

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 I. Costs of Evidence-Based Design Innovations

<i>Innovations</i>	<i>Additional Construction Costs</i>	<i>Design Details and Cost Calculations</i>
Larger Single-Patient Rooms	\$13,500,000	Increase all 300 single-patient rooms by 100 sq. ft.: 100 sq. ft. x 300 beds @ \$450/sq. ft.
Acuity-Adaptable Rooms	\$202,500	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
Larger Windows	\$225,000	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
Larger Patient Bathrooms with Double-Door Access	\$2,880,000	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
Ceiling-Mounted Patient Lifts	\$2,805,500	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
Enhanced Indoor Air Quality	\$374,400	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
Decentralized Nursing Substations (Alcoves)	\$135,000	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
Hand-Hygiene Facilities	\$235,875	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
Medication Area Task Lighting	\$100,000	Increased lighting controls and intensity levels for all medication dispensing and staff work areas
Noise Reducing Measures	\$600,000	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
Energy Demand Reduction	\$525,000	Reduce energy demand by 15% below baseline building performance: ¹ accomplished by enhanced building commissioning
Water Demand Reduction	\$550,000	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
e-ICU Comprehensive Remote ICU Monitoring Capability	\$1,950,000	e-ICU infrastructure and equipment for each of the 75 patient rooms in ICU and step-down unit: 75 rooms @ \$26,000/room

Healing Art	\$640,000	Allowance beyond typical art budget to provide healing art for public and patient care areas; Fable hospital also rotates loaned artwork from local artists and solicits donated art: \$500,000 increase in artwork budget, \$140,000 for lighting enhancements
Positive Distraction Measures	\$483,000	Additional allowance for music and other distraction measures in procedure areas and patient rooms: 345 rooms and procedure areas @\$1,400/room
Healing Gardens	\$1,000,000	Atrium, indoor plantings, fountains, outdoor gardens including meditation and strolling gardens, outdoor dining and meeting areas, playground, and pond
Total	\$26,206,275	Construction Cost Premium for Evidence-Based Innovations
Percent Premium of Construction Cost	7.20%	\$26,206,275 or 7.20% of \$350,000,000 construction cost

1. Relative to American Society for Heating, Refrigerating and Air Conditioning Engineers standard 90.1-2007.

Table 2. Costs of Experience-Based Innovations: Supported by Experience but Warranting Further Study

<i>Innovations</i>	<i>Additional Construction Cost</i>	<i>Design Details and Cost Calculations</i>
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)

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.

Improved Outcomes	Savings or Increased Revenue	Calculations	Design Details
Patient Falls Reduced	\$1,534,166	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.	Acuity-adaptable rooms, larger patient bathrooms with double-door access, patient lifts, decentralized nursing substations, family/social spaces
Patient Transfers Reduced	\$877,500	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).	Acuity-adaptable rooms
Adverse Drug Events Reduced	\$617,400	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%. Design features help reduce adverse drug events by 20%.	Larger private patient rooms, acuity-adaptable rooms, medication task area lighting, noise-reduction measures, e-ICU
Health Care-Associated Infections Reduced	\$355,400	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%.	Larger single-patient rooms, hand-hygiene facilities, HEPA filtration, improved indoor air quality ⁸
Length of Stay Reduced	\$1,092,975	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/day ¹⁰ = \$10,929,750. Design features contribute to length-of-stay reduction by 10%.	Larger windows, increased natural light, noise-reducing measures, healing art, healing gardens
Nursing Turnover Reduced	\$478,500	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%.	Larger windows, noise-reduction measures, healing art, healing gardens, staff respite areas, and single-patient rooms

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, ¹² calculated at \$26,000/injury, ¹³ or \$4,264,000 in patient handling staff injury costs/year. Design features help reduce patient handling injuries by 50%.	Larger patient bathrooms with double-door access, patient lifts
e-ICU Savings	\$2,239,056	Cost-savings of \$2,556/patient ¹⁴ 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%.	e-ICU
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%. ¹⁵ The average hospital achieving LEED certification can expect approximately 18% reduction in energy demand. Energy use reduction of 18%.	Energy-conserving building envelope and glazing, fuel-efficient heating and cooling systems, heat recovery system
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). 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.	Low-flow fixtures, rainwater capture, high-efficiency food service equipment
Total Annual Savings	\$10,032,162	\$29,246,275 total premium costs/\$10,032,162 annual savings = a return on investment within three years.	

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