more capital. Health systems with successful economic models will be operating hospitals whose building and care delivery processes are designed with a focus on quality, coordinated care, patient and employee safety, and economic sustainability.

Creating Fable 2.0

Like its predecessor, the Fable 2.0 hospital is an imaginary facility located in a medium-sized American city. It is a new three-hundred-bed regional medical center built to replace a fifty-year-old institution. Fable 2.0 provides a comprehensive range of inpatient and ambulatory services. It is
located on a donated urban site, so the cost of the land is not included in the calculations.

Fable 2.0 is approximately 600,000 square feet (2,000 square feet per bed) and costs $350 million to construct. Construction costs have increased substantially since 2004. According to Turner Construction, the average cost per square foot in an average city has more than doubled, from between $170 and $185 per square foot, to approximately $450 per square foot today. While construction costs in some areas are significantly higher or lower, we chose $450 per square foot as our baseline.

Fable hospital's leadership promotes superior clinical quality, safety, patient-focused care, family friendliness, staff support, efficiency, community responsibility, and ecological sustainability. Reflecting the latter goal, Fable 2.0 decided to achieve a sustainable building that met LEED's gold-certified level using a range of construction and operational initiatives. Management engaged an experienced, interdisciplinary health care design and construction team that was philosophically aligned with the organization's culture and values. The hospital board, medical staff, and management were actively involved in discussions about evidence-based design and its impact on ongoing operating costs. The premium associated with the proposed innovations for the original Fable hospital was approximately 5 percent of total construction costs. For Fable 2.0, the premium was estimated to be 7.2 percent because of a longer list of evidence-based features, and approximately 8.4 percent when the list included design features that look promising but are not backed by research-based evidence.

As can be seen from the tables, the payback for the Fable 2.0 investment should occur within three years—longer than the one year estimated for the original Fable hospital, but still a reasonable return by any business standard. A primary factor in the longer payback period is that our financial calculations no longer include increased revenue projections. We continue to believe that design innovations will often bring important economic benefits, but there is enough variability to make average revenue estimates unreliable. We also believe that some hospitals that incorporate evidence-based design features will secure additional philanthropy. In Fable 2.0, we have been even more conservative in ascribing cost savings to evidence-based environmental design because, to be effective, design interventions must be part of a bundle of proven process improvements and cultural change.

Paralleling developments in evidence-based design is “target value design,” a lean construction project process that enables designers to reduce waste and add value. Using target value design, Sutter Health reduced costs by over 20 percent during design and construction of its Cathedral Hill Hospital in San Francisco. Target value design may help solve the problem of high initial costs.

**Evidence-Based Innovations**

We have organized recommended design innovations into two categories. The first, set out below and outlined in Table 1, are supported by research in peer-reviewed journals. The second (Table 2) includes innovations that are supported by experience but not yet deemed evidence-based.

- **Larger single rooms**. Single-patient rooms are the most effective intervention and, as recommended by the Facility Guidelines Institute, have become the standard in most newly constructed or renovated hospitals. Single-patient rooms improve clinical outcomes by reducing hospital-acquired infections, adverse drug events, and falls. They also improve patient satisfaction. Increasing room size by one hundred square feet allows family members to stay overnight with the patient, increasing their satisfaction and involvement in care.

- **Acuity-adaptable rooms**. Hendrich and colleagues were among the first to present evidence that transferring patients from one level of care acuity to another can contribute to medical errors. While including infrastructure for monitoring equipment in patient rooms increases construction costs, it decreases transfers. Reducing patient transfers avoids diagnostic and treatment service delays, reduces medication errors and patient falls, reduces staff work load, and increases patient satisfaction.

- **Larger windows**. Increasing window size can increase light and enlarge views. Natural light and nature views are calming and instrumental in patient recovery and improved outcomes. The calming effect also benefits hospital staff.

- **Larger patient bathrooms with double-door access**. Many patient falls occur between the bed and the bathroom or in the bathroom itself. Enlarging patient bathrooms and widening bathroom doors help staff or family members assist patients moving to and from the bed and the bathroom.

- **Ceiling-mounted patient lifts**. Hospital staff experience a high rate of musculoskeletal injuries caused by lifting patients.
**Tables: Calculations of Costs and Benefits**

Each design intervention was priced based on national averages as calculated by Turner Construction, a leading health care construction firm, and by our own experience. The figures are estimated averages; actual costs will vary.

