

© Health Research and Educational Trust

DOI: 10.1111/1475-6773.12430

SPECIAL ISSUE - GREEN HOUSE MODEL OF NURSING HOME CARE

New Evidence on the Green House Model of Nursing Home Care: Synthesis of Findings and Implications for Policy, Practice, and Research

Sheryl Zimmerman, Barbara J. Bowers, Lauren W. Cohen, David C. Grabowski, Susan D. Horn, Peter Kemper, for the THRIVE Research Collaborative^a

Objective. To synthesize new findings from the THRIVE Research Collaborative (The Research Initiative Valuing Eldercare) related to the Green House (GH) model of nursing home care and broadly consider their implications.

Data Sources. Interviews and observations conducted in GH and comparison homes, Minimum Data Set (MDS) assessments, Medicare data, and Online Survey, Certification and Reporting data.

Study Design. Critical integration and interpretation of findings based on primary data collected 2011–2014 in 28 GH homes (from 16 organizations), and 15 comparison nursing home units (from 8 organizations); and secondary data derived from 2005 to 2010 for 72 GH homes (from 15 organizations) and 223 comparison homes.

Principal Findings. Implementation of the GH model is inconsistent, sometimes differing from design. Among residents of GH homes, adoption lowers hospital readmissions, three MDS measures of poor quality, and Part A/hospice Medicare expenditures. Some evidence suggests the model is associated with lower direct care staff turnover.

Conclusions. Recommendations relate to assessing fidelity, monitoring quality, capitalizing opportunities to improve care, incorporating evidence-based practices, including primary care providers, supporting high-performance workforce practices, aligning Medicare financial incentives, promoting equity, informing broad culture change, and conducting future research.

Key Words. Green House, nursing home, culture change, outcomes, evidence

The Green House (GH) model is a prescriptive model of residential long-term or rehabilitative care licensed by THE GREEN HOUSE Project[®] (<http://thegreenhouseproject.org/>). Essential elements of GH homes relate to core

values of *real home* (e.g., no more than 12 elders [the term that refers to the residents who live there], meals cooked in a central open kitchen, elder-directed living); *meaningful life* (e.g., elder control over time to wake, eat, and sleep, and access to activities in the broader community); and *empowered staff* (e.g., self-managed teams of Shahbazim, the term that refers to certified nursing assistants; Cohen et al. 2016).

As of May 2015, 174 GH homes were in operation, 80 percent of which provided long-term nursing care. These homes have elicited great interest among policy, provider, and research stakeholders, in large part because they offer a true alternative to traditional models of nursing home care and are consistent with the “culture change” movement by focusing on person-centered care and deinstitutionalizing the nursing home (Koren 2010; Zimmerman, Shier, and Saliba 2014). At the same time, the cost of new construction for GH homes has become a point of concern (Jenkins et al. 2011) as have questions about whether outcomes are at least comparable to traditional nursing homes in which nurses and allied health staff are more readily available (i.e., in the GH model, the clinical care staff is available but not based in the GH home itself; Zimmerman and Cohen 2010).

Between 2011 and 2014, the Robert Wood Johnson Foundation funded an independent evaluation of GH nursing homes by four project teams; their collaborative interrelated research projects examined GH care processes and outcomes. Termed the THRIVE Research Collaborative (THRIVE: The Research Initiative Valuing Eldercare; Fishman, Lowe, and Frazier 2016), these projects collectively constitute the largest and most coordinated evaluation of the GH model to date, and they are described in this special issue of

Address correspondence to Sheryl Zimmerman, Ph.D., Cecil G. Sheps Center for Health Services Research and School of Social Work, University of North Carolina at Chapel Hill, 725 Martin Luther King Jr. Boulevard, Campus Box 7590, Chapel Hill, NC 27599-5790; e-mail: sheryl_zimmerman@unc.edu. Barbara J. Bowers, Ph.D., is with the School of Nursing, University of Wisconsin-Madison, Madison, WI. Lauren W. Cohen, M.A., is with the Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill, Chapel Hill, NC. David C. Grabowski, Ph.D., is with the Department of Health Care Policy, Harvard Medical School, Boston, MA. Susan D. Horn, Ph.D., is with the Health System Innovation and Research Program, University of Utah School of Medicine, Salt Lake City, UT. Peter Kemper, Ph.D., is with the Department of Health Policy and Administration, The Pennsylvania State University, University Park, PA.

^aThe THRIVE Research Collaborative includes Barbara Bowers, Patrick Brown, Lauren Cohen, David Grabowski, Susan Horn, Sandra Hudak, Kimberly Nolet, David Reed, and Sheryl Zimmerman.

This project was supported by the Robert Wood Johnson Foundation as part of the evaluation of the Green House Project.

Health Services Research. This paper provides a brief background of previous peer-reviewed research related to GH nursing homes, synthesizes results from the THRIVE evaluation, and suggests policy, practice, and research recommendations related to the GH model of nursing home care.

BACKGROUND

The first GH homes went into operation in 2003 in Tupelo, Mississippi. Early experiences provided guidance regarding the need to avoid institutional-appearing buildings and assure kitchen safety; train leaders to facilitate team formation and direct care workers in teamwork; develop the role of the clinical support team (nurses and therapists); and address financial concerns, among other areas (Rabig et al. 2006). A postoccupancy evaluation of the first four GH homes identified areas that needed improvement (e.g., “institutional creep”) as well as appreciation of the privacy and shared spaces provided in GH homes (Cutler and Kane 2009).

