



Financial Implications of THE GREEN HOUSE® Model

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ABSTRACT

Existing research establishes that THE GREEN HOUSE® model of licensed nursing home care provides significant and sustained satisfaction and clinical improvements when compared to traditional nursing homes. Questions remain about the model's initial and long-term financial viability due to its significant transformation of traditional nursing home practices in caregiver staffing, administrative and organizational structure, and environmental design. Several recent studies, each limited in scope but with mutually reinforcing findings, provide growing evidence that The Green House model's operations are comparable in cost to traditional nursing home operations as well as nursing homes implementing other culture change practices. Capital costs for Green House homes are found to be equivalent to or less than similar culture change models but higher than traditionally designed nursing homes offering fewer square feet and amenities. Revenue enhancements are likely from the care and environmental upgrades found in The Green House model. These research results, coupled with anecdotal experience, indicate that Green House homes offer a strong option for organizations to explore as they seek to address current and future challenges in their nursing home operations and markets.

INTRODUCTION

THE GREEN HOUSE® Project's goal is to transform the prevalent institutional skilled nursing facility (SNF) model to deliver significantly improved outcomes within existing SNF licensing, certification, and reimbursement standards.

Research in operating Green House homes (Kane et al., 2007; Lum et al., 2009; Sharkey et al., 2010) shows that sustained improvements in satisfaction and clinical outcomes result from the model's redesign of current nursing home practices. Questions exist, however, about the model's staffing, organizational, and environmental design, and their costs relative to traditional and other culture change models. This article reviews core Green House practices, published research, and two new studies in order to address these financial performance questions in four main areas: Is the direct services staffing model (direct care, nursing, laundry, housekeeping, dietary, activities/enrichment, and associated leadership) time and cost neutral?; What is the impact of The Green House model on quality of care, resident/family satisfaction, occupancy, and related revenue?; Are there organizational cost increases that are not captured in the direct services cost analysis?; and What is the impact of The Green House model on capital needs?

OVERVIEW

The Green House model, founded by Dr. William Thomas, is among a growing number of culture change initiatives that seek to improve the quality of life and care in SNFs. In the first quarter of 2011, 97 Green House homes were open on 26 campuses across 21 organizations and 17 states. These operating homes are almost evenly divided between continuing care retirement communities (CCRCs) and freestanding implementations. Five percent of these adopters (one organization with two Green House campuses) are for-profit, representing 10% of the open homes. Another 130+ homes are in development on 25 campuses and in 10 additional states.

The Green House Project, a joint initiative of the Robert Wood Johnson Foundation and NCB Capital Impact, provides intensive implementation assistance, maintains standards, adapts the model to new situations, and supports the ongoing efforts of operating homes.

Green House Redesign

The Green House model offers an alternative to traditional nursing home practices, significantly redesigning the philosophy of life and care, physical environment, and operational approach within state and federal requirements for licensed SNFs. The model is designed to substitute efficiencies of small, flexible, organizationally flat, and customer-driven models of care in place of institutional economies while, at the same time, leveraging the additional quality and satisfaction benefits of a person-directed approach. The model's deep, integrated, and rapid restructuring in each of three domains of culture change—resident care, staff culture and environment, and the physical structure (Doty & Sturla, 2008)—make it a comprehensive change model, distinguishing it from culture change initiatives that pursue a more incremental and à la carte approach. Green House adopters commit to implementing and sustaining core principles and practices of the model in exchange for the use of The Green House Project trademark.

Philosophy Redesign

Based on a philosophy of person-directed and relationship-based care, The Green House model is focused on improving residents' quality of life while maintaining clinical excellence. The philosophy is operationalized through small homes where intentional communities, self-directed teams of caregivers, and private living spaces support normal and flexible daily routines that can meet individuals' needs and preferences.

The highest level of skilled nursing care is provided in this setting for both residents in long-stay residence and those receiving short-stay, post-acute

care. The resident is recognized and valued as a unique individual with the right to live a private life in a private place. Staff members are motivated to know each resident and honor the autonomy and choices of those living in the home. The home supports the growth of an intentional community where there are reciprocal relationships between residents, families and staff. This challenges each home to foster a culture based on meaningful activity, simple pleasures, and enjoyment. The model promotes maximal functional independence while understanding that risk is a normal part of life.

Environmental Redesign

The Green House home is a self-contained residence designed to the scale and décor of a private home. Ten to 12 residents live in the home, each with a private bedroom and full bathroom. Meals are prepared in a fully functional, open kitchen. The dining table supports a normal and social dining experience. A living room with a fireplace, together with the dining room and open kitchen, is the center of life in the home. Access to outdoors is maximized through a patio or balcony. The design supports both private and communal spaces for those living and working there. The physical space is not meant to be homelike but to be a true home in all respects.

Organizational Redesign

The model reorganizes staff and flattens the hierarchy of the traditional organization. Each house functions independently with consistent and dedicated certified nursing assistants (CNAs or “Shahbazim”) who work in a blended and expanded role. The Shahbazim are the managers of the home and the care partner to the resident. They work in self-managed teams, organizing and performing all the personal care and homemaker tasks required to meet the needs of the residents (typically four hours per resident per day). The Shahbazim report to a Guide (a position often assumed by the nursing home administrator). Guides receive extensive training in coaching skills as they support the Shahbazim

and the self-managed teams to function in this empowered workforce model.

The organization’s clinical staff forms a clinical support team (CST). Nurses from the team meet the clinical needs of the residents (typically 1-1.2 hours per resident per day). The remaining clinical professionals visit the house on a routine basis and as required by the needs of the residents.

Review of Past Studies Relevant to Financial Performance of The Green House Model

The following section addresses findings from previously published studies relevant to the financial performance of The Green House model. The first study addresses The Green House staffing model and the impact of the model on quality of care and resident/family satisfaction. Additional studies are cited that suggest deep culture change models such as The Green House Project positively impact operational efficiencies and resulting financial performance. The financial implications of these studies, where quantifiable, are reviewed in the discussion section.