<table>
<thead>
<tr>
<th>Innovations</th>
<th>Additional Construction Costs</th>
<th>Design Details and Cost Calculations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Larger Single-Patient Rooms</td>
<td>$13,500,000</td>
<td>Increase all 300 single-patient rooms by 100 sq. ft.: 100 sq. ft. x 300 beds @ $450/sq. ft.</td>
</tr>
<tr>
<td>Acuity-Adaptable Rooms</td>
<td>$202,500</td>
<td>Additional medical gases and monitor mounts to provide ICU/step-down capabilities with plug-in monitors for all 45 single-patient step-down rooms; all other rooms are conversion ready: 45 rooms @ $4,500/room</td>
</tr>
<tr>
<td>Larger Windows</td>
<td>$225,000</td>
<td>Increase typical patient room window size from 3 ft. x 5 ft. to 5 ft. x 8 ft. for all single-patient rooms: 300 rooms @ $750/room</td>
</tr>
<tr>
<td>Larger Patient Bathrooms with Double-Door Access</td>
<td>$2,880,000</td>
<td>An increase of 32 sq. ft. with a 4 ft. doorway for each of the 225 ADA-compliant private bathrooms: 225 bathrooms @ $12,800/room</td>
</tr>
<tr>
<td>Ceiling-Mounted Patient Lifts</td>
<td>$2,805,500</td>
<td>Patient lift equipment, track access to most rooms, including bathrooms, for all ICU and step-down rooms, as well as 10 general nursing unit rooms: 75 ICU/step-down rooms @ $18,100/room, 80 nursing unit rooms @ $18,100/room</td>
</tr>
<tr>
<td>Enhanced Indoor Air Quality</td>
<td>$374,400</td>
<td>Improved ventilation: HEPA filtration and increased air change rates for all air handling units serving patient care areas: 36 air handling units @ $10,400/unit</td>
</tr>
<tr>
<td>Decentralized Nursing Substations (Alcoves)</td>
<td>$135,000</td>
<td>Alcoves with direct views of patients for 270 non-ICU rooms; alcoves include charting, medications, supplies, alcohol rub dispensers, and access to computerized physician order entry; assumes substation between mirrored rooms with inboard toilets: 135 substations @ $1,000/substation</td>
</tr>
<tr>
<td>Hand-Hygiene Facilities</td>
<td>$235,875</td>
<td>Hand-washing sinks in all 300 patient rooms, automated alcohol-based hand-rub dispenser at each bedside in all 135 nursing substations: 300 sinks @ $750/sink; 435 alcohol rub dispensers @ $25/hand dispenser</td>
</tr>
<tr>
<td>Medication Area Task Lighting</td>
<td>$100,000</td>
<td>Increased lighting controls and intensity levels for all medication dispensing and staff work areas</td>
</tr>
<tr>
<td>Noise Reducing Measures</td>
<td>$600,000</td>
<td>Sound-absorbing materials, high-performance acoustical ceiling tiles, and carpet with antimicrobial properties in all patient care areas. Sound-absorbing wall materials with an extra layer of drywall, and acoustical ceilings with improved noise reduction in all 300 patient rooms</td>
</tr>
<tr>
<td>Energy Demand Reduction</td>
<td>$525,000</td>
<td>Reduce energy demand by 15% below baseline building performance: accomplished by enhanced building commissioning</td>
</tr>
<tr>
<td>Water Demand Reduction</td>
<td>$550,000</td>
<td>Reduce potable water use by 30% with high-efficiency fixtures and by using nonpotable water for irrigation: $0.50/sq. ft. x 600,000 sq. ft. = $300,000 for water-efficient fixtures; $250,000 for rain water and condensate collection and detention tank for irrigation</td>
</tr>
<tr>
<td>e-ICU Comprehensive Remote ICU Monitoring Capability</td>
<td>$1,950,000</td>
<td>e-ICU infrastructure and equipment for each of the 75 patient rooms in ICU and step-down unit: 75 rooms @ $26,000/room</td>
</tr>
</tbody>
</table>
Table 2. Costs of Experience-Based Innovations: Supported by Experience but Warranting Further Study

| Innovations                        | Additional Construction Cost | Design Details and Cost Calculations                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------------------------|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------
| Family/Social Spaces               | $1,000,000                   | Space on each nursing unit to accommodate families and enhance involvement in the healing process; includes family rooms, kitchen, dining room, communication and business rooms, and sleeping rooms                                                                                                                                                                                                                                                                                                                                                         |
| Improved “Way-Finding”             | $200,000                     | Enhanced navigation aids include landmarks, differentiated ceiling heights and lighting effects, information areas, space for volunteers, color-coded departments, distinctive doorways and openings, and open views to public spaces, atriums, and healing gardens                                                                                                                                                                                                                                                                                                                                     |
| Health Information Resource Center | $240,000                     | An area with Internet-accessible health information: 800 sq. ft. @ $300/sq. ft.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Respite Areas                      | $200,000                     | Private reflection spaces for family and staff (separate) located on each nursing unit: eight 100 sq. ft. areas @ $250/sq. ft.                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Staff Gym                          | $500,000                     | A gym with exercise equipment, changing rooms, toilets, and showers: 1,500 sq. ft. @ $300/sq. ft.; $50,000 for equipment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Decentralized Nursing Logistics    | $600,000                     | Additional space on each nursing unit for medication, nutrition, linens, supplies, communications, consultation, and other nursing services: eight 250 sq. ft. spaces @ $300/sq. ft.                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Environmentally Responsible Materials | $300,000                   | Local, regional, and recycled materials with little or no toxic content; “green” cleaning maintenance protocols $0.5/sq. ft. x 600,000/sq. ft.                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Total                              | $3,040,000                   | Construction Cost Premium for Experience-Based Innovations                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| % Premium of Construction Cost     | 0.87%                        | $3,040,000 or 0.87% of $350,000,000 construction cost                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| TOTAL Construction Cost Premium (Evidence-Based and Experience-Based Innovations) | $29,246,275                | $29,246,275 (8.36% of $350,000,000)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
in and out of bed or a bathroom. Patient lifts are relatively new and are connected to the ceiling over the bed and extend into the bathroom. Using ceiling lifts reduces staff back injuries, staff sick time, and hospital costs.21

**Enhanced indoor air quality.** HEPA filtration is 99.97 percent effective in removing harmful particulates to reduce health care-associated infections. Infections can be reduced further if outside air is exhausted after a single use, rather than recirculated, as is standard in American hospitals today. In Fable 2.0, all of the air is exhausted after a single use.22

**Decentralized nursing substations.** Traditionally, hospitals were designed with one centralized nurse station per floor, but Fable 2.0 has decentralized stations, allowing nurses to see into the patients’ rooms and respond to problems more quickly. Decentralized stations help reduce patient falls and allow nurses to spend more time in direct patient care.23

