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SPECIAL ISSUE–GREEN HOUSE MODEL OF NURSING HOME CARE

The Green House Model of Nursing Home Care in Design and Implementation

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Objective. To describe the Green House (GH) model of nursing home (NH) care, and examine how GH homes vary from the model, one another, and their founding (or *legacy*) NH.

Data Sources/Study Setting. Data include primary quantitative and qualitative data and secondary quantitative data, derived from 12 GH/legacy NH organizations February 2012—September 2014.

Study Design. This mixed methods, cross-sectional study used structured interviews to obtain information about presence of, and variation in, GH-relevant structures and processes of care. Qualitative questions explored reasons for variation in model implementation.

Data Collection/Extraction Methods. Interview data were analyzed using related-sample tests, and qualitative data were iteratively analyzed using a directed content approach.

Principal Findings. GH homes showed substantial variation in practices to support resident choice and decision making; neither GH nor legacy homes provided complete choice, and all GH homes excluded residents from some key decisions. GH homes were most consistent with the model and one another in elements to create a real home, such as private rooms and baths and open kitchens, and in staff-related elements, such as self-managed work teams and consistent, universal workers.

Conclusions. Although variation in model implementation complicates evaluation, if expansion is to continue, it is essential to examine GH elements and their outcomes.

Key Words. Culture change, nursing home, Green House nursing home, person-centered care, staff empowerment

Over 1.4 million individuals reside in the almost 16,000 nursing homes (NHs) in the United States (Centers for Medicare and Medicaid Services 2013). Unfortunately, despite the clear need for NHs, they have historically been

plagued by evidence of suboptimal quality of care and quality of life, and a societal reputation as dreaded institutions (Mattimore et al. 1997). A 1986 Institute of Medicine report unequivocally documented poor care and outcomes in NHs, such as untreated pain and depression and lack of choice regarding basic daily needs (Institute of Medicine 1986), and prompted the introduction of extensive changes to NH regulations as part of the Omnibus Reconciliation Act of 1987 (OBRA-87), commonly referred to as the Nursing Home Reform Act. Among its many requirements, the Nursing Home Reform Act mandated the use of the Resident Assessment Instrument and Minimum Data Set (MDS) reporting. However, until 2010, the MDS primarily documented the structures, processes, and outcomes of care, with little focus on the psychosocial aspects of NH care and life.

A "culture change" movement in NHs took hold to address the psychosocial needs of NH residents by focusing not only on clinical care and outcomes but also on quality of life and well-being (Saliba and Schnelle 2002). Culture change is evident in NHs where resident care is individualized; living environments are home-like; close relationships between staff, residents, and families are supported; staff are empowered; and quality of care and quality of life are optimized (Koren 2010). Beyond individual culture change practices (e.g., changing bathing practices; Sloane et al. 2004) or clusters of practices, several models for promoting widespread culture change in NHs have been developed, including the Eden Alternative (Coleman et al. 2002), Wellspring (Bellot 2012), and recently, The Green House (GH) model (Zimmerman and Cohen 2010; The Green House Project 2012). Of these, the GH model is one that has taken root, and as of October 2014, 167 GH homes were in operation, with 133 licensed to provide skilled nursing, 25 assisted living, and 9 other types of specialized care. In total, 1,735 elders reside in GH homes, the

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majority of whom (nearly 1,500) receive skilled nursing care. The 133 homes providing skilled nursing are situated across 33 different campuses in 27 states; these campuses have between 1 and 16 individual GH homes on their site.

The Green House Model

The GH model is a trademarked model with structural, procedural, and philosophical components defined by the national Green House Project. As defined by the national office, the GH model is based on three values—real home, meaningful life, and empowered staff (The Green House Project 2012). These values are established through the creation of small, residential-style houses located in community neighborhoods. Often, these small houses are affiliated with the original founding NH—termed the *legacy* home—that remains open alongside its GH home(s). The GH model strives to eliminate the expectations associated with traditional NH roles (e.g., "resident," "nursing assistant") and avoids related terminology in its quest to do so. Per the model, GH homes house 10–12 residents—called *elders*—who each have a private room and attached bath; share a central living space with an open kitchen, dining, and living area or *hearth*; and have access to outdoor space. Meals are to be prepared in the open kitchen by caregivers and are shared at a common dining table in the spirit of *convivium*.

The model mandates that care in a GH home be provided by a consistent, empowered work team of universal caregivers—termed *Shahbazim*—who are responsible for the range of personal, clinical, and home care activities; the GH model prescribes that Shahbazim attend not only to elders' care needs but also to cooking, cleaning, laundry, ordering, scheduling, and other nontraditional NH caregiver tasks. The Shahbazim are to operate within a nonhierarchical staffing structure, and rotate primary responsibility for duties such as schedule creation, ordering supplies, and cooking meals. They do not report to a director of nursing or other clinical supervisor, but are supported by a *Guide* who coaches and supervises them. Clinical staff—who also work in the legacy NH—are to visit frequently, and a nurse is to be available 24 hours a day. To reinforce implementation of these components, GH homes receive ongoing support from the national office, which includes national meetings, webinars, a peer network, and other forms of communication (Zimmerman and Cohen 2010; The Green House Project 2012).

Operationally, homes adhering to the GH model seek to provide care to a diverse range of elders with a range of care needs. Care is

intended to be person-centered, meaning that elders dictate daily schedules, activities, and meals. Normalized daily activities are promoted, such as helping with laundry or setting the table for meals, and are assumed to be spontaneously organized by the residents and Shahbazim (Zimmerman and Cohen 2010; The Green House Project 2012). Table 1 presents the values, elements, and practices of the GH model as identified by The Green House Project national office using their chosen terms (The Green House Project 2012).

Existent Literature on the Green House Model

Unlike the many heterogeneous practices and models of NH culture change, the prescriptive nature of the GH model lends itself to systematic evaluation and replication. That said, relatively little research has been conducted about the GH model. Studies that have been conducted reveal some positive effects resulting from implementation of the GH model, including heightened resident quality of life in select areas, namely privacy, dignity, autonomy, and food enjoyment, but not in meaningful activity, relationships, or individuality (Kane et al. 2007); more resident and family satisfaction (Kane et al. 2007; Lum et al. 2009); and less decline in late-loss activities of daily living (ADLs; Kane et al. 2007). However, these few studies were limited by a small sample size (e.g., Kane et al. 2007), focus on only some model characteristics (e.g., Sharkey et al. 2011), or examination of select outcomes (e.g., Lum et al. 2009; Sharkey et al. 2011).