Sharkey and colleagues (2010) address aspects of the first financial question, “Is the direct services staffing model time neutral?” Answering this question is especially important since wage expenses account for nearly half of total operating costs in nursing homes nationally (California Health Care Foundation, 2003).

The study design examined overall staffing associated with direct services, including direct care, nursing, laundry, housekeeping, dietary, activities/enrichment, and associated leadership, at 14 Green House homes and 13 comparison organizations. One half of the comparison units were operated by the same organization as The Green House homes. The other half were unaffiliated with Green House organizations. Comparison organizations were selected to reflect “typical” traditional nursing homes, with populations comparable to The Green House homes in adjacent communities.

CNA and nurse hours in the homes and units

were tracked using direct observation. Non-nursing hours were evaluated through a combination of observation, interviews, surveys, and records reviews between October 2008 and March 2009. Measures included site and resident characteristics, nursing and non-nursing department staff hours per resident per day (HPRD), CNA direct and indirect care HPRDs, and CNA HPRDs engaged with residents.

Sharkey and colleagues (2010) reported that:

- *Overall staff time related to the provision of direct services was somewhat lower in Green House homes.* Staff time per resident per day, including direct care, nursing, dietary, laundry, housekeeping, activities, and related supervision, was approximately 5% less in Green House homes compared to the traditional nursing home units (5.6 hours versus 5.9, $p = 0.19$).
- *Direct care hours were significantly higher in Green House homes.* Within a context of the overall staffing hours reduction, CNAs (Shahbazim) in Green House homes provided approximately 22% more direct care time per resident each day than CNAs in the traditional SNF units (2.4 hours versus 2 hours, $p = 0.004$).
- *CNA/resident engagement was significantly greater in Green House homes.* Outside of time spent during activities of daily living (ADLs), CNAs in Green House homes were able to directly engage with residents four times more each day than CNAs in the traditional units (23.5 minutes versus 5.2 minutes). Almost one third of the additional engagement between residents and CNAs in Green House homes occurred during times the CNAs were performing another activity; e.g., meal preparation, laundry. In the traditional units, very little CNA engagement with residents occurred while performing other activities.
- *Administration and clinical leadership time reduced in Green House homes.* Administration and clinical leadership time per resident per day in The Green House homes was 68% less than in the traditional units (0.34 hours versus 1.07 hours).

The second study, Kane and colleagues (2007), examined the impact of The Green House model's redesigned philosophical, physical, and organizational approach on residents' satisfaction and quality of care. This study compared 40 Green House residents living in the first four Green House homes to open to 40 randomly selected individuals living at two traditionally organized comparison nursing homes over a two-year period. Quality of care was measured using eleven Minimum Data Set measures. Baseline data were collected prior to move-in and then at six-month intervals three additional times over the course of the research.

Kane and colleagues (2007) reported significant improvements for Green House residents in quality of care indicators. Green House residents maintained self-care abilities longer with fewer experiencing decline in late-loss ADLs ($p = 0.01$) such as eating, toileting, and transferring as well as depression ($p = 0.03$). Green House residents experienced significantly more incontinence than those in the comparison group ($p = 0.03$). Regarding quality of life measures, Green House residents reported significantly greater satisfaction on seven of the 11 domains of quality of life (privacy, dignity, meaningful activity, relationship, autonomy, food enjoyment, and individuality) compared to the residents living in one of the two traditional settings. Green House residents did not report less satisfaction in any of the 11 quality of life domains studied compared to either traditional nursing home.

In the third study, Lum and colleagues (2009) used the same data set as the Kane (2007) study to examine the model's impact on the experiences of residents' families. The study collected data from family members in person using a questionnaire focused on five domains (general amenities, physical environment, social environment, autonomy, and health care). Lum and colleagues (2009) found that families of Green House residents were significantly more satisfied with their family members' care compared to families of residents in the traditional sites ($p = 0.0006$). Family members of residents in Green

House homes reported higher satisfaction results in three to four of the five domains studied (general amenities, physical environment, autonomy, and health care).

STUDY #1: GREEN HOUSE ADMINISTRATION AND ORGANIZATIONAL STAFFING

Introduction

To address The Green House model's impact on overall staff and related costs, Chi Partners, who has extensive experience in long-term care and evaluating the finances of differing operational and business models, examined the quantity and costs related to non-direct service staff at a sample of Green House homes. The staff positions examined included non-nursing clinical, accounting, marketing, compliance, support, and management staff. Chi Partners also studied the total average staffing needs of Green House sites and compared their levels and costs to two good quality traditional settings.

Methods

Design

An intensive case study approach was used to evaluate a sample of five Green House and two traditional nursing home sites during 2009 to determine The Green House homes' overall staffing needs compared to traditional nursing homes. Each Green House site contained, in addition to The Green House homes, additional service lines such as independent seniors housing, assisted living, or traditional nursing homes. The research team conducted extensive interviews and record reviews to disaggregate Green House characteristics, operations, and allocations from the combined activities of the larger organization. Overall Green House organizational staffing needs were then calculated using the case study findings coupled with the recommended in-home staffing requirements of The Green House model. The traditional nursing homes'

staffing needs were calculated from onsite interviews and record reviews.

Each Green House site selected for participation in the study had at least four Green House homes operating under a SNF license. Of the six Green House sites that met this criterion, five were available for participation and were representative of other Green House adopters, including predominantly non-profit ownership structure, no dedicated short-stay rehabilitation unit, above-average occupancy levels, low direct care staff turnover, and positive federal and state licensing survey history. Selection criteria for the traditional settings sought to match The Green House characteristics, including survey history, high occupancy levels, and low direct care staff turnover. To ensure comparability with Green House sites, the selection criteria for the traditional sites also included non-profit ownership status and the absence of a dedicated short-stay rehabilitation unit.