An outcome evaluation of those four homes over 2 years indicated that GH residents rated quality of life better (in 9 of 11 domains) than residents in the legacy home (the original nursing home that remains open alongside its GH home), and better (in 4 of 11 areas) than residents in a comparison nursing home; in addition, GH residents rated their satisfaction and emotional well-being more favorably, and incidence of decline in late loss activities of daily living (ADLs) was lower, but there were no differences in health or overall ADL outcomes (Kane et al. 2007). Also, GH family members reported significantly higher satisfaction than families in the legacy home, but significantly lower satisfaction than families in the comparison home (Lum et al. 2008). Although informative, methodological shortcomings of this evaluation limit generalizability (e.g., medical services differed in the homes, and the homes were administratively related). A more recent evaluation of psychosocial outcomes in a different sample found GH residents exhibited an increase in social engagement but also an increase in the rate of depressive symptoms over 18 months; similar to the previous work, a methodological limitation of this study was that the GH homes were owned by the same organization as the comparison homes (Yoon et al. 2015).

Additional work has examined adoption of the GH model, staffing, finances, and the role of nurses. Nursing homes that adopt the GH model tend to be nonprofit, faith-based, part of a continuing care retirement community, and have a special care unit; prior to adoption they have more private-pay

residents and a greater nursing assistant staffing ratio than other homes (Grabowski et al. 2014a). Consistent with the latter finding, a study of a small, selective sample found that the staffing ratio of nursing assistants was higher in GH homes, but overall staff time was slightly less (18 minutes/resident/day; Sharkey et al. 2011). In another study, analyses indicated that although GH nursing costs were higher than the national average, other operational costs were lower, with the adjusted total operating expenses of GH homes being 7.6 percent higher than the national average (Jenkins et al. 2011). Finally, examination of the role of the clinical support team identified four variations in how the nursing role was enacted, ranging from a traditional model of nurse-directed clinical care to a “visitor” model wherein nursing assistants directed clinical care and invited nurse input when it was believed their expertise was needed (Bowers and Nolet 2014).

Based on previous research, the GH model seems to be a promising model of care, but it is not possible to draw conclusions due to small sample sizes, nonrepresentative comparisons, and different topics of study. Amassing sufficient data to evaluate the model has been impeded, given how recently the model was developed (2003), the small number of elders served (10–12 per home), and the challenge of identifying suitable comparisons (e.g., “traditional” nursing homes vs. homes that have undergone culture change; caution also is required when making comparisons to legacy homes due to their symbiotic relationship). The THRIVE studies aimed to overcome these limitations.

The THRIVE Research Collaborative is a mixed methods health services research team (Bowers et al. 2013) that examined numerous interrelated topics regarding the GH nursing home model. The collaborative collected primary data from 2011 to 2014 in 28 GH homes (from 16 organizations), and 15 comparison nursing home units (from 8 organizations); in addition, secondary data were obtained for years 2005–2010 from 15 GH organizations and 223 comparison nursing homes. Subsets of the sample and data were used to answer different research questions, with the overriding intent to better understand GH implementation and impacts using larger samples and more rigorous research methods than have been possible in the past. As a whole, the THRIVE papers address the GH model and its variation and comparison to legacy homes (Cohen et al. 2016); how practices in GH homes may relate to hospital transfers (Bowers et al. 2016); the impact of the GH model on quality of care outcomes (Afendulis et al. 2016) and Medicare utilization and expenditures (Grabowski et al. 2016); characteristics of the GH workforce compared to other nursing homes, including staff perceptions about care, stress, and sat-

isfaction (Brown et al. 2016); and issues related to sustaining the GH model (Bowers, Nolet, and Jacobson 2016). Table 1 summarizes the objectives, sample, methods, and key findings from each of these papers.

SYNTHESIS OF THE FINDINGS

Implementation of Model Elements Varies in GH Homes, Sometimes Differing from Design

GH homes were *consistent with the model* and one another in structural elements (all had 10–12 private rooms and baths and open kitchens) and staffing configurations (all had self-managed work teams); on the other hand, GH homes substantially *differed from the model* in practices intended to support resident choice (e.g., 33 and 67 percent restricted choice in times to awaken and bathe, respectively) and involve residents in decision making (e.g., none allowed residents to provide input on staffing changes; Cohen et al. 2016). Homes also varied in elements associated with clinical decision making (e.g., direct care staff variably interpreted their empowerment, and medical care staff involvement differed across homes; Bowers et al. 2016).

GH Homes Differ from Other Nursing Homes

GH homes *differed most from legacy homes* in providing residents more control in time to wake and go to bed (but not bathe); in being less likely to provide formal activities (33 percent of GH homes vs. 100 percent of legacy homes); in having fewer caregivers (Shahbazim and CNAs/resident/week; GH homes had 7.8 caregivers/resident/week compared with 10.6 in legacy homes); and in having self-managed work teams that did more tasks (Cohen et al. 2016); similarly, the amount of direct care worker time was higher in GH homes than legacy homes (i.e., 4.2 vs. 2.2 hours/resident/day; Brown et al. 2016). *Compared to other nursing homes*, direct care staff in GH homes reported being more familiar with residents and better able to detect change in resident condition earlier (Bowers et al. 2016). Finally, licensed practical nurses (LPNs) in GH homes were less compliant with procedures, had less training and skills, and were less satisfied than those in other homes; that said, LPNs and direct care workers in GH homes reported being better able to provide care in the case of unexpected absences (Brown et al. 2016).