**Hand-hygiene facilities.** Hand hygiene is the most important measure for preventing the spread of pathogens. Convenient access to sinks in all patient rooms and other points of care helps increase hand-washing compliance.24

**Medication task area lighting.** Medication dispensing errors are reduced when lighting is improved because clinicians can read medication labels and prescriptions more accurately. Considerable research has shown that performance and errors are affected by lighting levels.25

**Noise-reducing measures.** Noise is a common problem for patients and staff, causing patients sleep deprivation, slower recovery, and increased stress. Fable 2.0 uses multiple strategies to quiet the building, including high-performance, sound-absorbing acoustical ceiling tiles, carpeting where possible, sound-absorbing finished, noise and vibration-isolated mechanical rooms, wireless pagers, space for private discussion, reduced alarm sounds, and single-patient rooms.26

**Energy demand reduction.** Reducing fossil fuel use saves operating dollars, cuts carbon emissions, and lowers airborne emissions linked to community health problems (such as asthma). Energy demand is reduced through a high-efficiency building envelope and glazing, high-efficiency mechanical equipment, and heat recovery systems.27

**Water demand reduction.** As large water consumers, hospitals save money by implementing measures like low-flow fixtures, rainwater capture, and high-efficiency food service equipment. Water conservation measures do not include replacing hand-washing sinks with alcohol-gel alternatives, as water is often necessary to remove dirt from hands.28

**Electronic intensive care unit.** The e-ICU system is a remote, high-tech surveillance system, providing electronic, real-time connections to hospital ICUs. Using this system, which includes vital sign indicators and visual monitoring capabilities, physicians monitor the condition of multiple patients and communicate efficiently with staff, patients, and family. The use of e-ICU has reduced mortality rates, shortened the average ICU stay, and reduced costs.29

**Healing art.** Certain types of artwork in public and patient care areas can improve patient health outcomes. Art that depicts calming views of nature can reduce anxiety and depression and speed recovery.30

**Positive distraction measures.** Distraction can play an integral role in the patient healing process. In addition to art, calming music in patients’ rooms and procedure areas can speed recovery and decrease patients’ pain, length of stay, stress, and depression.31

**Healing gardens.** Well-designed indoor and outdoor gardens reduce stress and improve outcomes by providing positive distraction and restorative nature contact for patients, families, and staff.32

**Experience-Based Innovations**

While the following design innovations lack published research evidence, they have produced positive results in practice. We recommend that health care organizations consider them, and we have included them in our overall cost calculations.

**Family/social spaces.** Family support and involvement in patient care can enhance clinical outcomes and increase satisfaction with the hospital experience. Hospitals can foster these benefits by incorporating family gathering spaces, such as dining and kitchen spaces, business centers, and sleeping rooms.

**Improved “way-finding.”** How easily patients and families can find their way into and around a hospital can exacerbate or reduce stress and anxiety. Visitor-friendly signage reduces confusion and staff time in giving directions.

**Health information resource center.** Readily available health information improves patient self-care in the hospital and following discharge. A library provides reliable information and can foster more productive communication.

**Respite areas.** Quiet spaces for reflecting and meditation help caregivers, patients, and families relax and contribute to improved satisfaction.

**Staff gym.** Exercise is an important source of relief and rejuvenation for people who work in demanding and stressful settings. Easily accessible exercise facilities can increase staff recruitment and retention and improve staff health.

**Decentralized nursing logistics.** Areas in or close to patient rooms for storing frequently used supplies and equipment and for having consultations can increase nursing productivity and time devoted to patient care.

**Environmentally responsible materials.** Careful selection of building materials can benefit both building occupants and the local community. Avoiding materials that emit toxic chemicals can improve indoor air quality and reduce public health impacts. Selecting local materials can also benefit the local and regional economy.

**The Economic Benefits of Fable 2.0**

Central to the Fable hospital concept is the importance of analyzing and estimating the impact of evidence-based design interventions on outcomes and operating costs. At-
tempting to analyze the incremental costs and benefits of design improvements is a daunting task. Similar to the health care quality improvement field, available evidence is regarded as inadequate by some in part because it often cannot be collected in a randomized controlled trial. Also, the “average” hospital baseline keeps evolving, leading to questions about what design elements are considered “standard practice” and what innovations constitute “added costs” and require evidence. Most importantly, successful, specific environmental design improvements are usually part of a bundle of integrated facility and process improvements. Trying to isolate the effect of any one element is difficult and requires careful judgment.

We have analyzed ten design innovations that we believe are evidence-based and cost-effective. Using examples from the best available data and our own judgments, we reached conclusions about what portion of an improvement should be credited to design innovations. We have been conservative in our estimates. These calculations are based on specific examples and average costs. Leaders of individual projects will need to tailor their own estimates and analyses to their specific experiences. Details are shown in Table 3.

1. Fewer patient falls. Fable hospital reduced patient falls significantly. We attributed 30 percent of the reduction to variable acuity rooms, larger patient bathrooms with double doors, decentralized nursing stations, family space in each patient room, and electronic ICU capability.

2. Fewer patient transfers. Designing acuity-adaptable patient rooms by installing additional monitoring and other equipment enabled Fable to significantly reduce patient transfers, resulting in fewer errors, improved patient and family satisfaction levels, and reduced costs. In Fable 2.0, we were considerably more conservative than in the original Fable and assumed variable acuity rooms in the ICU step-down area only. We attributed 60 percent of the reduction to design improvements.

3. Reduced adverse drug events. As a result of larger private rooms, acuity-adaptable rooms, lower noise levels, and better task lighting, Fable measurably reduced adverse drug reactions that harm patients. We attributed 20 percent of the reduction to design improvements.