In a systematic review to examine the evidence for the elements of the model, Zimmerman and Cohen (2010) concluded that the evidence supports some GH model elements, including those related to privacy, outdoor access, residential-style kitchens and dining, and person-centered schedules of care. The evidence was mixed in other areas, including those related to the size of the home, consistent staff assignment, and the clinical staffing model, and was negative with regard to the GH's normalized engagement practices (Zimmerman and Cohen 2010).

Many unanswered questions remain about GH homes, especially because recent work suggests there is variation between GH homes in the implementation of key model elements. In prior work, Bowers and Nolet (2014) documented four disparate nursing models currently implemented in GH homes; in this issue of *Health Services Research*, they identify variation in the ability of homes to implement the changes required to adhere to the model, especially as related to supporting an empowered

Table 1: The Green House Project Values, Elements, and Practices*

Value	*Elements and Practices*
Real home	Natural surroundings • Small in scale, serving 10–12 residents (called elders) • Self-contained and self-sufficient • Design is accessible and easy to navigate • Reflective of the predominant residential type in immediate community • Residential, with institutional cues eliminated to the greatest extent possible • Evidence-based aging design elements Elements of real home • Direct and open access to all areas of home, both inside and outside • Private bedroom and full bath to support full expression of personal rhythms • Hearth area with open kitchen, dining, and living areas centered around a fireplace • Caregivers (called Shahbazim) cook meals in the home, and elders have 24-hour access to food • One dining table creates a sense of belonging and community with everyone-including caregivers, family, and guests joining together to share meals • Spa area with residential design Home for life • Elders remain in the home till the end of life • Elder-directed living • Pets encouraged and accommodated • Intentional community in the home and broader neighborhood

Continued

Table 1 *Continued*

Value	*Elements and Practices*
Meaningful life	Autonomy and control • Elders have control over the rhythms of the day, such as waking, sleeping, meals, and meaningful engagement, including alone time and self-care • Elders have informed choices and participate in formal and informal house decision making through venues such as house council meetings • Elders have direct involvement in their own care plan, creation, meeting, and implementation • The home is constructed with ceiling lifts or the ability to accommodate ceiling lifts Purposeful living • Elders have formal and informal opportunities for engagement inside and outside of the home • Elders engage in a full life where spontaneity and risk are supported by capitalizing on their abilities • Elders have access to the broader community through meaningful programs and opportunities • Elders enjoy individualized rituals and celebrations • Elders have opportunities for reciprocity based on their choice and preferences • Elders engage in deeply knowing relationships that are supported through a holistic understanding of their history and preferences • Family involvement is valued in care planning and life events • The end of life process is inclusive and reflects palliative and hospice care principles

Continued

Table 1 *Continued*

Value	*Elements and Practices*
Empowered staff	Green house organizational chart and reporting structure • Versatile direct caregivers (called Shahbazim) • Self-managed work team of caregivers • Caregivers responsible for managing work, including self-scheduling, ordering, budgeting, cooking, rhythms of the day and others • Caregivers report to a coaching leader (called a Guide) who is not the Director of Nursing or a nurse practicing within the organization • Volunteer (called a Sage) serves as an advisor to the self-managed work team Model integrity • Leadership serves as a champion for The Green House model and is vigilant in recognizing institutional creep • Guide supports continued growth and learning of the team by providing resources and ongoing educational opportunities • Green House education teaches skills related to critical thinking, clinical communications, consensus building, and other topics Systems and process • Person-centered, timely performance feedback to team and individuals that shows belief in the talent, competencies, and commitment of Green House staff • Regular team meetings to facilitate participative decision making and maintain a safe place and process for timely and meaningful peer feedback • Technology that supports communication and autonomy • Strong relationships through consistent staffing

*The values, elements, and practices are defined by The Green House Project (2012).

work team and avoiding institutional items such as medication carts and clinical uniforms for caregivers (Bowers, Nolet, and Jacobson 2016).

Variation in GH model implementation complicates its evaluation, and it may be partly responsible for mixed findings observed to date. Determining the extent to which GH homes are following the model is necessary to assess whether the model in its entirety—as opposed to one or two discrete elements—relates to outcomes under study. Another reason to examine GH homes' model implementation both individually and in context of its legacy home is that other work has shown differential adoption of culture change elements and models (including GH) by higher resourced NH organizations, meaning that positive outcomes observed in GH homes may be the product of high-performing NH organizations themselves, and not practices specific to the GH model. Indeed, Grabowski and colleagues reported that NH organizations that ultimately adopt culture change elements have higher quality ratings and fewer survey deficiencies prior to adoption, and also a higher proportion of private-pay residents (Grabowski et al. 2014).

This paper uses a mixed methods approach to describe the envisioned core values and essential practices of the GH model, and to examine the extent to which GH homes are following this defined model. It additionally compares select features of GH homes to their respective legacy home and to other NHs in the state and nation.

METHODS

Settings and Data Sources

Eligible organizations were those registered by The Green House Project that included at least one skilled nursing GH home that housed residents as of December 31, 2010, and was affiliated with a legacy NH. Of the 16 organizations meeting these criteria, staff from 12 GH organizations across 11 states took part in a structured interview that provided organizational-level data (including regarding residents and staff); data were collected from May 2012—May 2013. Staff from nine of these organizations also participated in semistructured interviews conducted on-site, February 2012—September 2014. Secondary data were used to broadly compare these settings to other NHs in the same states and across the nation.

Structured Interviews. Structured interviews were completed with administrators (or their designee) in 12 GH/legacy organizations. These interviews asked questions separately for the GH and legacy home except for areas that did not differ between the two (e.g., ownership status, religious affiliation). Questions addressed the presence of select structures and practices indicative of GH model implementation, and included those that create *real home* (e.g., unit size, outdoor access), *meaningful life* (e.g., resident control over bed times, availability of group activities), and *staff empowerment* (e.g., self-managed work teams).