Table 1: Objectives, Methods, and Key Findings of the Green House THRIVE Projects (The Research Initiative Valuing Eldercare)

Title (Authors)	Objective	Sample and Methods	Key Findings and Conclusions
The Green House Model of Nursing Home Care in Design and Implementation (Cohen et al.)	To describe the Green House (GH) model of nursing home care, and examine how GH homes vary from the model, one another, and their founding (or legacy) nursing home	Primary quantitative and qualitative data and secondary quantitative data collected at the organizational level. Primary quantitative data derived from 12 GH organizations in 11 states that also had a legacy home, collected 5/12 – 5/13; qualitative data were collected for 9 of the homes 2/12-9/14. Minimum Data Set (MDS) 3.0 staffing and quality measure data for all licensed NHs (from Nursing Home Compare); MDS data represent the 1/11 – 7/13 period, and quality measure data reflect the 4/11 – 7/12 period.	<i>Findings:</i> 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 intended to create real home, such as private rooms and baths and open kitchens, and in staff-related elements, including a self-managed work team and consistent, universal workers. <i>Conclusions:</i> Although model variation complicates evaluation, if expansion is to continue, it is essential to examine GH elements and their outcomes.
Inside the Green House “Black Box”: Opportunities for High Quality Clinical Decision Making (Bowers et al.)	To explicate and compare care processes in GH homes with higher and lower hospital transfer rates	Qualitative data from 84 direct care, professional, and administrative staff in 6 GH homes (from the Cohen sample above) that evidenced the highest and lowest rates of hospital transfer in that sample; data were collected 1/14 – 9/14.	<i>Findings:</i> Elements of the GH model created opportunities for staff to identify, communicate, and respond to early changes in resident condition; the extent to which these opportunities were capitalized upon differed in GH homes with lower and higher transfer rates. <i>Conclusions:</i> Variations in care processes within a single care model suggest explanations for inconsistencies in past research on the clinical outcomes of culture change. Assessment of specific care processes implemented in culture change may be an important consideration in replication efforts and policy initiatives.

continued

Table 1. *Continued*

Title (Authors)	Objective	Sample and Methods	Key Findings and Conclusions
Green House Adoption and Nursing Home Quality (Afendulis et al.)	To evaluate the impact of the GH model on person-level nursing home quality of care measures	Difference-in-difference analysis of MDS assessments merged with Medicare claims data and Online Survey, Certification and Reporting System reports Analyses at the organizational level included 15 existing nursing homes in 11 states that adopted the GH model between 2005–2010 (5 of which were entirely GH homes), and 223 matched control nursing homes; analyses at the resident level included 12 existing GH organizations (in 10 states; 5 of which were entirely GH homes) and 178 matched control nursing homes; the number of residents was 4,733 (GH) and 100,774 (control)	<i>Findings:</i> For individuals residing in GH homes, adoption lowered readmissions and the MDS measures of poor quality related to bedfast residents, catheter use, and pressure ulcers. <i>Conclusions:</i> GH adoption led to improvement in hospital readmissions and some nursing home quality measures. The absence of evidence of declines in quality of care may allay concern that in its focus on improving quality of life, quality of care might suffer.
The Impact of Green House Adoption on Medicare Spending and Utilization (Grabowski et al.)	To evaluate the implementation of the GH model on Medicare expenditures and utilization associated with hospitalizations, skilled nursing home use, rehabilitation, and hospice	Difference-in-difference analysis of Medicare claims and enrollment data, MDS assessments, and Online Survey, Certification and Reporting System reports Same organizational sample as the Afendulis paper (above); the number of residents was 26,640 (GH) and 388,468 (control)	<i>Findings:</i> The adoption of GH had no detectable impact on Medicare spending and utilization across all residents living in the nursing home. For residents living in a GH home itself, adoption of the GH model reduced overall Medicare spending, although this reduction appeared to be partially offset by an increase in spending in legacy homes. <i>Conclusions:</i> Individuals residing in GH homes cost the Medicare program less than those in comparable nursing homes, but none of these savings accrue to GH organizations under traditional nursing home payment models.

continued

Table 1. *Continued*

Title (Authors)	Objective	Sample and Methods	Key Findings and Conclusions
Workforce Characteristics, Perceptions, Stress, and Satisfaction Among Staff in Green House and Other Nursing Homes (Brown et al.)	To compare workforce characteristics and staff perceptions of safety, stress, and satisfaction between GH and other nursing homes	Primary data regarding staff perceptions of safety, stress, and satisfaction from 226 staff in 26 GH units from 13 GH organizations in 11 states (12 organizations of which are included in the Cohen paper [above]) and 138 staff from 15 units from 8 comparison nursing homes, collected 1/11-7/12; secondary data from human resources records on workforce characteristics, turnover, and staffing hours reflecting the period 1/11-6/12.	<i>Findings:</i> There were few significant differences between settings, other than that GH direct caregivers provided twice the number of care hours and trended toward lower turnover. <i>Conclusions:</i> The GH environment may promote staff longevity and does not negatively affect worker stress, safety perceptions, or satisfaction. Larger studies are needed to confirm findings.
Sustaining Culture Change: Experiences in the Green House Model (Bowers, Nolet, and Jacobson)	To describe how culture change is being sustained in a sample of GH homes, as well as conditions that influence sustainability	Semistructured interviews with 166 staff in 11 GH organizations (included in the Cohen and Brown papers [above]) and observations of house meetings in six of those GH homes; data were collected 2/12-9/14.	<i>Findings:</i> Problem solving was central to understanding how the GH model is sustained. Collaborative norms and other key conditions influenced erosion or reinforcement of GH principles and practices. <i>Conclusions:</i> Sustaining the GH model requires a highly skilled team of staff with the ability to frequently and collaboratively solve complex problems in a way that supports reinforcement of the model. This finding leads to questions about the type of human resources practices and policy supports that could assist organizations to sustain culture change.

Management and Staffing Challenges Are among the Barriers to GH Implementation

Barriers to implementation and sustainability of the GH model arose as staff responded to critical events (e.g., survey citations), business challenges (e.g., staff hiring), daily routines (e.g., care provision), and gradual changes over time (e.g., resident decline); they were associated with *lead-*

ership (e.g., insufficient support provided to direct care workers, bypassing direct care workers when solving problems and instead reverting to hierarchical decision making, unclear roles and lack of time to coach direct care workers, and/or not fully supporting the GH model); *direct care workers themselves* (e.g., insufficient skills for problem solving); *budgetary concerns* (e.g., to purchase certain foods); an insufficient *pool of qualified staff*; and concerns about *regulation* (e.g., when homelike features allowed autonomy that could put residents at risk; Bowers, Nolet, and Jacobson 2016).