4. Fewer health care-acquired infections. As a result of larger single rooms, acuity-adaptable rooms, improved air filtration systems, and widely available hand-hygiene dispensers, Fable reduced health care-acquired infections. We attributed 20 percent of the reduction to design improvements.

5. Reduced length of stay. Using a combination of larger windows, calming views of nature and art, and positive distractions such as music, Fable reduced the need for anxiety and pain medication and overall length of stay. We attributed 10 percent of the reduction to design improvements. Many of the other design recommendations mentioned above also contribute to quicker recovery and shorter length of stay.

6. Reduced nursing turnover. An improved work environment—including such features as increased natural light, lower noise levels, patient ceiling lifts, improved location of supplies and medications, staff wellness and respite areas, and enhanced family involvement in care—helped reduce nursing turnover in Fable. We attributed 50 percent of the reduction to design improvements.

7. Fewer staff injuries. As a result of ceiling lifts in patient rooms and bathrooms, larger private rooms, larger bathrooms with double-door access, and staff exercise facilities, Fable reduced staff injuries. We attributed 50 percent of the reduction to design improvements.

8. Lower mortality and shorter length of stay in intensive care. Electronic ICU capability helped reduce Fable patient mortality and length of stay. We attributed a 40 percent reduction in cost per patient day to design improvements.

9. Reduced energy use. With high-efficiency building construction, high-efficiency equipment selections, and zoning of mechanical systems to operations, Fable measurably reduced energy use. We attributed an 18 percent reduction in energy cost per square foot to design improvements.

10. Reduced demand for water. Water conservation measures markedly reduced Fable’s water consumption. We attributed a 30 percent reduction in potable water consumption to design improvements.

Crossing the Cost/Quality Chasm

The business case for building better facilities is even stronger today than in 2004 when the original Fable hospital was described. The costs of infections, falls, and errors are greater; the number of proven effective design interventions is larger; the willingness of payers to reimburse hospitals for harm they cause is ending; and the expectations of consumers are greater in an environment of increased transparency and
Table 3. Improved Outcomes and Cost Savings

We calculated the following savings based on published information. We used our best judgment to attribute a portion of the savings to evidence-based design improvements and attempted to be conservative.

<table>
<thead>
<tr>
<th>Improved Outcomes</th>
<th>Savings or Increased Revenue</th>
<th>Calculations</th>
<th>Design Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient Falls</td>
<td>$1,534,166</td>
<td>300 beds @ 80% occupancy = 240 beds or 87,600 patient days; three falls per 1,000 patient days = 263 falls/year; $17,500/fall = $4,602,500 spent on falls/year. Incidence of falls ranges from 2.3 to 7/1,000 patient days. Average cost of patient falls in hospitals is $17,500.¹ Pebble Partner Clarion Methodist Hospital reduced falls by 80%.² Design features help reduce falls by one-third.</td>
<td>Acuity-adaptable rooms, larger patient bathrooms with double-door access, patient lifts, decentralized nursing substations, family/social spaces</td>
</tr>
<tr>
<td>Patient Transfers</td>
<td>$877,500</td>
<td>25% of 19,500 patient stays are in the ICU/step-down unit. Assuming one transfer per patient stay, 4,875 transfers x $300/transfer = $1,462,500 for transfers each year. Average direct cost of one patient room transfer is $300.³ Pebble Partner Clarion Methodist Hospital reduced transfers by 90% in its redesigned cardiac care unit.⁴ Design features help reduce transfers in ICU/step-down units by 60% (assumes no reduction in transfers in medical or surgical units).</td>
<td>Acuity-adaptable rooms</td>
</tr>
<tr>
<td>Adverse Drug</td>
<td>$617,400</td>
<td>0.9 adverse drug events/100 patient days x 87,600 patient days per year = 788 events/year; assuming 56% are preventable, 441 preventable events x $7,000/event = $3,087,000 spent on preventable adverse drug events/year.⁵ One study showed that medication-dispensing errors were reduced by one-third with higher work surface lighting levels.⁶ Clarion Methodist showed a reduction in medication errors of 70%.</td>
<td>Larger private patient rooms, acuity-adaptable rooms, medication task area lighting, noise-reduction measures, e-ICU</td>
</tr>
<tr>
<td>Health Care-</td>
<td>$355,400</td>
<td>Two health care-associated infections (HAIs)/1,000 patient stays x 19,500 patient stays/year = 39 HAIs/year; average incremental cost/HAI patient = $43,000; 39 x $43,000 = $1,677,000.⁷ Design features help reduce health care-associated infections by 20%.</td>
<td>Larger single-patient rooms, hand-hygiene facilities, HEPA filtration, improved indoor air quality⁸</td>
</tr>
<tr>
<td>Associated</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infections</td>
<td></td>
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<td></td>
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<tr>
<td>Length of Stay</td>
<td>$1,092,975</td>
<td>87,600 patient days/4.5 days average length of stay = 19,500 patient stays. One study showed a reduced length of stay of one day/stay as a result of increased access to sunlight.⁹ Being conservative, we used a half-day reduction: 0.5-day reduction/stay x $1,121/day¹⁰ = $10,929,750. Design features contribute to length-of-stay reduction by 10%.</td>
<td>Larger windows, increased natural light, noise-reducing measures, healing art, healing gardens</td>
</tr>
<tr>
<td>Nursing Turnover</td>
<td>$478,500</td>
<td>At 5.45 staff/occupied bed, Fable has 1,310 full-time employees, 395 of whom are nurses; attrition of 14%, or 55 nurses/year x $60,000 recruiting and training per nurse = $3,300,000 in nursing turnover costs per year. Bronson Methodist Hospital reduced nursing turnover from 14% (national average) to 10%, a decrease of 29%. Fable reduced nursing turnover by 29%, or $957,000.¹¹ Design features help reduce turnover costs by 50%.</td>
<td>Larger windows, noise-reduction measures, healing art, healing gardens, staff respite areas, and single-patient rooms</td>
</tr>
</tbody>
</table>
Nurse Injuries Reduced

$2,132,000

821,600 nurse hours/year x 20 patient handling injuries per 100,000 hours worked = 164 nurses injured/year, calculated at $26,000/injury, or $4,264,000 in patient handling staff injury costs/year. Larger patient bathrooms with double-door access, patient lifts.