In addition to individual questions, two established subscales were administered in GHs, namely those from a modified version of the Policy and Program Information Form (POLIF) (Lemke and Moos 1980; Zimmerman, Eckert, and Wildfire 2001). These questions addressed components in the Individual Freedom and Institutional Order domain (i.e., Policy Choice and Provision for Privacy) and addressed whether residents are encouraged, allowed, discouraged, or prohibited from exercising 11 various forms of freedom, ranging from skipping breakfast to sleeping late to choosing the furniture in their room. Scores represent the percent of the 11 behaviors encouraged or allowed, and theoretically range from 0 to 100 percent. Fifteen other items assessed the extent to which residents are involved in decision making in areas such as planning menus, making decisions about pets in the home, and choosing new residents. Scores represent the percent of the 15 areas in which residents make decisions either independently or with staff input, and again theoretically range from 0 to 100 percent.

Semistructured Interviews. Qualitative data were collected during visits to nine of the GH/legacy organizations selected to represent a range of organization size, length of operation, and resident clinical outcomes. During these visits, two members of the research team interviewed 250 GH/legacy staff, including direct care staff (nursing assistants and Shahbazim), directors of nursing and other licensed nurses, therapy staff, administrators (referred to as *Guides* in GH homes), and other department heads (social work, dietary, environmental services, human resources, medical director), and nurse practitioners. The semistructured interviews included questions relevant to the elements of the GH model, such as “Tell us how you make this a homelike environment for the elders” and “What parts of the model have been more difficult to implement or sustain?” Interviews began with open, nondirective questions about implementing the GH model and the impact

of the model on care processes; as data were analyzed, interview questions were iteratively refined, becoming increasingly focused on emerging themes.

Secondary Data. To determine the representativeness of GH/legacy organizations in relation to NHs nationally and in their respective state, minimum dataset (MDS) 3.0 staffing and quality measure data for all licensed NHs were downloaded from Nursing Home Compare (Centers for Medicare and Medicaid Services 2014). The staffing and quality measure data for GH/legacy organizations are combined in this dataset. MDS 3.0 staffing data represent the January 1, 2011—June 30, 2013 period, while quality measure data reflect the April 1, 2011 through June 30, 2012 reporting period, as these were the data that were available.

Analyses

Continuous data derived from the structured interviews were analyzed using related-samples Wilcoxon-signed ranks tests, and binary categorical data were analyzed using related-sample McNemar tests.

For comparison of MDS 3.0 staffing and quality measure data from GH/legacy organizations to those of other licensed NHs, Mann–Whitney tests were used because the data were not normally distributed. Analyses compared GH/legacy organizations to all other NHs, and also to only those NHs in the 11 states with a participating GH/legacy organization. Of note, data for GH/legacy organizations are combined upon dataset download, and so comparisons between GH and their legacy could not be made.

Semistructured interviews were transcribed verbatim, entered into NVivo10 (QSR International), and coded thematically; additional details regarding these analyses are available elsewhere (Bowers et al. 2016; Bowers, Nolet, and Jacobson 2016). These coded interviews were then reanalyzed using a directed content analysis, with analytic categories prescribed by the structured interview findings (Hsieh and Shannon 2005). Categories broadly focused on real home, meaningful life, and empowered staff. Within each category, content was sought relevant to presence or absence of GH model elements; perceptions of importance and value of GH model elements; implementation of GH model elements; and variations in—and factors perceived as contributing to variations in—GH model elements.

All materials and procedures were approved by the Institutional Review Boards of the University of North Carolina at Chapel Hill, University of Utah, and University of Wisconsin-Madison.

RESULTS

The majority of participating GH/legacy organizations were nonprofit (92 percent), affiliated with a religious organization (75 percent), and/or part of a continuing care retirement community (CCRC; 67 percent). Legacy homes had been in operation for an average of 44 years (range 3–97 years), and GH homes had been in operation for fewer years (average 4.3 years, range 2–7). Table 2 describes and compares the GH and legacy homes in terms of select characteristics and practices indicative of GH model implementation.

Legacy organizations typically built GH homes on the same campus under the legacy home's license, and shared administrative and some other staff and services. On average, a combined GH/legacy organization comprised 150 skilled nursing beds in total. These beds were distributed across 2–10 GH homes and 1–7 legacy units.

Real Home

In large part, the structures that we measured were included to some extent in almost all of the GH homes, and they differed substantially from the legacy homes. While most of the structural components provided opportunities to create a home environment, there was variation in whether they were fully used or used as envisioned by The Green House Project.

Small Scale. Consistent with the model's emphasis on small-scale design, GH homes had between 10 and 12 beds; far fewer than the legacy homes' units, which ranged from 24 to 50 beds. Respondents from GH homes considered the small scale to be an advantage related to staff responsiveness and efficiency, noted in a statement saying "We're in a close vicinity where we can hear if something is going on . . . we're not, you know, down another wing in another hall"; to the elders' safety and confidence, about which a staff member said: "[Elder] feels pretty good about herself that she can walk . . . she doesn't have that far to walk . . . . it kind of builds their self-esteem, makes them feel