Communication and Collaboration Appear Important to Achieving Better Outcomes

Interaction between medical care and direct care staff, other care staff, and families (as qualitatively reported) was more common in GH homes that had fewer hospitalizations, as was having direct care workers who interpreted their empowerment to mean they worked with the medical staff as opposed to independently (Bowers et al. 2016).

Some Quality of Care Measures Indicate GH Homes Provide Higher Quality Relative to Similar Nursing Homes

Residence in a GH home was associated with a 5.5 percentage point (31 percent) decline in all 30-day *hospital readmissions* and a 3.9 percentage point (30 percent) decline in *avoidable hospitalizations*. However, there was an offsetting increase in overall 30-day readmissions for residents in the legacy unit. In terms of *Minimum Data Set (MDS)-based quality measures*, residence in a GH unit was associated with a 0.3 percentage point (15.8 percent) decline in bedfast residents, a 4.1 percentage point (45 percent) decline in catheterized residents, and 1.9 percentage point (38 percent) decline in low-risk residents with pressure ulcers; across the entire GH organization, the bedfast result was the only MDS outcome that was statistically significant, suggesting some potential offsetting effect in the legacy units for the other outcomes (Afendulis et al. 2016).

Medicare Part A Spending in GH Homes Is Lower Relative to Similar Nursing Homes

Part A (plus hospice) Medicare spending for all residents in the GH organization as a whole was lower than spending in matched comparison homes, but these differences were not statistically significant (likely due in part to limited statistical power). However, when looking separately at residents in GH

homes and legacy units within the larger GH organization, adoption of the GH model was associated with decreased Medicare spending in GH homes by 30 percent or \$7,746/resident/year ($p < .06$). At the same time, although not statistically significant, the estimated effect on spending in legacy units was in the opposite direction, an increase of \$3,784, or 15 percent, which appears to partially offset the decrease in GH homes. Although sufficient power did not exist to determine whether specific components of spending in GH homes were significantly decreased, it is likely that hospitalizations and use of skilled nursing facilities were responsible for reduced costs, given that these are the most common expenditures (Grabowski et al. 2016).

DISCUSSION AND IMPLICATIONS

The findings emerging from the THRIVE studies have implications for practice, policy, and research for the GH model as well as for the culture change movement and other person-centered care efforts.

Do Not Assume Complete Adherence to the Nursing Home Model

That not all GH homes fully implemented the highly prescriptive model of culture change should not be surprising; implementation of any innovation is ultimately tailored by each organization (Weiner et al. 2011). Consequently, caution is advised when considering the fidelity of both the GH model and other less prescriptive models of culture change intended for widespread dissemination; policy makers, providers, and researchers must not assume that a given structure or process of care is in place. An important challenge for any promising innovation is to determine which elements can be tailored and which require fidelity and consistency if intended aims are to be achieved.

Continue to Monitor the Quality of Care

For residents of GH homes, the THRIVE studies found that adoption of the GH model improved three of eight quality of care MDS measures (bedfast, catheter, low-risk pressure ulcers) but not others. That these process and outcome indicators improved and that there was no evidence that other quality measure significantly declined is notable, and it may allay concerns that the GH focus on quality of life might come at the expense of clinical care. Although the THRIVE studies could not examine which components of the

GH model were responsible for this improvement, it is likely that the elements that were most consistently implemented (such as the smaller scale, consistent staff assignment, and/or central common area) could be responsible for these results—a point worthy of additional study. Of note, these and other elements are not unique to GH homes, as suggested in recent research that found nursing homes that adopted culture change evidenced decreased pressure ulcer incidence and hospitalization (Miller et al. 2014b).

At the same time, it is important to acknowledge that the GH model did not lead to improved quality of clinical care for a majority of the MDS measures. This finding is consistent with a study of culture change adopters that found traditional health-related quality indicators were not improved compared to other nursing homes (Grabowski et al. 2014b). Indeed, the preponderance of data from culture change studies indicates that culture change rarely results in significant improvement in clinical outcomes, but neither does it have negative impacts (Shier et al. 2014).

More so, earlier pilot research found that GH adoption was associated with improved satisfaction and quality of life reported by residents and their families in some but not all domains (Kane et al. 2007; Lum et al. 2008); it also was associated with increased social engagement but also depression—a finding the authors suggest could have been an artifact of more consistent and attentive staff and better reporting (Yoon et al. 2015). Overall, findings provide optimism but also cause to continue to monitor quality of care and quality of life outcomes in GH homes, and to expressly include quality of life as an important outcome.

Three caveats are important when interpreting the quality of care impact estimates. First, due to variable implementation, the GH model being examined was not actually a pure model, and some GH components may have been present in comparison homes. Second, because GH adopters tend to be higher resourced homes (Grabowski et al. 2014a), they may have less room for improvement than comparison homes. Third, some outcomes that are considered to be negative might in fact reflect better care; for example, GH staff who are attuned to early changes in resident condition might recognize depression, or a need for hospitalization, that otherwise would have gone undetected.