Design features help reduce patient handling injuries by 50%.

e-ICU Savings

$2,239,056

Cost-savings of $2,556/patient x 2190 patients (in 75 ICU rooms) in Fable = $5,597,640.

The e-ICU model, dependent on design features, helped reduce ICU patient costs by 40%.

Energy Demand Reduced

$653,400

Average U.S. hospital energy cost per year: $6.05/sq. ft., or $3,630,000. Dell Children’s Medical Center of Central Texas reduced source energy demand by 45%. The average hospital achieving LEED certification can expect approximately 18% reduction in energy demand.

Energy use reduction of 18%.

Water Demand Reduced

$51,765

Average U.S. hospital water consumption: 300 gallons/bed/day, or 32.8 million gallons/yr.; average cost of water is $2,720 per million gallons (not including sewer, heating, or other treatment). Low-flow fixtures, rainwater capture, high-efficiency food service equipment

Water demand reduction of 30%, or 9.84 million gallons; $26,765 per year plus $13,000 reduced sewer charges and $12,000 for lower treatment/heating surcharges.

Total Annual Savings

$10,032,162

$29,246,275 total premium costs/$10,032,162 annual savings = a return on investment within three years.

ease of comparing outcomes and experiences. In describing Fable 2.0, we were conservative in ascribing economic benefits to evidence-based design improvements. Despite this, Fable 2.0 provides a return on the incremental costs of design within three years. Health care leaders, architects, designers, and researchers have a growing body of evidence about how to build better hospitals. Existing health care facilities can also undertake high-impact innovations that improve care.34

The cost/benefit estimates contained in Fable 2.0 will vary according to the type of patient population and the region of the country. Our objective has been to broaden the conversation from one focused exclusively on capital costs to one that includes balancing capital costs and operating savings. We hope that health care and design leaders will strengthen their commitment to building better caring environments. Health care is one of the most personal and consequential services that people use. We should use our best available research and experience to build health care facilities that serve patients and staff better and cost less to operate.

Acknowledgments

We appreciate the assistance of the team at The Center for Health Design in the preparation of this article.

BY CHERYL HERBERT

Case Study:
Dublin Methodist Hospital

Several years ago, we built a new hospital from the ground up in Dublin, Ohio, for the OhioHealth system, and we found ourselves presented with an opportunity to try to put the Fable hospital concept into practice. This planned ninety-four-bed community hospital was intended to serve the growing northwest quadrant of Franklin County, along with areas to the west and northwest. With tertiary facilities already a part of the OhioHealth system, Dublin Methodist was intended to provide primary and secondary care. Our goal was to be as innovative as we could afford to be, to challenge the status quo at every turn. Our stated purpose was to “redefine the way patient care is provided” through the development of a less-stressful healing environment, with an emphasis on patient safety and the patient/family experience. In addition, we promised the community a high level of customer service and elected to incorporate a fully electronic medical record management system in the new facility. The senior leadership and the board of directors of OhioHealth fully supported these efforts.

When planning began in 2004, it was apparent that evidence-based design could help to achieve many of our goals. We became aware of evidence-based design from Rosalyn Cama, a consultant on our architectural team who supported its use and employed its principles. The Fable hospital article provided guidance as we began our design journey.

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First and foremost, we chose single-bed rooms, although they were not required by the American Institute of Architects until 2006. The evidence for this decision was strong:

Nursing Quarterly (2006); Hendrich, Fay, and Sorrells, “Effects of Acuity-Adaptable Rooms on Flow of Patients and Delivery of Care.”


34. Sadler et al., Using Evidence-Based Environmental Design to Enhance Safety and Quality.

While single rooms create additional square footage and more expense during construction, building them was clearly the right thing to do. Private rooms supported our commitment to patient safety, as they have been shown to reduce infections, medication errors, and falls. Noise levels are lower, communication is enhanced, and social support is easier to provide in rooms with only one patient. All of these benefits contributed to both the healing environment and the level of customer service we wished to ensure. Private rooms with doors were also built into the emergency department, as well as the pre- and postoperative treatment area. At no time in their journey through our building do patients share a room.

Because of the positive effects of natural light, such as its contribution to a better mental outlook, we also chose to incorporate windows wherever we could, resulting in access to daylight in approximately 90 percent of the occupied spaces in the building. There are windows in all inpatient rooms and most emergency department rooms, in addition to the corridors surrounding our surgery suites, many offices and administrative spaces, and all public areas. Four open-air courtyards enhance the access to natural light and allow people to step outside.

The nature theme is consistent, with live trees, plants, and a three-and-a-half-story waterfall in the main atrium. Trees also serve to bring nature to the emergency department walk-in patient lobby, and enlarged photographs of natural scenes are scattered throughout the building, serving as both stress reducers and way-finding clues. Natural materials were used whenever possible, and the colors of flooring and walls were chosen for both their timelessness and their representation of the outside environment. Since there are few ninety-degree angles in nature, many of our walls and soffits are curved to soften the appearance of corridors and corners.