Table 2: Green House and Legacy Characteristics and Practices

	Green House (GH) NH (n = 12)	*Legacy NH (n = 12)*	*Difference (GH—Legacy)*
Green house value: Real home			
Number of units/Green Houses, mean (range)	4.0 (2–10)	3.4 (1–7)	0.6
Number of beds per unit/Green House, mean (range)	10.5 (10–12)	34.4 (24–50)	−23.9**
Percent of rooms private, mean (range)	100 (–)	35.8 (0–71)	64.2**
No overhead paging installed, *n* (%)	10 (83)	7 (58)	3
Kitchen residents and families can access, *n* (%)	9 (75)	3 (25)	6*
Protected outdoor space, *n* (%)	9 (75)	4 (33)	5
Green house value: Meaningful life			
Choose time to awaken with no limits, *n* (%)	8 (67)	1 (8)	7*
Choose time to go to bed with no limits, *n* (%)	10 (83)	1 (8)	9**
Choose time to bathe with no limits, *n* (%)	4 (33)	1 (8)	3
Daily prescheduled group activities, *n* (%)	4 (33)	12 (100)	−8**
Green house value: Empowered staff			
Self-managed work team, *n* (%)	12 (100)	0 (0)	12**
Caregiver involvement			
Noninteractive tasks, of seven, mean (range)	6.6 (5–7)	1.0 (0–3)	5.6**
Interactive tasks, of 11, mean (range)	9.3 (7–11)	6.7 (5–9)	2.6**
Number of different caregivers/resident/week, mean (range)	7.8 (6–10)	10.6 (6–15)	−2.8*
Specialized workers of any kind, *n* (%)	5 (42)	10 (83)	−5
Medication aides, *n* (%)	2 (17)	3 (25)	−1
Feeding aides	0 (0)	1 (0.8)	−1
Bathing aides, *n* (%)	0 (0)	3 (25)	−3
Cost and payment			
Private room rate per month, mean (range)	7,958 (5,100–15,060)	7,588 (5,100–12,020)	400**
Percent of Medicaid residents, mean (range)	40.7 (0–78)	54.0 (23–75)	−13.3
Percent of private-pay residents, mean (range)	58.6 (15–90)	44.2 (20–77)	14.4*

Continued

Table 2 *Continued*

	Green House (GH) NH (n = 12)	*Legacy NH (n = 12)*	*Difference (GH—Legacy)*
Clinical care services			
Medical care available, of seven, mean (range)	5.3 (4–6)	5.4 (4–6)	−0.1
Standing treatment team			
Falls prevention, *n* (%)	10 (83)	10 (83)	0
Wound management, *n* (%)	10 (83)	10 (83)	0
Hospital transfer, *n* (%)	0 (0)	1 (8)	−1

Notes: Noninteractive tasks include ordering and stocking resident food, cooking resident meals, planning activities for residents, handling resident laundry, setting and clearing dining tables, performing light housekeeping duties, and performing deep housekeeping duties; interactive tasks include serving resident meals, helping residents to eat meals (i.e., feeding), helping residents with exercises, taking residents on trips, ensuring residents are engaged in activities that they enjoy, leading group activities, participating in group activities, helping residents stay in contact with family and friends, weighing residents, taking blood pressures, and checking blood sugars. The medical care services are X-ray, bladder scanner, catheter and drain care, tracheotomy management, wound care, IV capabilities, and tube feeding. Differences between site types in the availability of individual services were not statistically significant for any of the services.
$^{*}p < .05$; $^{**}p < .01$.

good they can walk versus having to be in a wheelchair;" and to staff and resident relationships, noted as: "... they recognize you, because there's only a few of us, and there's only a few of them. And they become friends, and they, you know, when we're busy, it's funny how patient they are. They don't say, I got to go, I got to go. They see that we're helping this person ..."

Private Space. Also consistent with the GH model, all of the rooms in GH homes were private, while only 36 percent of those in legacy units were private.

Residential Feel. A lower proportion of GH homes (17 percent) had overhead paging systems installed, compared to the legacies (42 percent), although this difference was not significant. Still, contrary to the GH model, two (17 percent) GH homes did have overhead paging installed, and staff indicated it was used in some circumstances. Respondents from GH homes reported other characteristics of the homes provided a 'homey' feel, for example: "We have a big table where all the elders can sit. It's not little. It's beautiful. You'd want one in your own home .... Some of the elders and families have brought in trinkets

or, you know, furniture that they've donated . . . And having little things like that really make it homey."

Open Kitchen. All GH homes included an open kitchen, and 75 percent of these permitted families and elders access. This proportion was significantly higher than that reported by legacy homes, where 25 percent of homes allowed families and residents to access the kitchen ($p = .03$). Despite the ready access in GH homes, respondents reported kitchens were infrequently used by elders, citing reasons such as health or cognitive status (i.e., frail or cognitively impaired residents were unable or unaware), and expectations (i.e., some expected to be "waited on" and/or had no interest in preparing food). Staff believed that families did sometimes use the kitchens to prepare food for their family member, and noted that planning and organization were important: "If it's for their [elder] and other things aren't being prepared at the same time, that's fine. If it's for other [elders], or if they are in the kitchen while the Shahbazim are cooking for everyone, we have to plan it out. We need to make sure it's safe for everyone, like with how things are cooked and textures. We have to follow our guidelines."

Outdoor Space. Protected outdoor space was provided in 75 percent of GH homes and 33 percent of legacy units. In GH homes, outdoors spaces varied considerably in their design, access, and use. Some were large areas with adequate seating and protection from the weather; others contained only small "overhangs" and caregivers worried that residents might get sunburnt or overheated. There was also variation in whether staff could easily observe residents using the outdoor space. In homes where staff noted having clear visibility to outside areas, doors were left unlocked, allowing elders to come and go as they pleased. But, in homes where they could not be easily observed in outside areas, staff were often reluctant to let them go outside unaccompanied. This reluctance limited outside access and staff members explained: "I think they would need help to get in and out, but then we also have to look . . . at safety and can the person do that independently." One GH home Guide also noted that the outdoor spaces were not consistently successful saying: "Some houses do great at it. I've got one house that . . . you go over there, and they're always outside on the porch, whether they're drinking margaritas,

whether they're doing exercises, or just sitting there talking. That's an activity. So it's hit and miss."

Location. The commitment to creating a home-like environment in a "residential" area led many GH/legacy organizations to build GHs at some distance from the legacy homes. Respondents noted both benefits and limitations of this arrangement. One reported benefit of the residential location was that it created the sense of the GH homes being part of a neighborhood; as one respondent explained: "... they [elders] can sit out there ... watching, being on your street and cars and your neighbors are coming home. And they can see the people walking ... and oh, there goes the mailman ..."

From an organizational perspective, the distance contributed to some GHs describing support services and oversight processes as inconsistent and insufficient, however. One administrator indicated: "The support was not as strong as we'd like to it have been. The support staff does not go down to the [GHs] as much as we'd like." At some sites, where administrators sought to increase the integration between GH and legacy homes, there too were challenges, as it led to decreased autonomy of GH homes and was perceived by some staff as inconsistent with the intended autonomy of the GH model and its staff.