Take Advantage of Opportunities for Communication and Collaboration to Provide Good Quality Care

It is challenging to identify the effective elements of a multicomponent innovation such as the GH model, because some components may not be opera-

tive, and others may work only in combination. Nonetheless, the THRIVE research establishes the importance of communication and collaboration between and among direct care staff and medical care providers to effect good quality care (at least perhaps in the three MDS areas noted above). In GH homes, consistent assignment of universal worker direct care staff, and small homes built around a central living area, allow familiarity with residents and provide opportunities for frequent interactions among staff. If used in an opportune manner, increased multidisciplinary collaboration might lead to early identification and intervention in response to resident change of medical condition, a vital step in quality care. Some GH homes took advantage of these opportunities to improve quality; others did not. Consequently, GH leadership and others promoting culture change to improve care should identify and overcome barriers for communication and collaboration. The THRIVE studies suggest that scheduling physician, nurse, and other professional staff visits should be more purposeful, and that congregate areas should be used to promote interaction; other work in GH homes suggests enacting an “integrated” model of nursing care to promote their collaboration with direct care staff (Bowers and Nolet 2014).

More Actively Include Primary Care Providers in Implementing the GH and Other Models of Nursing Home Culture Change

Physicians and nurse practitioners played an important role in whether a GH home took advantage of opportunities to improve the quality of care; components such as a fewer number of primary care providers and provider responsiveness to GH principles promoted the model and better care. Therefore, GH leadership should attend more closely to the role of primary care providers as they serve residents, perhaps by providing them information about the model as well as feedback regarding approaches to enhance collaboration.

In addition, professional organizations such as the Society for Post-Acute and Long-Term Care Medicine could increase attention to the role of primary care providers in new models of long-term nursing home care. For example, recommendations have been made to promote the development of nursing home physician specialists (Katz et al. 2009), and not only do some such practices already exist (e.g., Extended Care Physicians [<http://www.ecpmd.com/>] and Physicians Eldercare [<http://peltc.com/>], but evidence suggests that fewer and more dedicated primary care providers serving nursing home residents does indeed improve care (Lima et al. 2012; Zimmerman et al. 2014).

Expand the GH Model to Encompass Use of Evidence-Based Care Practices

At the same time that efforts to take advantage of opportunities created by some elements of the GH model are recommended, it must also be considered whether components of care less common in the GH model require attention. The GH model—as well as other culture change models—has focused more on overall organizational change and resident quality of life than on specific evidence-based structures and processes of clinical care. To be sure, the intent to radically reform nursing homes requires substantial organizational change, but other changes that may improve care and are evidence-based should not be overlooked. A great deal of literature exists to guide individual practices (e.g., see Nazir et al. 2013; Zimmerman et al. 2013; Backhaus et al. 2014) that could be implemented in GH homes. For example, evidence-based practices such as pleasant sensory stimulation (Whall et al. 1997; Remington 2002) and individualized protocols for bathing (Sloane et al. 2004) could be used to reduce resident agitation, and function-focused care could be used to promote independence (Resnick et al. 2009). The GH model provides an overarching framework within which to provide evidence-based quality care, but it should not be considered to exemplify optimal care in and of itself. This point is consistent with the finding that few culture change efforts focus on improvement in quality of care (Shier et al. 2014), and it suggests additional study of how to best implement specific quality improvement programs in GH homes.

Support High-Performance Human Resource Practices and Workforce Training, Including for Professional Staff

Departures from the GH model and failure to exploit opportunities to improve quality often resulted from human resource challenges. On occasion, administrators were uncommitted or not collaborative; LPNs were not confident about their roles and lacked skills; and direct care workers overinterpreted their authority. Implementing human resource practices that support high-performance work teams requires ongoing training and a focus on worker competencies, as well as the self-managed work teams and flattened supervisory hierarchy that are promoted in GH and other models of culture change (Bishop 2014). Of course, management and workforce challenges are not unique to GH initiatives (Kemper et al. 2007), indicating the broader value of public policy and coalition efforts to strengthen the long-term care workforce at all levels. Although the sufficiency of ongoing training for nursing home staff is an industry-wide issue, the GH model provides indications where benefits may be found.

Nursing home culture change has long promoted the importance of relationships (Shier et al. 2014), but comparatively little attention has been paid to the culture change required of professional staff in their day-to-day work with other staff, and the human resource infrastructure needed to support them. Training is required not only for the direct care workforce but also for professional staff. Educators and professional organizations, such as the National Association of Directors of Nursing Administration in Long-Term Care, the American Physical Therapy Association, the National Association of Social Workers, and others, should increase attention to the role of their discipline in new culture change models of long-term nursing home care, including the GH model.

Consider Ways to Better Align Medicare's Financial Incentives

Findings suggest that GH homes reduce Medicare Part A (plus hospice) spending, but the GH organization does not share in the related financial savings. These savings accrue to the Medicare program or, if the benefit relates to rehospitalizations, to hospitals themselves as they avoid payment penalties when rehospitalizations are reduced. Medicare is currently exploring ways to realign incentives such as value-based payment, bundled payment models, and accountable care organizations. These programs strive to incentivize providers to invest in practices that lower Medicare spending while maintaining quality. To date, these payment programs have generally not considered the role of GH homes and other nursing home culture change models and whether they might play a role in increasing value for the Medicare program.

Promote Equity as the GH Model Expands

The vast majority of GH organizations studied are nonprofit, faith-based, and part of a continuing care retirement community; they charged GH residents somewhat more than residents of legacy units, and GH homes had a higher share of private-pay residents than legacy homes. In this context, it is important to note that establishing a GH home requires an initial capital investment, and operating expenses of GH homes are almost 8 percent higher than the national average (Jenkins et al. 2011). Consumers with more resources may well be willing to pay more for care in a GH home if satisfaction and quality are indeed better (Kane et al. 2007; Lum et al. 2008), as might nursing home eligible individuals residing in assisted living who are disillusioned with care that sometimes is not person-centered (Zimmerman et al. 2015).