Settings

The Green House sites included in the study ranged in size from four homes serving 40 residents to 16 homes serving 192 residents (10 of the 16 homes were open at the time the study was completed). Each Green House site included traditional nursing facility beds in addition to The Green House homes, with other types of seniors housing also available at three of the five sites. Four of the five sites had a non-profit ownership structure. The percentage of Medicare patient days in The Green House homes ranged from 4% to 11%, with none of the homes including dedicated rehabilitation beds.

The two participating traditional nursing facilities had 99 and 59 beds, respectively. Both facilities were owned by non-profit organizations. The occupancy at the two traditional facilities (96% and 98%) was slightly higher than the average occupancy at The Green House homes (96%) and approximately 10% higher than the national average occupancy rate of 88% (medicare.gov). The average percentage of Medicare patient days was also slightly higher (7% and 10%) in the traditional facilities than in The

Green House homes (6% average). **Table 1** compares characteristics across the participating nursing home sites.

Data Sources and Measurements

The data gathered from the participating sites included property characteristics, organizational charts, a breakdown of all employees by full-time equivalent (FTE) staff for each job title and functional assignment, and job descriptions for selected positions. In addition, onsite interviews were conducted at each facility with staff members in administrative, clinical, and other support positions, with follow-up interviews conducted as needed by phone. The purpose of these interviews was to clarify that site's staffing patterns, job duties associated with each position, and miscellaneous data. At The Green House sites, effort was also taken to understand the role of each position in relation to The Green House homes versus the rest of the campus. In addition, conversations with each site's CFO were held to determine how FTEs were allocated across product types or divisions of the site.

Analysis

Based on the information obtained at Green House sites, best practice¹ levels of administrative and organizational staff were established on a per bed basis. These best practice recommendations, together with the direct care and nursing staff required for Green House homes, were used to determine the number of FTEs needed to operate Green House sites of comparable size to the two traditional sites studied. Overall, the best practice analysis yielded 1.040 FTEs per bed, which is 2.39% lower than the median (1.065) for the Green House homes in the sample.

Results

Table 2 summarizes the comparison of FTEs

utilized in the 59-bed and 99-bed traditional facilities to the number of FTEs recommended for similar sized Green House sites.

The data show that the total number of FTEs utilized in the two traditional facilities is comparable to the number of FTEs recommended for Green House homes. That is, 1.08 FTEs are utilized per resident in the 59-bed traditional facility compared to 1.07 FTEs required for a 60-resident Green House Project (a 0.9% decrease in The Green House homes). Similarly, the 99-bed traditional facility utilized 1.06 FTEs per resident compared to the 1.07 required for a 100-resident Green House Project (a 0.9% increase in The Green House homes). If the analysis is adjusted to use the median per bed FTEs from The Green House sample rather than the recommended staffing, the 59- and 99-bed Green House homes would have 1.97% and 2.49% more staff, respectively, than the traditional nursing homes.

The data in Table 2 show a shifting of staff time between the Green House model and traditional nursing homes similar to that found in previous Green House research (Sharkey et al., 2010). In The Green House model, an increase is seen in the number of direct care FTEs compared to the two traditional comparison sites. The number of recommended nurse and CNA FTEs in The Green House homes are 49.9% and 57.8% higher, respectively, than in the comparably sized 59-bed and 99-bed traditional facilities.

This increase in the recommended direct care FTEs in Green House homes is offset by a reduction in the number of administrative and support staff FTEs. The numbers of housekeeping, laundry, and food service FTEs are 88.6% and 90.8% less, respectively, in comparably sized Green House homes than in the 59-bed and 99-bed traditional facilities. Similarly, the number of life enrichment (activity)

¹ The best practice staffing recommendations for GREEN HOUSE homes are used as the basis for the comparison to the traditional facilities rather than the GREEN HOUSE averages from the study sites. The authors believe that using the recommended staffing levels is the most appropriate point of comparison as homes operating at these levels are providing excellent outcomes.

Table 1. Sample Characteristics of Participating Nursing Home Sites – 2009.

	Green House Sites						Traditional Sites		
	GH Site 1	GH Site 2 ^a	GH Site 3 ^a	GH Site 4	GH Site 5	GH Average	Traditional Facility 1	Traditional Facility 2	National Median ^g (n = 12,643)
Number of Beds	60	60	192 ^b	40	48	80	99	59	100
Type of Ownership	Non-profit	For Profit	Non-profit	Non-profit	Non-profit	n/a	Non-profit	Non-profit	n/a
Occupancy ^c	97%	n/a	99%	93%	96%	96%	98%	96%	88%
Medicare% ^d	8%	11%	4%	3%	4%	6%	10%	7%	12%
Avg. Survey Health Deficiencies Last 3 Inspections (per bed) ^e	.05	n/a	.016	.025	n/a	.03	.04	0	n/a
Direct Care Staff Turnover ^f	19%	n/a	21%	9%	n/a	16%	23%	17%	n/a

^a Data are only available from 4Q/2009.

^b Green House Facility 3 had 100 beds open when the study was conducted.

^c Self-reported for The Green House homes (medicare.gov data do not disaggregate Green House homes from the traditional home on campus); as reported by medicare.gov for the traditional facilities

^d Reported by EQUIP for Quality for Green House Site 3, self-reported for all other Green House homes (medicare.gov data do not disaggregate Green House homes from the traditional home on campus); reported by medicare.gov for the traditional facilities

^e Self-reported for The Green House homes for time periods available between 2007 and 2009 and as reported by medicare.gov for the traditional facilities

^f Self-reported for The Green House homes, reported by calquality.org for the traditional facilities