Meaningful Life

Implementing and supporting the practices to create meaningful life proved somewhat challenging for GH homes. Although the GH homes more often implemented practices to support meaningful life than did the legacy homes, they fell short of promising complete resident choice, decision making, and meaningful engagement.

Resident Control. Residents in GH homes had significantly more choice in awakening (67 percent vs. 8 percent) and bed (83 percent vs. 8 percent) times than did those in legacies (p = .016 and .004, respectively); GH homes also allowed more choice around bath times than legacies (33 percent vs. 8 percent), but this difference was not significant. All four GHs with constraints on awakening times also constrained choice of bath times, and two GHs placed constraints on awakening, bath, and bed times. These two homes reported that

elders must choose awakening, bath, and bed times within "a predefined window of time."

Staff who had worked in both the GH and legacy home reported that they found it challenging to make the shift from accustomed routines in the legacy home to unconstrained resident choice: "One [caregiver] came to me the other day and she's been in the Green House 3 years. She said, 'It's like it is in the legacy, when that [resident] leaves, whoever comes in their spot gets the bath, right? I said 'No way! He doesn't have to take the dead man's bath.' That's not the way it works. I said, 'When does he want his bath?' and she said, 'Well I don't know, I haven't asked him.' And I told her that's the first problem. 'You ask him what he wants and you all figure out how to accommodate him.'"

In some GH homes, therapy staff were challenged to support elder choice. Although therapists regarded GH homes positively overall, having to schedule around elder preferences led to time lost while waiting for them to awaken, or making multiple trips to determine the preferred time: "Therapy has a schedule they need to go by to be productive, and therapy is very important. And they have to walk [to the GH]. But we have taught the Shahbaz and the nurses very well that [the elders] have the right to sleep when they want to and go to bed when they want to and do what they want to. . .. We've had to educate the therapists on the philosophy of the Green House and to say you need to call the Shahbaz and work with them about when might be good time to do therapy and then fix your schedule accordingly." Some, but not all, homes were able to successfully resolve this challenge.

GH homes reported that elders had complete choice and privacy in 70 percent of the areas measured by the POLIF (data not shown). Areas where they most often had choice were in having their own furniture in the room, moving furniture around the room, skipping breakfast to sleep late, and having a glass of wine or beer with meals (92 percent of GH homes reported that elders were either encouraged or allowed to do these things). They were less often allowed to choose to have a hot plate or coffee maker in their room; 83 percent of homes stated these practices were prohibited, and the other 17 percent reported they were discouraged. Similarly, the majority (83 percent) of homes reported that residents were not allowed to lock their bedroom doors, and in fact, all stated that the doors were not equipped with locks.

Elder Decision Making. Nearly all of the GH homes (92 percent) had standing resident council meetings (data not shown). Despite these forums, GH elders made decisions independently or with staff input in only 24 percent of the 15

policy areas assessed on the POLIF. The two decisions elders made independently in the majority of homes were those related to visiting hours for families and friends and whether pets were allowed in the home (8 [67 percent] of homes reported elders made these decisions). The remaining and majority of policy decisions were made either by staff or by staff with input from elders; decisions in which elders were least involved were about new elders being admitted (11 [92 percent] of homes said staff made these decisions without input) and changes in staff (100 percent of homes excluded elders from these decisions).

Engagement. GH homes were significantly less likely than legacy homes to have prescheduled daily activities (33 percent vs. 100 percent; $p = .008$), relying instead on spontaneous, naturally occurring activities. One caregiver's description was indicative of the unstructured, elder-directed life of many GH homes saying: "They get to dictate what they want to do, so sometimes we'll have three people playing cards, and somebody else wanted to go take a nap. Or we'll have a craft. Some of them join in. Some of them don't. Exercises, on some days they feel up to it. Sometimes they don't. So we do try to accommodate them and find what they like to do, is the goal."

Some elders preferred having a consistent schedule of activities where they could interact with others (e.g., music groups, crafts). A department head from a legacy home said: "The biggest thing that I've heard is that if it's someone who likes lots of activities, [the GH home] isn't usually as, isn't something that they like as well as being in the [legacy] where they have more, you know, big activities. . .." GH caregivers found it difficult to regularly offer activities or provide meaningful engagement within the house, and identified activities as the first thing to drop when it was a busy day, or when resident acuity was particularly high. Challenges were also identified related to outings, particularly when trying to support choice about whether to participate: "The [legacy] building does more of the outings, because now we have to have two people [Shahbazim] here at all times [to meet staffing requirements for remaining residents]. Obviously, you can't take two people and leave the other eight and take off."

Half of the GHs used staffing strategies to assist caregivers with activities, such as having a caregiver scheduled exclusively for activities 3 days per week, having a dedicated therapy aide from the legacy home visit the GH each day to supervise an activity, and selecting Guides or caregivers who had a background in activity provision.

Empowered Staff

GH homes were highly consistent with the GH model—and differed notably from the legacy homes—in areas related to staffing. Self-managed and universal work teams were prominent features of the GH homes, and these caregivers were more consistently assigned to residents than were caregivers in legacy homes.

Self-Managed Work Teams. All GH homes used self-managed work teams to assign work responsibilities; none of the legacy homes did so (p = .001). However, there was variation in what tasks were "self-managed" by the caregivers in the GH homes. For example, while most reported that caregivers created their own schedules and self-managed absences, in others, the schedules were created or managed by staff in the legacy home. In one organization, the responsibility was spread among several staff described as: "Well, they're [the GH Guides] overseeing the scheduling. We have the schedulers [a designated Shahbaz], but you know, they're not here all the time . . ." Scheduling was consistently described by Shahbazim as the most undesirable task: "I think it's a scary thing for some people, just because of the, they think, oh, my gosh, I have to fill these holes, and I have to call all these people. Because it's really, it's more time-consuming probably now than most of the other roles."

Some GH homes reported hiring caregivers to fill specific roles, such as cooking or organizing activities. Although such a specialized worker is not in accordance with the GH model, one administrative staff explained: "Our satisfaction with our food was not great, because, again, you have 19-, 20-year-old CNAs cooking. Not everybody can cook . . . . it has actually worked out beautifully. It ensures food preferences were spot on. You know, after 40 hours a week cooking for your elders, they get to know exactly what each likes."