Noise is a stressor and a distraction that we aimed to minimize in this facility. Measures taken to reduce sound levels include acoustic ceiling tiles throughout the building, carpet tiles in the hallways of inpatient units, ceilings of various heights, patient beds in pavilions out of mainstream traffic patterns, and the use of a hands-free, wireless communication device. This device is worn by all employees and has eliminated the use of overhead paging except in cases of public emergency (a tornado watch, for example).

We built sixty acuity-adaptable rooms because they would allow us to leave patients in place regardless of how sick they are during their stay. We made this decision because evidence showed that each time a patient is transferred and handed off to a new team of caregivers, the possibility of medical error increases, patient and family stress increases, and patient belongings are often misplaced, to say nothing of the time and energy required from staff. With acuity-adaptable rooms, as a patient’s condition changes, staff and technology can be moved in and out of the room.

We took a leap of faith when we decided to standardize the layout of as many spaces as possible. The evidence in this area was not as strong as in others. Standardization has proven to dramatically increase safety in other industries, so we surmised that it would help reduce errors in medicine. Particularly during an emergency, staff does not have to take time to remember where to find something, as everything is located in the same place in each room. Standardization was applied to inpatient, emergency department, x-ray, and labor and delivery rooms, as well as surgical suites and pre- and postoperative rooms. Our inpatient rooms have the bathroom on the headwall to keep patients from having to cross the room with no support.

Three years later, the results are good. If we had it to do over, we would locate a couple of things differently—for example, we would move the sterile processing area closer to the surgery department and make the outpatient areas about 50 percent larger to accommodate an unexpected increase in the number of outpatients. But by and large, the effort has lived up to our expectations. From opening day in January 2008, patient satisfaction, as measured by a national survey instrument, has been outstanding. The responses show that we achieved our goals in relation to “noise level in and around my room,” which consistently ranks in the ninety-ninth percentile for satisfaction, as well as in accommodations for family and visitors and other aspects of satisfaction with the room in which they stay. Patients are also asked whether they thought their care was provided in a safe manner and whether staff routinely washed their hands. These results have also ranked consistently in the ninetieth percentile and above.

Health care-acquired infections have occurred at a comparatively low rate, as have patient falls with injury. We do not yet know how much the standardized layout improved patient safety. Comparisons with similar hospitals are hard to make because that information isn’t publicly available, but our infection rate is about 0.5 per one thousand patient days, lower than those documented by the National Nosocomial Infections Surveillance System. Our electronic medical records and an electronic system for ordering and distributing medication, which double-checks for accuracy, have almost eliminated serious medication errors.

Although volumes were a bit slow when we opened, Dublin Methodist has exceeded volume and financial expectations since December 2008 and continues to grow at a steady pace. We calculate that the evidence-based design elements we incorporated were 2.5 percent of the total project cost of $150 million. Our results tell us it was worth it.
Ten years ago, PeaceHealth, a Catholic health care system comprised of seven hospitals and multiple physician clinics serving Washington, Oregon, and Alaska, embarked on a journey to replace its flagship hospital. Sacred Heart Medical Center, in Eugene, Oregon, was a 432-bed tertiary care facility serving much of western Oregon. Following the development of a new 386-bed facility in Springfield, Oregon, known as Sacred Heart Medical Center at RiverBend, it is now a two-campus hospital with a total of 490 beds. It is the largest medical center between Portland, Oregon, and Sacramento, California.

Our pivotal decision was to engage two architectural firms—one with resort and hospitality experience, and the other, Anshen and Allen, with more than two-thirds of its focus on evidence-based hospital design. A lead Anshen and Allen partner suggested that we join the Pebble Group. We agreed that ours would be an ideal project to contribute to the body of evidence regarding hospital design. While we knew little about this science, we did know that we had one of the most beautiful sites in the country—185 acres on the McKenzie River, known for its spectacular fly fishing. Careful orientation of the new hospital could give virtually all patient rooms a view of the McKenzie River, the nearby Coburg Hills, or the Oregon Coast range.

During the planning process we made a commitment to create a “healing environment,” which we defined as maximizing the advantages of the pastoral site along the McKenzie River. As time progressed, we discovered that this also meant the use of evidence-based design features, including comfortable family space and carefully designed single patient rooms. A few community members were skeptical that this was anything more than a justification for building an expensive “Hospital Hilton.” The evidence gleaned from our work with the Pebble Group and the overwhelmingly positive response to the early design concepts by the patient review teams converted the skeptics to strong supporters. Roger Ulrich, Texas A&M professor and author of research on evidence-based hospital design, held design sessions with project leaders. Four key elements emerged from Ulrich’s research as the most important:

- Views from patient rooms reduced stress and length of stay by approximately 10 percent.
- Single-patient rooms helped increase communication between caregivers, patients, and families by 50 percent or more.
- Single-patient rooms helped reduce infection rates by up to 25 percent.
- The use of soothing, impressionistic art, muted, warm color, and natural and indirect light had a significant impact in putting patients and families at ease.

Another important influence was a finding from our own research on the benefits of patient lifts. Based on the increasing weight of patients and aging of the nursing workforce, one of our nursing leaders was convinced that the cost of installing lifts—which were rare in U.S. hospitals until recently—would be offset by a reduction in staff injuries. With the average age of our nursing staff pushing fifty, this proposition seemed plausible. To test this hypothesis, we installed lifts in the old hospital in 2003: one of our intensive care units was equipped with lifts, the other was not. Our sixty-month study, published in *Health Care Design* in 2006, showed an 83 percent reduction in annual work injury costs due to patient lifting. Within the two nursing units in the study, annual staff injuries declined to two from twenty-five, with an associated cost savings of $305,000 during the two-year study period. The lifts actually paid for themselves in fifteen months.