However, the consequence is that GH homes risk serving primarily the “high end” of the nursing home market, despite the undesirability of facilitating a two-tier system in which those able to pay have access to better quality than those who cannot (Mor et al. 2004). To succeed and promote more equitable access, GH and other nursing homes pursuing a high-performance work system must be rewarded with increased revenue (Bishop 2014). In addition to better aligning Medicare incentives, Medicaid pay-for-performance has promise to reward GH and culture change adopters if they provide better quality care. Previous studies of culture change more generally found that adoption is more likely when homes seek to increase their Medicare case mix (Lepore et al. 2015), when Medicaid payment rates are higher (Grabowski et al. 2014a), and when states have developed pay-for-performance strategies that result in nursing homes with more private rooms and small households (Miller et al. 2014a).

Apply Implications for Culture Change More Broadly

Many of the findings and implications from the THRIVE projects are applicable to other culture change initiatives and to legacy homes. In any model, allowing residents more control; improving communication and collaboration among and between direct care and physician and nursing staff; striving for optimal integration of nursing staff; promoting physician practice models that support engagement in the nursing home; and achieving more effective use of congregate areas can all be implemented regardless of the nursing home configuration. Notably, such efforts can be implemented with relatively little upfront cost, an important point for many homes implementing culture change (Elliot et al. 2014). Benefits of the small size and consistent staff assignment in GH homes were especially noted by staff and need not be restricted to the GH model. Indeed, other small house models with physical layout similar to the GH model have been promoted across the United States and Europe (Verbeek et al. 2009), and they could benefit from the guidance provided herein regarding how the physical layout influences care practices.

The culture change “train has left the station” (Zimmerman, Shier, and Saliba 2014), and continued efforts are needed if the train is to continue moving forward. One important effort in this regard is the focus of the Centers for Medicare and Medicaid Services on increasing public awareness and promoting person-centered efforts in nursing homes (Centers for Medicare & Medicaid Services 2004). Additional efforts include those of organizations and states such as adapting related regulations, participating in coalitions (Beck et al. 2014), and providing technical assistance (Bishop and Stone 2014).

Conduct Further Research on Elements of the GH Model

Future research should build on that reported herein, continuing to assess which practices are associated with better outcomes while examining distinctions between them and their significance, and also conducting additional research on the impact of the GH model on utilization and expenditures.

Several elements of the GH model in particular merit examination. First, although resident control is central to the GH and other models of culture change, resident control was not comprehensively evidenced by any GH home. Realistically, it is not feasible to promise unlimited control to 10–12 elders regarding every component of their round-the-clock experience, nor is it realistic to promise such to any individual. Greater understanding of the unavoidable limitations on resident control can lead to realistic expectations for the type and extent of choice residents can reasonably retain, and also prevent unnecessary limitations. Resident preferences should be taken into account regarding the areas in which autonomy and control are most desired, and then attempts made to fulfill these desires. Practices such as this recognize that individuals differ in their preferences, and future research could examine how person-centered practices vary by background and culture, as suggested by others (Bishop and Stone 2014).

A second element that is core to the GH model, and to the culture change movement in general, is commitment to direct care worker empowerment. The THRIVE project revealed inconsistencies in how empowerment was implemented and the importance for resulting care processes; that is, direct care workers in some GH homes overstepped their clinical training and legal authority, with potentially negative consequences for clinical care. Despite its importance in the culture change movement, empowerment practices have not been well examined.

Third, the mix and roles of LPNs and registered nurses (RNs) is not prescribed in the GH model, but several studies suggest their roles merit further examination. The common practice of using LPNs and RNs interchangeably in nursing homes has been challenged (Toles et al. 2009), partially informed by research demonstrating the importance of sufficient RN presence to improve clinical outcomes (Castle and Anderson 2011; Needleman et al. 2014). In fact, the advantages to be achieved from an empowered direct care staff may rely, in part, on the mix of licensed nursing staff. Thus, the mix and roles of direct care workers, LPNs, and RNs requires better understanding.

Fourth, questions exist regarding whether there are rightly “shades of green” and “how green is green” when it comes to implementation of the GH

model. The benefit of a highly prescriptive model is that it specifies a goal toward which to strive, but variability in implementation begs the question as to how much deviation is allowable both to constitute the GH model and to achieve intended outcomes. Future research should examine finer distinctions of the GH model of care.

Finally, low statistical power limited the ability to draw definitive conclusions about the impact of adopting the GH model on the Medicare service utilization and expenditures of the GH organization as a whole, and about the sources of the changes in overall spending. In addition, data were lacking regarding Medicare Part B and D, Medicaid, and private payer spending. Medicare policy makers are advised to invest in larger scale studies that could more comprehensively assess whether savings exist when all Medicare spending is accounted for, whether the savings persist over a longer time period, and what impacts GH adoption has on spending by Medicaid and other payers.

CONCLUSIONS

GH homes aim to “transform the culture of long-term care” (<http://www.thegreenhouseproject.org/green-house-model>). The findings and policy, practice, and research recommendations emanating from the THRIVE and other studies suggest that compared to traditional nursing homes, the GH model is a preferable model of care. At the same time that, this model is worthy of promotion, so too may be other models of nursing home care, most notably if they embody effective components of care and promote person-centered resident quality of life. Policy makers, providers, and researchers should continue their efforts to facilitate the adoption, implementation, and sustainability of evidence-based models of culture change, including GH homes. In addition, indicators of collaborative care, resident-directed care, and other quality of life indicators should be included among more traditional health-related quality of care indicators.