Versatile Universal Workers. In the GH homes, caregivers were responsible for an average of seven noninteractive tasks (e.g., cleaning, cooking meals) and nine interactive tasks (e.g., participating in activities, taking blood pressures), all of which were more prevalent in GH than in legacy homes. Areas of greatest difference included ordering and stocking food and cooking meals (staff in 100 percent of GH homes and 0 percent of legacy homes did these tasks); handling resident laundry (100 percent GH, 8 percent legacy); deep housekeeping

(75 percent GH, 0 percent legacy), and planning resident activities (83 percent GH, 8 percent legacy). GH and legacy caregivers had similar responsibilities in areas such as helping residents eat meals and taking resident blood pressures (100 percent in both home types), weighing residents (100 percent GH, 92 percent legacy), serving meals to residents (100 percent GH, 75 percent legacy), and helping residents with exercises (75 percent GH, 67 percent legacy).

There was substantial variation in caregiver responsibilities between GH homes as well. While caregivers in 64 percent of GH homes took elders on trips outside the building, in the other GHs trips were infrequent or were taken only in partnership with the legacy home and its activities staff. One caregiver explained: "You know, with all the house duties, it's [taking resident's on outings] too much."

Consistent Assignment. Compared to legacy homes, GH homes reported greater consistency in the caregivers assigned to elders each week; GH homes reported that one elder was cared for by an average of 8 (range 6–10) different people across all three shifts in a week compared to 11 (range 6–15) in legacies ($p = .011$). Caregivers in GH homes felt the consistency in staffing was crucial in creating a team and a home, but also acknowledged the challenges associated with working so closely. As one explained: "... We are a close team. You know, there's only a few of us. There's three on days, three on evenings, and ... one and a half at night. So working as a team, when you have a new person come in, the dynamics change. So it's hard for some ..."

GH and legacy homes shared administrators and reported having an average of two different administrators within the previous 3 years. The number of different administrators varied from one to three; 58 percent reported one, 25 percent two, and 17 percent reported three different administrators during that time period. Similar variation in stability was seen among the directors of nursing; 60 percent of GH/legacy homes had one, 33 percent had two, and one (8 percent) had three directors of nursing over this period. The one GH/legacy home with three different directors of nursing also had two different administrators.

Cost and Payment

In the GH homes, the average private-pay monthly rate for a private room was $7,958 (range $5,100–$15,060) and in legacy units, the corresponding rate

was 5 percent lower at $7,558 (range $5,100–$12,020; $p = .003$). In all but two GH/legacy organizations (where rates were the same), rates for a private room in the GH were higher than in the legacy. A slight majority of legacy residents were supported by Medicaid payments (54 percent), while fewer (41 percent) GH residents were. In some GH homes, no residents were supported by Medicaid, whereas the lowest percentage of residents supported by Medicaid in a legacy was 23 percent.

Clinical Care Services

GH and legacy homes offered—and in most cases shared—equipment and workforce to support a similar array of clinical care services, such as on-site X-ray, catheter and drain care, wound care, and tube feeding. They were also similar in the presence of standing treatment teams to address falls, wounds, and hospital transfers.

National and State Comparison

GH/legacy organizations significantly differed from their national and state counterparts in adjusted (based on resident acuity) and unadjusted CNA (caregiver) hours per resident day ($p < .001$) and total care hours per resident day, but they did not significantly differ from others in licensed nurse hours per resident day. In terms of quality measures, GH/legacy organizations differed from their state counterparts only in the percent of long-stay residents whose need for help with ADLs increased (median 12.6 percent vs. 16.4 percent, $p = .032$), indicating less decline among residents of GH/legacy organizations. No other differences in the quality measures were observed in comparisons made to the study states or the nation overall. See the online appendix for details. (Of note, a more refined analyses of these comparisons can be found in Afendulis et al. 2016).

DISCUSSION

GH homes are most consistent with the model and with other GH homes in structures intended to create a real home, such as small size, private rooms and baths, and open kitchens, and also in areas relevant to staff empowerment, including consistently assigned, universal workers. As reflected in the results, GH staff attributed enhanced resident oversight and improved resident

interactions to the small size. Other research indicates that private rooms and bathrooms are preferred by NH residents and families, associated with reduced infections, and relate to better quality of life (Zimmerman et al. 2002; Drinka et al. 2003; Calkins and Cassella 2007; Rosen et al. 2008; Xu, Kane, and Shamliyan 2013). Therefore, consistently implementing these structures seems advantageous. The evidence to support consistent assignment and universal workers is less strong in terms of outcomes (Zimmerman and Cohen 2010), but these models are largely preferred by residents and families and are accepted by staff (Teresi et al. 1993; Bowers, Esmond, and Jacobson 2000; Burgio et al. 2004). However, GH homes did vary in their implementation of the universal worker model, as for example, some homes had found it advantageous to modify the model by using specialized workers (e.g., "schedulers" and cooks) to perform certain tasks. Consequently, the use of specialized workers merits further study as to its benefits and limitations.

The GH homes differed most among themselves and from the model in practices related to resident choice. Over a third of GH homes reported that residents did not have complete choice of awakening time, and nearly two-thirds reported residents could not make unrestrained choices about bathing times. A third of GH homes reported that elders must choose awakening, bath, and bed times within "a predefined window of time". This finding is counter to the GH model, and to the culture change movement, more generally. GH respondents offered insights into the challenge of offering resident's unrestricted choice, citing reasons such as long-held practices and clinical schedules.

Also contrary to the GH model, elders also were not involved in decision making. Although they made decisions independently in the majority of homes about visiting hours and pets, the majority of policy decisions (13 of 15) were made either by staff or by staff with input from elders. In all GH homes surveyed, residents were not permitted input into decisions about changes in staff, and in all but one home, were also excluded from decisions made about new residents. These latter two findings are not only contrary to the GH model, but are counterintuitive given the close and intimate nature of the GH homes. GH residents reside in a relatively small and shared space where normalized activities of home occur, where they share a common dining table, and where they are cared for by a small and relatively consistent group of caregivers. Excluding residents from decisions about their housemates and caregivers disempowers residents, suggests they have little real control over their 'home', and may tarnish perceptions of nursing home quality (Hamann 2014). On the other hand, there may be both practical and ethical challenges to

including residents in these selection processes. This challenge remains unresolved.