^g Medicare.gov

Table 2. FTE Comparisons Traditional Facilities and The Green House Model.^a

	Traditional 59-Bed Facility (@97% occ)	60-Bed Green House Recommendation (@97% occ)	Traditional 99-Bed Facility (98% occ)	100-Bed Green House Recommendation (@98% occ)
Administration	6.2	4.7	11.9	8.8
LPNS and RNs	8.9	11.2	14.0	18.7
CNAs	26.6	42.0	42.2	70.0
Housekeeping	5.6	0.8	8.4	1.4
Laundry	1.0	0 ^b	2.8	0 ^b
Dietary	5.7	0.6	15.0	1.0
Dietician	0.4	0.4	1.0	0.6
Life Enrichment	3.6	0.6	2.0	1.0
Social Work	1.0	0.6	1.5	1.0
Staff Education	0.6	0.6	1.0	1.0
Other	2.0	0.8	3.0	1.3
Total for Project	61.6	62.3	102.8	104.8
Total per Bed	1.04	1.04	1.04	1.05
Total per Resident	1.08	1.07	1.06	1.07

a These recommendations assume 97% and 98% occupancy levels for the purposes of comparison to the traditional facilities.

b The Green House Project recommends that all laundry is washed in the homes

FTEs decrease 88.3% in The Green House model as compared to the 59-bed traditional facility, and 50.0% as compared to the 99-bed traditional facility. The FTEs needed for these positions decrease in the Green House model because the Green House CNAs (Shahbazim) perform housekeeping, laundry, food service, and life enrichment functions in addition to direct care tasks.

A decrease is also seen in administrative staff in Green House organizations, 26.2% and 26.1% lower, respectively, as compared to the 59-bed and 99-bed traditional facilities (the administrative category includes the administrator, director of

nursing, business office, clerical, admissions/marketing, MDS, medical records, and central supply staff). The administrative FTEs decrease in the Green House model because of the increased role of the direct care staff—both nurses and Shahbazim—in coordinating care and maintaining resident records; unit secretaries and charge nurses are typically not utilized in the Green House model.

The number of FTEs in social work positions also decreases slightly in The Green House model, with a 40.0% decrease in social workers in the model as compared to the 59-bed traditional facility and a 33.3% decrease in comparison to the 99-bed

Table 3. Personnel Cost Comparison Traditional Facilities and the Green House Model.

	59-Bed Traditional Facility	60-Bed Green House Site	% Change	99-Bed Traditional Facility	100-Bed Green House Site	% Change
Total Personnel Costs	\$2,039,562	\$2,046,780	n/a	\$3,345,367	\$3,448,041	n/a
Per-Bed Personnel Costs	\$34,569	\$34,113	-1.34%	\$33,792	\$34,480	2.00%

traditional facility. These reductions are due, in part, to a decrease in the types of issues typically addressed by social work staff; e.g., roommate concerns, lost clothing, and complaints about food. Additionally, the Shahbazim in Green House homes often play a larger role in the relationship management issues that would typically be handled by social work staff.

Applying 2009 wages derived from salary.com and payscale.com to the FTEs calculations, with an average 5.0% increase applied to The Green House CNA wage to reflect wage increases typically found in the Green House homes, the total estimated personnel costs are essentially equal between The Green House homes and the comparison sites (see **Table 3**).

As is shown in Table 3, on a per bed basis, the cost for the recommended staffing for a 60-bed Green House model is 1.34% lower than the 59-bed traditional facility, and the cost for the 100-bed Green House model is 2.00% higher than the 99-bed comparison facility.

STUDY #2: ENVIRONMENTAL COSTS, OVERALL FINANCIAL PERFORMANCE, AND BENCHMARKING OF GREEN HOUSE HOMES

Introduction

Of primary concern for potential adopters and policy makers interested in implementing significant culture change is whether the modifications required by The Green House model a) increase overall costs in unexpected ways; and b) how the capital needs and related revenue enhancements compare to other options. To answer these two final financial questions, the ICA Group conducted an analysis of available data and research to understand what is currently known about Green House homes' overall operational performance and capital costs and what may be reasonably predicted. ICA Group is a non-profit consultancy with significant experience with financial analysis of health care providers in the nursing home and home care sectors.

Methods

Overall Costs

Using financial data from Green House operators, Centers for Medicare and Medicaid Services (CMS) data sets and other publicly available data sources, ICA Group analyzed operating and capital cost information to evaluate the financial implications of Green House adoption. Data on traditional nursing homes as well as comparable culture change models,

including the neighborhood/household and small house models, were collected to provide context for The Green House model findings. The analysis identifies the cost centers most likely to be affected by The Green House model and considers potential revenue implications as well.

Calculations of Green House adopters operating expenses were derived primarily from a proprietary database developed by The Green House Project to establish performance benchmarks for Green House adopters. Eight adopters are currently submitting their financial data to this system; the five adopters with the most complete financial information were included in this analysis. Information from this database was supplemented with interviews of Green House adopter CFOs and analysis of additional financial information furnished by adopters. Findings from the operating expense analysis apply only to the adopters that have contributed information and are not necessarily representative of the experience of adopters overall.

Other financial and descriptive variables for this study were extracted from the *CMS Skilled Nursing Facility Healthcare Cost Report Information System* (HCRIS) for fiscal years 2007 through 2009. This data set includes cost and charges by cost center, occupancy rates, payer mix, and other facility characteristics; all Medicare-certified SNFs are required to submit this cost report annually. Facilities reporting 12 months of activity in FY 2007 and who filed a cost report using the same unique identifier for all three years were included in the analysis. Records with missing data and outliers for the measures of occupancy rate (below 30%) and operating expense per resident day (top 8%) were excluded, resulting in a list of 8,903 facilities. A literature review provided insights into potential revenue implications of culture change adoption.

Capital Costs

To identify capital cost implications of implementing The Green House model, a literature review focused on nursing home development activity,

trends, and costs was conducted as well as a review of trade publications, newspaper reports, Internet research, and interviews with architects and financing agencies. The literature review found very little academic research on the subject. The media review and interviews identified information that was useful to gaining a general understanding of the key factors driving costs and associated capital estimates.