ACKNOWLEDGMENTS

Joint Acknowledgment/Disclosure Statement: This research was funded by the Robert Wood Johnson Foundation as part of the evaluation of the GH Project. The authors thank the staff of the GH and other nursing homes that participated in this research, for their commitment to informing and improving long-

term care. Thanks also are extended to members of the GH Project Team who provided important guidance to drive the direction of the THRIVE studies: Susan Frazier, David Farrell, Robert Jenkins, Anna Ortigara, Marla DeVries, Rachel Scher McLean, Sandy Ransom, and Scott Brown. Special recognition and appreciation are extended to Jane Isaacs Lowe, Senior Adviser for Program Development, and Nancy Wieler Fishman, Senior Program Officer, at the Robert Wood Johnson Foundation; Nancy Fishman not only spearheaded this work but also remained closely involved with the THRIVE team throughout the entire project.

Disclosures: None.

Disclaimers: None.

REFERENCES

- Afendulis, C. C., D. J. Caudry, A. J. O'Malley, P. Kemper, 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.
- Backhaus, R., H. Verbeek, E. van Rossum, E. Capezuti, and J. P. Hamers. 2014. "Nurse Staffing Impact on Quality of Care in Nursing Homes: A Systematic Review of Longitudinal Studies." *Journal of the American Medical Directors Association* 15 (6): 383–93.
- Beck, C., K. J. Gately, S. Lubin, P. Moody, and C. Beverly. 2014. "Building a State Coalition for Nursing Home Excellence." *The Gerontologist* 54 (S1): S87–97.
- Bishop, C. E. 2014. "High-Performance Workplace Practices in Nursing Homes: An Economic Perspective." *The Gerontologist* 54 (S1): S46–52.
- Bishop, C. E., and R. Stone. 2014. "Implications for Policy: The Nursing Home as Least Restrictive Setting." *The Gerontologist* 54 (S1): S98–103.
- Bowers, B. J., and K. Nolet. 2014. "Developing the Green House Nursing Care Team: Variations on Development and Implementation." *The Gerontologist* 54 (Suppl 1): 53–64.
- Bowers, B., K. Nolet, 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., L. W. Cohen, A. E. Elliot, D. C. Grabowski, N. W. Fishman, S. S. Sharkey, S. Zimmerman, S. D. Horn, and P. Kemper. 2013. "Creating and Supporting a Mixed Methods Health Services Research Team." *Health Services Research* 48 (6 Pt 2): 2157–80.
- Bowers, B., K. Nolet, T. Roberts, 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, 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.
- Castle, N., and R. Anderson. 2011. "Caregiver Staffing in Nursing Homes and Their Influence on Quality of Care: Using Dynamic Panel Estimation Methods." *Medical Care* 49 (6): 545–52.
- Centers for Medicare & Medicaid Services. 2004. "Action Plan (for Further Improvement of) Nursing Home Quality" [accessed December 26, 2014]. Available at <https://www.cms.gov/Medicare/Provider-Enrollment-and-Certification/CertificationandCompliance/downloads/2005nursinghomeActionplan.pdf>
- Cohen, L. W., S. Zimmerman, D. Reed, P. B. Brown, B. J. Bowers, K. Nolet, S. L. Hudak, S. D. Horn, for the THRIVE Research Collaborative. 2016. "The Green House Model of Nursing Home Care in Design and Practice." *Health Services Research* 51 (1 Pt 2): 352–77.
- Cutler, L. J., and R. A. Kane. 2009. "Post-Occupancy Evaluation of a Transformed Nursing Home: The First Four Green House[®] Settings." *Journal of Housing for the Elderly* 23: 304–34.
- 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.
- Fishman, N. W., J. Lowe, and S. Frazier. 2016. "Promoting an Alternative to Traditional Nursing Home Care: Evaluating the Green House Small Home Model: An Introduction from the Funders and Green House Program." *Health Services Research* 51 (1 Pt 2): 344–51.
- Grabowski, D. C., A. Elliot, B. Leitzell, L. W. Cohen, and S. Zimmerman. 2014a. "Who Are the Innovators? Nursing Homes Implementing Culture Change." *The Gerontologist* 54 (Suppl 1): 65–75.
- Grabowski, D. C., A. J. O'Malley, C. C. Afendulis, D. J. Caudry, A. Elliot, and S. Zimmerman. 2014b. "Culture Change and Nursing Home Quality of Care." *The Gerontologist* 54 (1): S35–45.
- Grabowski, D. C., D. J. Caudry, A. J. O'Malley, C. C. Afendulis, P. Kemper, for the THRIVE Research Collaborative. 2016. "The Impact of Green House Adoption on Medicare Spending and Utilization." *Health Services Research* 51 (1 Pt 2): 433–53.
- Jenkins, R., T. Sult, N. Lessell, D. Hammer, and A. Ortigara. 2011. "Financial Implications of THE GREEN HOUSE[®] MODEL." *Seniors Housing and Care* 19 (1): 3–22.
- 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 (6): 832–9.
- Katz, P. R., J. Karuza, O. Intrator, and V. Mor. 2009. "Nursing Home Physician Specialists: A Response to the Workforce Crisis in Long-Term Care." *Annals of Internal Medicine* 150 (6): 411–3.