The legacy homes shared many of the same challenges as those faced by their GH homes, and were even less likely to promote resident choice. Also, unlike the GH homes, most of the legacy homes were built prior to the culture change movement (an average of 44 years ago) and did not include the physical structures that enable "real home" such as open kitchens and private rooms. Although retrofitting the legacy home to include these structural elements might be cost-prohibitive, some procedural elements of culture change implemented in the GH homes—such as those related to a self-managed work team and universal workers—involve little upfront capital investment (Elliot et al. 2014). Yet these staffing structures were not seen in the legacy homes. Admittedly, findings from other research related to staff preference for greater empowerment and expanded roles are equivocal, and in the absence of financial incentives, staffing models that require additional expertise and responsibility on the part of caregiving staff do not relate to job satisfaction or intent to continue employment (Bishop et al. 2008; Zimmerman and Cohen 2010). In Brown et al. (2016) report that GH caregivers earn an average of $0.60 more per hour than do legacy caregivers, suggesting that if legacy homes are to adopt the GH staffing practices perceived as requiring "more" of caregiving staff, modest pay increases may facilitate acceptance. Indeed, the national GH office suggests that caregivers in the GH be paid 10 percent more than those in the legacy home (S. Frazier, personal communication, December 11, 2014).

Also unlike the GH homes, all of the legacy homes offered prescheduled daily activities. A substantial body of evidence suggests that these activities are important to resident well-being and social engagement (Mor et al. 1995; Degenholtz et al. 2006). Although the GH model prescribes normalized, spontaneous activities, it has been shown that residents are more likely to participate in activities when prompted by staff; further, resident quality of life is positively affected by the presence of designated activities staff in the NH (Schroll et al. 1997; Degenholtz et al. 2006). Therefore, GH homes must ensure caregivers have adequate time, skill, and training to promote and ensure activity engagement. Fortunately, the GH/legacy organizations do have more caregiver hours per resident day than their local or national counterparts, and so seem to be in a position to promote resident activity engagement.

Taken together, these findings provide valuable insight into the implementation of, and adherence to, the prescribed GH model of NH care. Although GH homes represent the core values of the model in many areas, in others they appear more similar to their legacy homes. Of course, these

findings must be considered in tandem with the limitations of the data, including that they are derived from a small sample size and reflect only some elements of the GH model, and all eligible GH homes had to have a legacy home. Other manuscripts in this special issue further examine the extent of model implementation and variation and also determine the effects of the model on clinical and cost outcomes. As GH and similar models of NH care continue to be promoted and employed, this evidence is essential for elucidating the precise structures and practices they comprise and their relationships to outcomes.

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References

Afendulis, C. C., D. J. Caudry, A. J. O'Malley, and D. C. Grabowski, for the THRIVE Research Collaborative. 2016. "Green House Adoption and Nursing Home Quality." *Health Services Research*, 51 (1 Pt 2): 454–74.

Bellot, J. 2012. "Nursing Home Culture Change: What Does It Mean to Nurses?" *Research in Gerontological Nursing* 5 (4): 264–73.

Bishop, C. E., D. B. Weinberg, W. Leutz, A. Dossa, S. G. Pfefferle, and R. M. Zincavage. 2008. "Nursing Assistants' Job Commitment: Effect of Nursing Home Organizational Factors and Impact on Resident Well-Being." *The Gerontologist* 48 (S1): 36–45.

Bowers, B. J., and K. Nolet. 2014. "Developing the Green House Nursing Care Team: Variations on Development and Implementation." *The Gerontologist* 54 (S1): S53–64.

Bowers, B. J., S. Esmond, and N. Jacobson. 2000. "The Relationship between Staffing and Quality in Long-Term Care Facilities: Exploring the Views of Nurse Aides." *Journal of Nursing Care Quality* 14 (4): 55–64.

Bowers, B., K. Nolet, and N. Jacobson, for the THRIVE Research Collaborative. 2016. "Sustaining Culture Change: Experiences in the Green House Model." *Health Services Research*, 51 (1 Pt 2): 398–417.

Bowers, B., T. Roberts, K. Nolet, and B. Ryther, for the THRIVE Research Collaborative. 2016. "Inside the Green House "Black Box": Opportunities for High Quality Clinical Decision Making." *Health Services Research*, 51 (1 Pt 2): 378–97.

Brown, P. B., S. L. Hudak, L. W. Cohen, S. D. Horn, and S. Zimmerman, for the THRIVE Research Collaborative. 2016. "Workforce Characteristics, Perceptions, Stress, and Satisfaction among Staff in Green House and Other Nursing Homes." *Health Services Research*, 51 (1 Pt 2): 418–32.

Burgio, L. D., S. E. Fisher, J. K. Fairchild, K. Scilley, and J. M. Hardin. 2004. "Quality of Care in the Nursing Home: Effects of Staff Assignment and Work Shift." *The Gerontologist* 44 (3): 368–77.

Calkins, M., and C. Cassella. 2007. "Exploring the Cost and Value of Private versus Shared Bedrooms in Nursing Homes." *The Gerontologist* 47 (2): 169–83.

Centers for Medicare and Medicaid Services. 2013. "Nursing Home Data Compendium 2013 Edition" [accessed November 10, 2014]. Available at http://www.cms.gov/Medicare/Provider-Enrollment-and-Certification/CertificationandComplianc/downloads/nursinghomedatacompendium_508.pdf

Centers for Medicare and Medicaid Services. 2014. "Nursing Home Compare" [accessed December 14, 2014]. Available at https://data.medicare.gov/data/nursing-home-compare

Coleman, M. T., S. Looney, J. O'Brien, C. Ziegler, C. A. Pastorino, and C. Turner. 2002. "The Eden Alternative: Findings after 1 Year of Implementation." *The Journals of Gerontology Series A: Biological Sciences and Medical Sciences* 57 (7): 422–7.