Results

A. Overall Costs

In 2009, total operating costs per resident day, excluding interest and depreciation, for the five Green House Projects ranged from \$161 to \$237, with an unweighted mean value of \$199. This compares to a national median value of \$197.51 for nursing homes overall, an operating cost difference of less than 1% (CMS 2009). Green House homes, however, tend to serve a lower proportion of short-stay Medicare-funded residents than a typical nursing home, and Medicare residents may increase ancillary costs. Adjusting the mean ancillary cost for the five Green House Projects to match the national median results in a mean Green House home per resident day cost of \$213 (7.6% higher), although it would be expected that the higher Medicare ancillary costs should be offset by an associated increase in reimbursement. The adjusted Green House sample's per resident day costs fall in the 60th percentile of nursing home costs nationally.

Table 4 presents operating cost data for these Green House Projects and the corresponding median figures for traditional facilities.

Table 4 shows the impact The Green House model's utilization of Shahbazim has on the distribution of costs across cost centers. All Shahbazim expenses are captured in the nursing cost center. In addition to fulfilling the role of a CNA, however, the Shahbazim also perform functions traditionally categorized in dietary, laundry, and housekeeping cost centers. As a result, nursing costs are higher in The

Table 4. Operation Costs for Green House Projects.

	2009 SNF Median (n=8,903)	Green House Project Mean	Green House Site 1	Green House Site 2	Green House Site 3	Green House Site 4	Green House Site 5
Overview							
# of Green House Homes	n/a	4	4	4	6	4	2
Occupancy Rate	88%	96%	98%	96%	97%	93%	98%
% Medicaid	64%	36%	n/a	4%	46%	55%	38%
% Medicare	12%	5%	n/a	4%	8%	3%	6%
% Private Pay	21%	57%	n/a	92%	37%	42%	55%
Expenses by Department per Resident Day							
Nursing	72.42	127.08	117.30	117.89	126.11	148.45	125.66
Dietary	15.47	9.70	7.98	8.48	13.76	11.12	7.15
Laundry & Linen	2.70	1.97	0.00	0	3.07	3.31	1.49
Housekeeping	5.17	3.02	3.80	1.37	5.98	2.67	1.28
Plant Operations	9.69	9.74	5.09	6.42	14.83	8.31	14.03
Ancillary Services	22.23	8.30	6.02	3.50	18.46	6.98	6.56
Administration	35.73	33.17	19.87	30.64	10.90	36.52	67.92
Other Expenses* (excluding capital costs)	n/a	6.54	0.53	7.16	10.53	1.21	13.30
Total Expenses (excluding interest & depreciation)	\$197.51	\$199.13	\$160.58	\$175.46	\$203.64	\$218.56	\$237.39
*Other expenses include costs associated with activities, social services, medical records, costs categorized as "other" in the CMS cost reports, and Green House adopters' internal accounting. Employee benefits (\$17.02 per resident day) are included in the traditional facilities "Other Expense" line. In Green House adopters' figures, employee benefits are captured in the individual departmental expense lines and not in the "Other Expenses" line.							

Green House homes but these other departmental costs are correspondingly lower.

Food Costs. Approximately half of the Green House adopters for which data is available report lower food costs in their Green House homes than in

their traditional facilities while the other half report higher food costs. Generally food costs per resident day in The Green House homes average \$7.48. Food costs are included in the Dietary department's expense line.

Plant Operations. The average utility cost per resident day in Green House homes is \$5.28 compared to \$5.17 for nursing homes overall (Larson Allen, 2009). Newly built facilities will typically have lower utility and maintenance costs per square foot than older structures; however, if a new facility provides more square feet per resident, as Green House homes and other culture change models do, utility costs and other expenses that increase in proportion to facility size may offset the per square foot efficiencies obtained from new construction. A review of the aforementioned financial benchmarking data confirms this.

Ancillary Costs. Ancillary costs in The Green House homes are \$14.48 per resident per day lower than median national nursing home costs. Green House homes have, until recently, focused on serving longer-stay residents. Data available from The Green House Project's 2009 study show an average Medicare occupancy of 5.25% compared to a 12% average for nursing homes nationally. Medically complex, short-stay residents likely utilize more ancillary services than chronic-stay residents.

Administrative Expenses. Many operators report a reduction in administrative expenses in The Green House homes. Most do not systematically track the time that administrators spend on Green House-related matters and rely instead on estimates. For the purposes of this analysis, to be conservative, a share of the operator's total administrative expense is allocated to The Green House homes in proportion to the number of resident days of care The Green House homes provided. The Green House initiative intends to undertake a more thorough ongoing study of administrative costs in the future.

B. Capital Costs – Per Square Foot and Per Unit.

The cost of building a nursing facility is driven by the size of the structure, site conditions, planning

and zoning requirements, and local per square foot costs for construction.

Cost per Square Foot. Commercially available data (Reed Construction Data, 2008) indicates that the average cost per square foot, including materials, labor, general contractor, and architectural cost, for a traditional two-story, 25,000-square-foot nursing facility is \$128. It is not known if facilities that incorporate environmental culture change and feature private rooms are more expensive to build or if they will mimic the commercially available rates.

To estimate an average cost per square foot of nursing home projects more comparable to The Green House model, 11 recently constructed nursing facilities were identified that were built using the neighborhood, household, or small house model.² Available data suggests that fewer than 50 such projects were built between 2004 and 2009 (Ziegler, 2008). While the 11 identified facilities do not represent a random sample, they do represent a substantial proportion of recent projects incorporating non-traditional designs. In this sample, the average cost per square foot was \$198 with a range of \$138 to \$364 (excluding the cost of land). The average square foot cost for the small house models in this sample (three of 11 projects) was \$148.