We concluded that every patient room in the new facility must be outfitted with patient lifts. In addition, there must be only single-patient rooms, and art, color, and finish materials must be carefully selected. The comfort and warmth of the facility would belie the sophisticated technology behind the walls. There were risks in designing a patient room that would be replicated hundreds of times. We learned from studying Marriott hotel designers that they build room mock-ups for every hotel and seek customer and staff input prior to construction. The conceptual design often would be changed many times before the room was approved.

We decided to build three mock-up rooms in a warehouse—a patient room, a neonatal intensive care room, and a...
surgical suite. Staff and former hospital patients were invited to provide feedback on the design. More than one hundred substantive suggestions were made. Two of the new rooms—one medical/surgical room and one ICU room—were built in the old hospital so that staff and patients could actually use the rooms for at least three years prior to construction. More than two hundred additional refinements were made to the patient room.

One of the most noteworthy design changes was to place all nonnarcotic medications inside the patient room to significantly reduce staff walking time and medication errors, a change that required prolonged negotiations with regulators. We also installed a system using pneumatic tubes to deliver medications to patient care units, which reduced delivery time by half. Another significant design change was to create a bathroom “barn door” on a sliding track that increased the usable space in the 240-square-foot room, allowing virtually all 386 patient rooms in the RiverBend hospital to have bathrooms that complied with the Americans with Disabilities Act. Surgical suites were designed to a 650-square-foot standard. We theorized that a standard design would reduce errors and facilitate use of any surgical room for specific specialties, except for open heart procedures. A common surgical information technology support system further improved capability by allowing images and data to be moved easily within the surgical environment.

Construction began in the fall of 2005, and the new hospital opened in August 2008. It won the 2009 Vista Award of the American Society for Healthcare Engineering for best hospital project. While the results are still preliminary, trends are emerging that confirm some of the early data from the evidence-based design research.

• Length of stay has decreased from 4.18 to 3.82 days, even though our patient population has become sicker. While we haven’t studied the reason, anecdotal evidence suggests that a reduction in stress (because of families’ increased involvement, single-patient rooms, and calming views) played a role.

• The cost per adjusted discharge has been reduced by $790 per admission (from $14,559 to $13,769), or 5.4 percent. Evidence-based design contributed significantly by reducing circulation time for nursing staff, pharmacy distribution expenses, and surgery-related costs.

• Patient satisfaction has risen to 86 percent, in the top fifteenth percentile nationally and well above the national average of 66 percent. It is also the highest of any acute-care facility within PeaceHealth. Patient comments suggest significant improvement in communication with nurses and physicians. This deserves more study.

• Prior to operating in the new facility only 23 percent of the operating room turnover times were less than twenty minutes. Today more than 36 percent are less than that, improving surgeon satisfaction.

Several areas require further attention. Hospital caregivers need more social spaces that are easily accessible during work activities. Anecdotes suggest that we have succeeded in creating more time with patients, but that staff spend less time with one another. For some, this leads to feelings of isolation from colleagues. Even though injuries due to patient lifting continue to be at minimal levels due to patient lifts, other caregiver injuries have increased. The increased distances that housekeeping staff must navigate due to the larger square footage of the hospital appear to contribute to this troubling outcome. While the trends are promising, we have not been able to confirm any statistically significant change in infection rates, in part because our patients are sicker upon admission.

The ultimate test of any hospital is the experience of patients and families. Shortly after the hospital opened, I experienced the death of a close friend whose last days were spent at the new hospital. The old hospital had mostly 250-square-foot double patient rooms, leaving little opportunity for privacy or space for gathering. In contrast, the 240-square-foot single-patient room in the new hospital became a gathering place for friends and family. It created a sanctuary for conversation, tears, stories, and sacred moments. It was gratifying to know that all the analysis and thoughtful design resulted in a place where families and patients could experience a culture of healing, whether at the beginning or end of life.
Architecture, like ethics, concerns actual rather than ideal choices. William James's remarks on ethics, at a meeting of the Yale Philosophical Club in 1890, could apply equally well to the built environment:

The actual possible in this world is vastly narrower than all that is demanded; and there is always a pinch between the ideal and the actual which can only be got through by leaving part of the ideal behind. There is hardly a good which we can imagine except as competing for the possession of the same bit of space and time with some other imagined good.1

Health care facilities are spaces in which certain imagined goods—the care of the sick, the treatment or prevention of disease—meet the actual possible of resource allocation. They are complex institutions, socially and with respect to their physical features: health care design is a highly specialized area of architecture. Hospitals are one type of health care facility in which ethical goals, such as error prevention and better coordination of care, can be supported by the built environment through the development and application of evidence-based design. Architecture and design also support ethical goals in other types of health care facilities, including the nonprofit, federally funded community health centers known as federally qualified health centers (FQHCs), which are organized around the ethical goal of improving access to primary care for medically underserved populations.

There are more than 1,100 FQHCs nationwide. In 2009, 18.8 million patients received primary medical care, dental care, and behavioral health services at them. The centers serve as a safety net for the uninsured, as well as for people insured by Medicaid and the State Children's Health Insurance Program, migrant workers, public housing residents, and the homeless. However, FQHCs accept patients regardless of payer or income, and from June 2008 to June 2009, the number of visits to FQHCs grew by 14 percent due to the economic downturn.2 At a time of record long-term unemployment and the loss of employment-related health insurance, FQHCs are serving as a safety net for a new population.