- Kemper, P., D. Brannon, T. Barry, A. Stott, and B. Heier. 2007. "Implementation of the Better Jobs Better Care Demonstration: Lessons for Long-Term Care Workforce Initiatives." *The Gerontologist* 48 (S1): 26–35.
- Koren, M. J. 2010. "Person-Centered Care for Nursing Home Residents: The Culture-Change Movement." *Health Affairs* 29 (2): 312–7.
- Lepore, M. J., R. R. Shield, J. Looze, D. Tyler, V. Mor, and S. C. Miller. 2015. "Medicare and Medicaid Reimbursement Rages for Nursing Homes Motivate Select Culture Change Practices But Not Comprehensive Culture Change." *Journal of Aging and Social Policy* 27 (3): 215–31.
- Lima, J. C., O. Intrator, J. Karuza, T. Wetle, V. Mor, and P. Katz. 2012. "Nursing Home Medical Staff Organization and 30-Day Rehospitalizations." *Journal of the American Medical Directors Association* 13 (6): 552–7.
- Lum, T. Y., R. A. Kane, L. J. Cutler, and T. C. Yu. 2008. "Effects of Green House Nursing Homes on Residents' Families." *Health Care Financing Review* 30 (2): 35–51.
- Miller, S. C., N. Cohen, J. C. Lima, and V. Mor. 2014a. "Medicaid Capital Reimbursement Policy and Environmental Artifacts of Nursing Home Culture Change." *The Gerontologist* 54 (S1): S76–86.
- Miller, S. C., M. LePore, J. C. Lima, R. Shield, and D. A. Tyler. 2014b. "Does the Introduction of Nursing Home Culture Change Practices Improve Quality?" *Journal of the American Geriatrics Society* 62 (9): 1675–82.
- Mor, V., J. Zinn, J. Angelelli, J. M. Tenno, and S. C. Miller. 2004. "Driven to Tiers: Socioeconomic and Racial Disparities in the Quality of Nursing Home Care." *Milbank Quarterly* 82 (2): 227–56.
- Nazir, A., K. Unroe, M. Tegeler, B. Khan, J. Azar, and M. Boustani. 2013. "Systematic Review of Interdisciplinary Interventions in Nursing Homes." *Journal of the American Medical Directors Association* 14 (7): 471–8.
- Needleman, J., P. Burehaus, M. Stewart, K. Zelevinsky, and S. Mattke. 2014. "Nurse Staffing in Hospitals: Is There a Business Case for Quality?" *Health Affairs* 25 (1): 204–11.
- Rabig, J., W. Thomas, R. A. Kane, L. J. Cutler, and S. McAlilly. 2006. "Radical Redesign of Nursing Homes: Applying the Green House Concept in Tupelo, Mississippi." *The Gerontologist* 46 (4): 533–9.
- Remington, R. 2002. "Calming Music and Hand Massage with Agitated Elderly." *Nursing Research* 51 (5): 317–23.
- Resnick, B., A. L. Gruber-Baldini, S. Zimmerman, E. Galik, I. Pretzer-Aboff, K. Russ, and J. R. Hebel. 2009. "Nursing Home Resident Outcomes from the Res-Care Intervention." *Journal of the American Geriatrics Society* 57 (7): 1156–65.
- Sharkey, S. S., S. Hudak, S. D. Horn, and J. B. Howes. 2011. "Frontline Caregiver Daily Practices: A Comparison Study of Traditional Nursing Homes and the Green House Project Sites." *Journal of the American Geriatrics Society* 59 (1): 126–31.
- Shier, V., D. Khodyakov, L. W. Cohen, S. Zimmerman, and D. Saliba. 2014. "What Does the Evidence Really Say about Culture Change in Nursing Homes?" *The Gerontologist* 54 (S1): S6–16.

- Sloane, P. D., B. Hoefler, 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.
- Toles, M., R. A. Anderson, R. L. Landerman, J. Levins, and K. Corazzini. 2009. "Licensed Staff Mix and Nursing Home Deficiencies." *The Gerontologist* 49 (S2): 336.
- Verbeek, H., E. van Rossum, S. M. G. Zwakhalen, G. I. J. M. Kempen, and J. P. H. Hamers. 2009. "Small, Homelike Care Environments for Older People with Dementia: A Literature Review." *International Psychogeriatrics* 21: 252–64.
- Weiner, B. J., C. M. Belden, D. M. Bergmire, and M. Johnston. 2011. "The Meaning and Measurement of Implementation Climate." *Implementation Science* 6: 78.
- Whall, A. L., M. E. Black, C. J. Groh, D. Yankou, B. Kupferschmid, and F. Norman. 1997. "Effect of Natural Environments Upon Agitation and Aggression in Late Stage Dementia Patients." *American Journal of Alzheimer's Disease and Other Dementias* 12 (5): 216–20.
- Yoon, J. Y., R. L. Brown, B. B. Bowers, S. S. Sharkey, and S. D. Horn. 2015. "Longitudinal Psychological Outcomes of the Small-Scale Nursing Home Model: A Latent Growth Curve Zero-Inflated Poisson." *International Psychogeriatrics* 27 (6): 1009–16.
- Zimmerman, S., and L. W. Cohen. 2010. "Evidence behind the Green House and Similar Models of Nursing Home Care." *Aging Health* 6 (6): 731–51.
- Zimmerman, S., V. Shier, and D. Saliba. 2014. "Transforming Nursing Home Culture: Evidence for Practice and Policy." *The Gerontologist* 54 (Suppl 1): 1–5.
- Zimmerman, S., W. L. Anderson, S. Brode, D. Jonas, L. Lux, A. S. Beeber, L. C. Watson, M. Viswanathan, K. N. Lohr, and P. D. Sloane. 2013. "Systematic Review: Effective Characteristics of Characteristics of Nursing Homes and Other Residential Long-Term Care Settings for People with Dementia." *Journal of the American Geriatrics Society* 61 (8): 1399–409.
- Zimmerman, S., P. D. Sloane, R. Bertrand, L. E. W. Olsho, A. S. Beeber, C. Kistler, C. L. Hadden, A. Edwards, D. J. Weber, and C. M. Mitchell. 2014. "Successfully Reducing Antibiotic Prescribing in Nursing Homes." *Journal of the American Geriatrics Society* 62: 907–12.
- Zimmerman, S., J. Allen, L. W. Cohen, J. Pinkowitz, D. Reed, W. O. Coffey, D. Reed, M. Lepore, and P. D. Sloane. 2015. "A Measure of Person-Centered Practices in Assisted Living: The PC-PAL." *Journal of the American Medical Directors Association* 16: 132–7.

SUPPORTING INFORMATION

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

Appendix SA1: Author Matrix.