As noted previously, average national nursing home square foot capital costs were \$128 in 2008 (Reed Construction Data, 2008). Average small home capital costs (2007 to 2009) were \$148 per square foot among the three small house projects with available cost data. It is difficult to draw predictive conclusions from this information as the sample is small, potentially biased by location and organizational objectives, and there may not be consistency in how capital costs are defined and categorized. Furthermore, it may be the case that adopters of significant environmental culture change, tend to be higher than average cost operators and thus may elect to incur higher costs in both planning and

² GREEN HOUSE homes are a subset of the small house category and should have equivalent costs per square foot. The three small house projects in the construction cost data are not GREEN HOUSE homes.

execution than more cost sensitive, traditional operators. How much of the apparent difference in per square foot capital cost is attributable to these factors and how much reflects a real difference in square foot costs endemic to small home development is not yet clear. Additional research is required to address this question. For the purposes of cost estimating later in this article, it is assumed that the average square foot cost of building small homes can be the same as the construction of traditional facilities (e.g., \$128) when the efficiency of proprietary developers is brought to bear on small house development at the same levels it is present in traditional nursing homes.

For the reasons outlined, it is not possible to definitively determine the cost differential on a square foot basis, if any, between Green House and traditional nursing home construction. As the square foot per bed analysis indicates, however, differences in the space per resident between the models will have a greater bearing on capital costs per resident than differences in per square foot construction costs.

Differing Costs per Square Foot Based on Construction Type. The cost per square foot in a detached Green House homes should be equal to or potentially less than a household or neighborhood model, as smaller detached structures can meet the required nursing home building and life-safety standards using less costly methods and materials. The average cost per square foot for the eight neighborhoods and household facilities identified was \$205 compared to \$148 for the small house projects. While a small sample, the 39% increase in cost per square foot for household and neighborhood models suggests that the theory of lower square foot costs for small homes is not unreasonable. Green House home development square foot costs for multistory projects can be expected to be equal to non-small house culture change models, as the construction standards are equivalent. The total capital costs for households, neighborhoods, and small house models per resident will be dependent on the decisions of individual adopters.

Traditional nursing homes average 239 square feet

gross per resident. Traditional settings built with all private rooms are likely to be at least 79 square feet per resident larger (Calkins & Cassella, 2007), for an average of 318 square feet gross per resident. Based on the small data sets available, Green House homes and average culture change models are likely 104% and 124% larger, respectively, than traditional nursing homes with all private rooms.

Square Feet Per Bed. To determine the size of typical, recently constructed facilities, data from the Online Survey Certification and Reporting (OSCAR) database were used to identify nursing homes built between 2005 and 2008 and matched to Medicare cost report data to determine square footage per bed. Homes built between 2005 and 2008 ($n = 320$) had an average of 239 square feet gross per resident (CMS 2008, CMS 2005).

To estimate the range of square feet per resident in deep environmental culture change projects, 21 sites, including the 11 sites used to estimate capital costs, were identified for which total square feet and beds were reported. Ten of these sites were household/neighborhood models, and 11 were small house models, including seven Green House adopters. These neighborhood/household models are units within larger facilities that feature decentralized living and dining areas but rely on centralized resources to varying degrees for laundry, food preparation, and other services. For the purposes of the square foot analysis, no distinction is made between neighborhood and household models, as in practice, there are no clear, universally accepted characteristics that can be used to do so. Small houses are differentiated from neighborhood/household models in that they are free-standing structures designed to accommodate a smaller number of residents, typically 16 or fewer. Green House homes, a subset of small homes, are designed for a maximum of 12 residents. The average gross square feet per resident in these projects was 713 (median 690 square feet), with a range of 343 to 1,105 per resident.

Private rooms, expanded common space, decentralized dining, and multiple kitchens are all hallmarks

of the deep environmental culture change present in The Green House model, small house, household, and neighborhood culture change models. These changes significantly increase the overall square feet per bed compared to a traditional nursing home with a single dining area and mix of double occupancy and private rooms.

Neighborhood and household models average between 596 square feet to 654 square feet per resident. Small house and Green House models average 748 square feet. The average gross square feet per resident among the seven Green House Projects was 659 (median 688). Differences in the size of these projects likely reflect differences in operator preference rather than any inherent space requirements of the model; e.g., seven Green House-certified projects range in size from 556 square feet to 700 square feet per resident.

Cost Per Bed. For a Green House project with a capital cost reflecting the national average of \$128 per square foot, a project providing 650 square feet per resident (the recommended size for a Green House home) will have a cost of approximately

\$83,200 per resident. This compares to \$30,592 per resident to build a traditional facility with the standard mix of semi-private rooms (239 square feet per resident) and \$40,704 if a private room (318 square feet per resident) is the standard of comparison. In both cases, Green House homes are more than double the cost of a traditional facility. If there is an inherent cost differential per square foot between the two settings, this cost gap will increase further. (The national average cost for nursing home construction, \$128 per square foot, is used for this comparison because of the small size of the small house sample, the lack of a compelling reason for small house construction costs to exceed national square feet costs, and the likelihood, in the opinion of the authors, that the five projects included in the small house sample represent higher-than-average construction costs for a variety of factors.)

The type of facility being built, size, local labor rates, and site-specific preparation costs are the primary drivers of the capital costs. The sensitivity analysis in **Table 5** presents the variation in capital cost per bed dependent on the two variables

Table 5. Sensitivity Analysis – Capital Cost Per Bed.

		Cost Per Square Foot						
		\$128	\$148	\$168	\$188	\$205	\$228	\$248
Square Feet Per Resident	239	\$30,592	\$35,372	\$40,152	\$44,932	\$48,995	\$54,492	\$59,272
	350	\$44,800	\$51,800	\$58,800	\$65,800	\$71,750	\$79,800	\$86,800
	450	\$57,600	\$66,600	\$75,600	\$84,600	\$92,250	\$102,600	\$111,600
	550	\$70,400	\$81,400	\$92,400	\$103,400	\$112,750	\$125,400	\$136,400
	650	\$83,200	\$96,200	\$109,200	\$122,200	\$133,250	\$148,200	\$161,200
	750	\$96,000	\$111,000	\$126,000	\$141,000	\$153,750	\$171,000	\$186,000
	850	\$108,800	\$125,800	\$142,800	\$159,800	\$174,250	\$193,800	\$210,800

discussed: square feet per resident and construction cost per square foot. The ranges broadly reflect the sample projects identified.