Degenholtz, H. B., R. A. Kane, R. L. Kane, B. Bershadsky, and K. C. Kling. 2006. "Predicting Nursing Facility Residents' Quality of Life Using External Indicators." *Health Services Research* 41 (2): 335–56.

Drinka, P., P. Krause, L. Nest, B. Goodman, and S. Gravenstein. 2003. "Risk of Acquiring Influenza A in a Nursing Home from a Culture-Positive Roommate." *Infection Control and Hospital Epidemiology* 24: 872–4.

Elliot, A., L. W. Cohen, D. Reed, K. Nolet, and S. Zimmerman. 2014. "A "Recipe" for Culture Change? Findings from the THRIVE Survey of Culture Change Adopters." *The Gerontologist* 54 (S1): S17–24.

Grabowski, D. C., A. Elliot, B. Leitzell, L. W. Cohen, and S. Zimmerman. 2014. "Who Are the Innovators? Nursing Homes Implementing Culture Change." *The Gerontologist* 54 (S1): S65–75.

The Green House Project. 2012. *Core Values and Practices.* The Green House Project.

Hamann, D. J. 2014. "Does Empowering Resident Families or Nursing Home Employees in Decision Making Improve Services Quality?" *Journal of Applied Gerontology* 33 (5): 603–23.

Hsieh, H. F., and S. E. Shannon. 2005. "Three Approaches to Qualitative Content Analysis." *Qualitative Health Research* 15 (9): 1277–88.

Institute of Medicine. 1986. *Improving the Quality of Care in Nursing Homes.* Washington, DC: National Academy Press.

Kane, R. A., T. Y. Lum, L. J. Cutler, H. B. Degenholtz, and T. C. Yu. 2007. "Resident Outcomes in Small-House Nursing Homes: A Longitudinal Evaluation of the Initial Green House Program." *Journal of the American Geriatrics Society* 55: 832–9.

Koren, M. J. 2010. "Person-Centered Care for Nursing Home Residents: The Culture-Change Movement." *Health Affairs (Millwood)* 20: 312–7.

Lemke, S., and R. Moos. 1980. "Assessing the Institutional Policies of Sheltered Care Settings." *Journal of Gerontology* 35: 96–107.

Lum, T. Y., R. A. Kane, L. J. Cutler, and T. C. Yu. 2009. "Effects of Green House Nursing Homes on Residents' Families." *Health Care Financing Review* 30 (2): 35–51.

Mattimore, M. J., N. S. Wenger, N. A. Desbiens, J. M. Teno, M. B. Hamel, H. Liu, R. Califf, A. F. Connors, J. Lynn, and R. K. Oye. 1997. "Surrogate and Physician Understanding of Patients' Preferences for Living Permanently in a Nursing Home." *Journal of the American Geriatrics Society* 45 (7): 818–24.

Mor, V., K. Branco, J. Fleishman, C. Hawes, C. Phillips, J. Morris, and B. Fries. 1995. "The Structure of Social Engagement among Nursing Home Residents." *Journal of Gerontology: Psychological Sciences* 50B (1): P1–8.

Rosen, T., M. Lachs, A. J. Bharucha, S. Stevens, J. A. Stevens, F. Nebres, and K. Pillemer. 2008. "Describing Resident-to-Resident Aggression in Long Term Care Facilities: Insights from Focus Groups of Nursing Home Staff." *Journal of the American Geristrics Society* 56: 1398–408.

Saliba, D., and J. F. Schnelle. 2002. "Indicators of the Quality of Nursing Home Residential Care." *Journal of the American Geriatrics Society* 50: 1421–30.

Schroll, M., P. V. Jonsson, V. Mor, K. Berg, and S. Sherwood. 1997. "An International Study of Social Engagement among Nursing Home Residents." *Age and Ageing* 26: 55–9.

Sharkey, S. S., S. Hudak, S. D. Horn, B. James, and J. Howes. 2011. "Frontline Caregiver Daily Practices: A Comparison Study of Traditional Nursing Home and the Green House Project Sites." *Journal of the American Geriatrics Society* 59: 126–31.

Sloane, P. D., B. Hoeffer, C. M. Mitchell, D. A. McKenzie, A. L. Barrick, J. Rader, B. J. Stewart, K. A. Talerico, J. H. Rasin, R. C. Zink, and G. G. Koch. 2004. "Effect of Person-Centered Showering and the Towel Bath on Bathing-Associated Aggression, Agitation, and Discomfort in Nursing Home Residents with Dementia: A Randomized, Controlled Trial." *Journal of the American Geriatrics Society* 52 (11): 1795–804.

Teresi, J., D. Holmes, E. Benenson, C. Monaco, V. Barrett, M. Ramirez, and M. J. Koren. 1993. "A Primary Care Nursing Model in Long-Term Care Facilities: Evaluation of Impact on Affect, Behavior, and Socialization." *The Gerontologist* 33 (5): 667–74.

Xu, D., R. L. Kane, and T. A. Shamliyan. 2013. "Effect of Nursing Home Characteristics on Residents' Quality of Life: A Systematic Review." *Archives of Gerontology and Geriatrics* 57: 127–42.

Zimmerman, S., and L. W. Cohen. 2010. "Evidence Behind the Green House and Similar Models of Nursing Home Care." *Aging Health* 6 (6): 717–37.

Zimmerman, S., J. K. Eckert, and J. Wildfire. 2001. "The Process of Care." In *Assisted Living Needs, Practices, and Policies in Residential Care for the Elderly*, edited by S. I. Zimmerman, P. D. Sloane, and J. K. Eckert, pp. 198–223. Baltimore, MD: Johns Hopkins Press.

Zimmerman, S., A. L. Gruber-Baldini, J. R. Hebel, P. D. Sloane, and J. Magaziner. 2002. "Nursing Home Facility Risk Factors for Infection and Hospitalization:

Importance of Registered Nurse Turnover, Administration, and Social Factors." *Journal of the American Geriatrics Society* 50 (12): 1987–95.

Supporting Information

Additional supporting information may be found in the online version of this article:

Appendix SA1: Author Matrix.
Table S1. Staffing and Quality Measures.