FQHCs are undergoing their largest capital expansion since 2002 as the result of $2 billion in economic stimulus funding and an additional $11 billion from the Patient Protection and Affordable Care Act. The expansion includes construction projects and supports collaborations between FQHCs and hospitals to recruit and train primary care physicians to work in community settings. Analysts predict that FQHCs will fill gaps in health reform by serving patients who cannot afford to buy insurance or cannot obtain it even on the health insurance exchanges (as is the case for undocumented patients) and because they are already established in rural areas where primary care options are limited.

FQHCs offer opportunities to explore the role of architecture, planning, and design in efforts to realize complex and competing ethical goals ranging from equality to safety, effectiveness, and efficiency. Health centers, like hospitals, are accountable for promoting patient safety through the built environment. Their designers draw on evidence concerning how to facilitate hygiene, use task lighting, or use signage to (for example) reduce the risk of nosocomial infection or medication error and help patients and families navigate a facility.

FQHCs have special design challenges related to their mandates. Because FQHCs are centers for health education, their design must include dedicated spaces for education and outreach. Because they aim to coordinate a patient's health needs, architects must accommodate services, such as dental care, that draw patients to a center and provide access to other services. FQHC architects, like hospital architects, follow multiple sets of stringent guidelines and standards, ever mindful of their client's mandate to be genuinely community-centered and to be responsive to the health needs and cultural preferences of specific populations. An FQHC's interiors may incorporate cultural motifs or artwork representing a population they serve. They aim to be welcoming places. “Institutional” colors are often avoided in favor of a warmer palette. A waiting room wall in one center is decorated with child-size handprints (made by the seven-year-old daughter of the designer) at a child’s own level, adding visual interest for patients and their siblings while communicating, without the need for signage, that this is a space for children.

The location of an FQHC is selected with reference to census data and available medical services, so that service sites are

close to where underserved populations live. That constraint in and of itself presents a huge challenge, but it can also spur innovation. Zufall Health Center, an FQHC in northwestern New Jersey, sought to improve access to medical services for migrant workers and seasonal workers in agricultural areas of several counties. Establishing multiple permanent facilities was not feasible because agricultural workers often lack transportation, and the size and location of the population shifts according to the harvest. A mobile health van was designed to bring health care to these patients.

To lessen the van’s environmental impact, the center decided to make the van “green.” The Highlands Health Van, with two exam rooms, began serving patients in 2009 and is expected to serve five thousand patients, making over seven thousand visits, annually. The van uses sustainable materials that have low emissions of volatile organic compounds (VOCs), operates on biodiesel, and includes a solar array and gray-water recycling.

Green design is of interest to leaders and designers of other FQHCs because of the broad interest it has gained within architecture, and because of the values-based affinity between the health of specific places and the health of their populations. La Maestra Community Health Center, an FQHC in San Diego, completed construction on the nation’s first green community health center in 2010. This FQHC had outgrown its original facility—a collection of fourteen structures built as single-family homes—and sought to build a new facility that incorporated the environmental dimensions of population health with respect to energy efficiency, materials, and the education of building users. The three-story building consolidates services and includes green features such as full-height, exterior-glazed windows, aluminum sunshades, a solar array, water-conserving plumbing, energy-efficient mechanical systems, and materials that are sustainably sourced, recycled, recyclable, and low-or-no VOC.

La Maestra’s facility is one of a growing number of buildings to receive Leadership in Energy and Environmental Design (LEED) certification from the U.S. Green Building Council. Establishing and reinforcing standards within professions—through certification and accreditation and through other measures such as practice guidelines—is part of the “professionalization” of any profession: the claiming and recognition of special knowledge or skills necessary to achieve certain outcomes. Within architecture, green building is an emerging specialty, even as architects continue to debate what “green,” “sustainable,” or “energy-efficient” means to the overall environmental impact of a given building. As environmental goals can be achieved without formal certification—by installing energy-efficient heating and cooling systems, for example—clients considering LEED certification must consider a project’s potential to recover upfront investment costs of green design choices. These resource allocation considerations may be particularly relevant to FQHCs, due to economies of scale: even a small increase to a design and construction budget to achieve sustainability goals must be weighed against the other needs that could be fulfilled with those funds to address the fundamental goal of access.

The Americans with Disabilities Act offers a historical example of the role of design, and of public investment in design, in efforts to reduce health-related social disparities. Largely through architectural and other environmental interventions, the ADA has improved access for the more than fifty-four million disabled residents of the United States, and others as well: parents pushing strollers use the ramps and curb cuts designed for wheelchairs. Ramps—a physical representation of “access”—are now mainstream. FQHCs serve one out of every eighteen U.S. residents. With health care reform and the search for medical homes for all Americans, will FQHCs—another physical representation of “access”—move into the mainstream, too? And can good design shape our common understanding of what good primary care looks like and how it reflects both place and population? Recalling James’s caution that our imagined goods are always fighting over the space and the time we allot them, we should expect that the ethics of access, and our continuing national debate over promoting health as a social good, will involve those who shape our spaces and show us how to use them well.

Acknowledgments

Julia Boltin, whose interior design work for Zufall Health Center is described in this essay, died on November 18, 2010, as this essay was going to press. In recognition of her longstanding commitment to health care for low-income women and children, a unit in Zufall’s facility will be named in her honor.

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On the cover: California’s Gold by Vicki Asp, acrylic on canvas, triptych: 48” x 36”, 48” x 48”, 48” x 36”.
Courtesy of Smith Gallery, Sacramento, CA, www.smithgallery.com. This piece is on display at the Loma Linda University Medical Center.