Capital Costs – Per Resident Day Implications.

Capital costs are fixed and from an accounting perspective, they decline when measured on a per resident day basis as the number of resident days increases. If the environmental culture change undertaken can reasonably be expected to impact occupancy, projecting cost on a per resident day basis may be a more meaningful measure than the commonly used cost per bed. Presenting these costs on a per resident day basis facilitates comparisons with other SNF costs that are typically measured on a similar basis. The following analysis examines capital costs on a per resident per day basis using variable inputs likely impacted by the environmental enhancements associated with culture change.

- **Occupancy Rates.** A recent study found that occupancy rates for SNFs engaged in culture change increased an average of 3% (Elliot, 2010). The experience of Green House adopters exceeds this average; e.g., (Table 6) – the five Green House adopters that completed their first Green House home during 2007 (and for which HCRIS cost report is available through 2009) had a median occupancy rate of 91.8% (this includes the adopters’ Green House homes and traditional facilities) in their initial partial year of Green House Project operations compared to a

median occupancy rate of 89.6% for SNFs overall (n = 8,903). By 2009, the median occupancy rate among these adopters, including both The Green House homes and traditional facilities, was 95% compared to a median occupancy of 88.5% for SNFs overall (CMS 2007, 2008, 2009) – a 6.5% increase.

- **Occupancy Rate Impact on Per Resident Day Costs.** As the sensitivity analysis in Table 7 demonstrates, occupancy rates have a significant impact on the total capital costs (capital costs plus assumed debt service) when allocated on a per resident day basis. In 2009 the median occupancy rate among SNFs was 88.5% (CMS 2009). In The Green House homes themselves (excluding the traditional facility), the average occupancy rate was 96.2% (n = 5), with a range of 92.7% to 97.8%.

Assuming 100% of the capital costs will be financed with debt and the debt will be repaid over a period of 30 years at an interest rate of 6%, a Green House project with the recommended 650 square feet per resident, built at the national average of \$128 per square foot and with an occupancy rate that matches the national average, will have capital costs per resident day of \$18.82, \$8.69 higher than a facility with the same capital cost per square foot and occupancy rate but only offering 350 square feet per resident (350 square feet is the authors’ estimate for the likely gross square feet per resident in a new

Table 6. Median Occupancy Rates 2007 to 2009.

	2007	2008	2009
All SNFs (N = 8,903)	89.6%	88.9%	88.5%
GH Adopters* Opened 2007 (n = 5)	91.8%	92.6%	95.0%

** Adopter occupancy rate includes Green House homes and traditional facility*
Source: CMS 2007, 2008, 2009

Table 7. Sensitivity Analysis – Capital Cost Per Resident Day (at 650 Square Feet/Bed).

Cost per square foot							
Occupancy Rate	\$128	\$148	\$168	\$188	\$205	\$228	\$248
88%	\$18.82	\$21.76	\$24.70	\$27.64	\$30.14	\$33.52	\$36.46
90%	\$18.40	\$21.27	\$24.15	\$27.02	\$29.47	\$32.77	\$35.65
92%	\$18.00	\$20.81	\$23.62	\$26.44	\$28.83	\$32.06	\$34.87
94%	\$17.62	\$20.37	\$23.12	\$25.87	\$28.21	\$31.38	\$34.13
96%	\$17.25	\$19.95	\$22.64	\$25.34	\$27.63	\$30.73	\$33.42
98%	\$16.90	\$19.54	\$22.18	\$24.82	\$27.06	\$30.10	\$32.74
100%	\$16.56	\$19.15	\$21.73	\$24.32	\$26.52	\$29.50	\$32.08

traditional facility with all private rooms built to current customer expectations—somewhat higher than the 318 square feet found in the Calkins and Cassella 2007 research). If that same Green House project were to maintain an occupancy rate of 96%, the cost per resident day would be \$17.25, reducing the differential cost to \$7.12. If the capital costs were \$148 per square foot, the adjusted differential would be \$8.23 per resident per day. If the capital costs are inherently higher in either model, these differential costs will increase or decrease accordingly.

- **Marginal Costs, Net Revenue, and Capital Costs Implications.** Green House home adoption is associated with increased occupancy. The revenue that each new resident represents, even Medicaid residents, can reasonably be expected to exceed the marginal cost of providing their care because a portion of administration, indirect services, and direct costs are fixed and do not increase with modest changes in occupancy. While there is surprisingly limited published research on fixed and variable costs in nursing homes, one study (Wade & Hendrickson, 2008) concluded that 75% of direct care costs, 63% of indirect care costs, and 16% of administrative

costs are apt to vary in relation to occupancy rate. Applying these percentages to 2008 Medicare cost report data (n = 11,961) suggests that approximately 55% of costs are variable. If each new resident generates \$220 per day in revenue (the median private-pay rate) and 55% of that revenue (\$120) goes to variable costs, then each additional resident will provide a net contribution (revenue less variable costs) of \$100 per day.

To provide an example of the impact this net contribution could provide, consider a 100-bed nursing home with the 2009 national median occupancy of 88.5%. If this home increased its census by 3.2% (the average increase in occupancy that Green House adopters achieved between 2007 and 2009), it would serve, on average, 3.2 additional residents per day, generating \$320 more per day or \$3.20 per bed. This contribution would further reduce the differential capital costs between traditional nursing home and Green House models.

- **Private-Pay Days and Capital Cost Implications.** In addition to increasing overall occupancy, The Green House model appears to enable adopters to increase their proportion of private-pay residents. Between 2007 and 2009,

the number of private-pay days increased an average of 24% among the five Green House adopters that began operations in 2007. Nursing homes overall (n = 8,903) experienced a 5% decline in the number of private-pay days during the same period, resulting in a 29% variance. The average Medicaid nursing home payment in 2009 was \$167 a day (AHCA, 2009) compared to a private-pay average of \$219 (MetLife, 2009), a difference of \$52 a day. A 29% increase in private-pay days at \$52 per day will significantly offset increased capital costs, adding \$92,817 in additional revenues for an average facility size of 102 beds.

- **Private Room Premium and Capital Cost Implications.** While there are additional costs associated with constructing the all-private bedroom Green House homes, there are also potential revenue enhancements. Older adults prefer private rooms by a ratio of 20:1 (Calkins & Cassella, 2007). Nationally, private-pay residents pay 11% more for private rooms over semiprivate accommodations. In some markets, private rooms can command premiums as high as 86% (Met Life, 2010). As a result, the additional private-pay residents that the Green House model attracts may be willing to pay a premium over the average aforementioned private-pay rates for the single room environment that the Green House offers. In markets with sufficient private payer demand, these additional revenues would further offset increases in capital costs.

DISCUSSION

Financial Implications of the Published and New Studies

The research reviewed in this article assembles the growing evidence about The Green House model's performance. The emerging performance that the research represents has implications for the four main financial questions outlined at the beginning of this article.

1: Is the direct services staffing model time and cost neutral?

The relevant research indicates that while significantly more direct-care and nursing time is delivered in The Green House home, overall direct service staffing does not increase compared to traditional settings due to a shift from supervisory and department hours to direct care hours (Sharkey et. al., 2010). In fact, The Green House model better leverages existing resources, allowing staff to engage residents while completing tasks where traditional settings do not. The 5% reduction in overall nursing and non-nursing hours found for Green House projects combined with the 68% reduction in administration and clinical leadership time suggest that costs will be lower as well (Sharkey et. al., 2010). This suggestion is reinforced by Chi Partners and ICA Group findings that overall operating costs are consistent with nursing homes with similar characteristics. These findings are also consistent with general culture change research showing operational efficiency associated with deep culture change models (Doty & Sturla, 2008; Elliot, 2010; Grant, 2008; Farrell & Elliot, 2008). Collectively, the trend of these findings provides support for the theory that implementing The Green House direct service staffing model, especially the shift of expensive supervisory time into direct care, will result in staff and cost neutral operations or, perhaps, modest savings.

2: What is the impact of The Green House model on quality of care, resident/family satisfaction, occupancy, and related revenue?

The Green House model of care has been shown to deliver significant improvements in care (Kane et al., 2007; Sharkey et al., 2010) and in resident, family, and staff satisfaction (Kane et al., 2007; Lum et al., 2009; Sharkey et al., 2010). The research of Chi Partners and ICA Group found consistent and financially important differences in Green House providers' overall occupancy and private-pay

occupancy compared to national nursing home averages. These findings are consistent with other recent research findings that associate deep culture change implementation with occupancy and operational improvements (Doty & Sturla, 2008; Elliot, 2010; Farrell & Elliott, 2008). Taken together, these findings suggest that implementing The Green House model may be expected to have a positive impact on quality, satisfaction, occupancy, and revenues.

3: Are there organizational cost increases that are not captured in the direct services cost analysis?

The ICA Group and Chi Partners studies, while derived from small samples, show that overall Green House project operating costs can be comparable to traditional models exclusive of depreciation and interest. In the two studies, estimated Green House staff operating costs ranged between 1.34% lower to 2% higher than the comparison group and cost report data. Some uncertainty exists in the ICA Group analysis regarding the impact of greater short-stay utilization on operating costs (Green House homes have lower short-stay utilization than most nursing homes). If Green House homes served a higher proportion of short-stay residents, operating costs would increase as would revenues. Whether the increased revenues completely offset the higher costs would depend on the specific needs of the population served and the payment streams associated with those residents.

The ICA study suggests that typical Green House operating costs should be between the 50th and 60th percentile of national nursing home costs. Collectively, the new research provides confidence that there are no hidden or unexpected costs associated with The Green House model.

4: What is the impact of The Green House model on capital costs?

The ICA Group research finds that The Green House model operations should cost less or be equal to other dominant culture change models. Green

House homes will incur modestly more capital costs compared to traditional nursing homes mainly due to increased square foot requirements. While square footage in traditional settings and Green House homes vary widely based on individual implementations, the ICA Group research suggests that a 300 square foot increase per person may be a reasonable assumption when traditional settings with all private rooms are the point of comparison (Green House homes recommend providing 650 square feet per bed in order to offer all private rooms). Adding 300 square feet per bed at the average national square foot cost (\$128) for nursing homes increases capital costs by approximately \$38,400 per bed or \$8.69 per bed per day (at 6% interest, a 30-year loan term, and 88% occupancy rate). Using more conservative but, as noted earlier, unequal and potentially biased assumptions, if an average Green House home with construction costs similar to the small house projects identified in the ICA study (659 square feet per bed and \$148 per square foot respectively) is compared to a traditional nursing home with mostly dual occupancy rooms and a construction cost similar to the national average (239 square feet per bed, \$128 per square foot), The Green House model could increase capital costs by as much as \$66,940 per bed, or \$13.32 per resident per day (at 6% interest, 30-year term, and 100% occupancy).

When revenue increases related to the occupancy gains experienced by The Green House projects are considered, the ICA Group study suggests that these increases may cover approximately one third of the additional capital costs. In addition, and where available, the 24% increase in private-pay days experienced by Green House adopters and the 11%–86% premium that private rooms can command will also contribute revenue gains that further offset increased capital costs.

CONCLUSION

Analysis of the published and new Green House studies related to financial performance, each limited

in scope but with mutually reinforcing findings, provides growing evidence that The Green House model's operations are comparable in cost to traditional nursing homes as well as nursing home providers utilizing some culture change practices in their SNFs. Capital costs are found to be equivalent or less than similar culture change models but higher than traditional designs, which provide much less space per resident. Increased occupancy and more private-pay days found to be associated with Green House home implementation may offset these capital cost increases.

While perhaps counter to prevalent beliefs, the studies reviewed here suggest that it is possible to provide a high-quality of life and care through The Green House model at a net profitability and return on investment comparable to large, traditionally structured nursing facilities.

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