



**TITLE: Eden Alternative and Green House Concept of Care: Review of Clinical Effectiveness, Cost-Effectiveness, and Guidelines**

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**CONTEXT AND POLICY ISSUES:**

Approximately 7% of seniors in Canada reside in long-term care facilities such as nursing homes.<sup>1</sup> Institutional residency increases with age, with 2% of seniors aged 65 to 74 years living in such facilities compared with 32% among seniors over the age of 85 years.<sup>1</sup> Traditionally, nursing homes have operated under the medical model of care which focuses on the eradication of disease.<sup>2</sup> This model has been criticized for failing to provide individualized care, not providing for an acceptable quality of life for their residents, and not making interventions that address dignity, freedom of choice, and individuality a priority.<sup>2</sup> For residents of long-term care facilities, daily life may be predictable and lack individual choice, personal decisions, privacy, and dignity.<sup>2</sup> Inadequacies in the quality of care provided in long-term care facilities that operate under the traditional medical model have also been reported.<sup>3</sup>

In the 1990s, the principals of the Eden Alternative (EA) concept of care was developed with the intention of reducing boredom, loneliness, and lack of meaning in the lives of residents of long-term care facilities and to promote human flourishing in these settings.<sup>4</sup> Central to the EA is the restoration of power to the residents of the facility and the promotion of meaningful lives for the residents.<sup>2</sup> The EA involves the introduction of pets, plants, and children to the facilities and into the daily lives of residents to increase their quality of life.<sup>2</sup> This concept recognizes the individuality of each resident and the need for residents to know staff personally and feel secure.<sup>2</sup> A team approach to care is taken and the team works together to problem-solve about concerns reported by residents or family members.<sup>2</sup> The EA can be “overlaid” on existing facilities through Eden training for staff and through changes to the processes of care delivery.<sup>2</sup>

The Green House (GH) philosophy of care involves a small-house nursing home model.<sup>5</sup> It builds upon the EA, but reconfigures the physical structure of the nursing home to promote shared decision-making, social interaction, and quality of life.<sup>2</sup> A GH is a skilled nursing facility, but maintains the appearance of a warm, inviting home for 10 or fewer residents.<sup>2</sup> Each resident has a private bedroom and bathroom, and the house has a shared gathering place, patio, and

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garden.<sup>2</sup> Daily life is planned to create a homelike atmosphere, with an emphasis on mealtime as a time for social interaction. In order to maintain the home-like environment, the nursing station is replaced with a sitting area. Certified nursing assistants who work in the GH have an expanded universal role that includes cooking, cleaning, laundry, shopping, and other activities of daily living, implementation of care plans, and assisting residents to spend time according to their preferences.<sup>2,5</sup>

Compared to the traditional medical model of care, the EA and GH concepts are intended to improve quality of life for residents of long-term care facilities.<sup>2</sup> This report will identify and review evidence of clinical and cost-effectiveness of these care models and guidelines for their application. This evidence could then be used for decision-making about models of long-term care delivery in existing and future facilities.

### **RESEARCH QUESTIONS:**

1. What is the clinical effectiveness of the Eden Alternative and Greenhouse Concepts of Care for residents in long-term care facilities?
2. What is the cost-effectiveness of the Eden Alternative and Greenhouse Concepts of Care for residents in long-term care facilities?
3. What are the evidence-based guidelines for the Eden Alternative and Greenhouse Concepts of Care for residents in long-term care facilities?

### **METHODS:**

A limited literature search was conducted on key health technology assessment resources, including PubMed, The Cochrane Library (Issue 2, 2010), University of York Centre for Reviews and Dissemination (CRD) databases, ECRl (Health Devices Gold), EuroScan, international health technology agencies, and a focused Internet search. The search was limited to English language articles published between 1994 and March 2010. Filters were applied to limit the retrieval to health technology assessments, systematic reviews, meta-analyses, randomized controlled trials, controlled clinical trials, observational studies, guidelines, and economic studies.

### **SUMMARY OF FINDINGS:**

In total, three relevant controlled clinical trials were identified, two of which evaluated the EA concept<sup>6,7</sup> and one which evaluated the GH concept.<sup>5</sup> There were no relevant guidelines or economic evaluations identified. No health technology assessments, systematic reviews, meta-analyses, randomized controlled trials, or observational studies were identified.

#### **Controlled clinical trials**

Kane et al.<sup>5</sup> studied the effects of the GH model on residents' reported outcomes and quality of care using a quasi-experimental design. Patients of four 10-person GHs were compared to residents at two sites which operated under the medical model and were followed for two years. The sites were located in the United States. The four GHs were built on the same site, which

was a nonprofit retirement complex. This site also had three types of housing which operated under the traditional nursing home model: independent housing, assisted living, and a nursing home licensed for 140 beds. The comparison groups were the nursing home on the same site (Cedars) and a nursing home from a community approximately 90 miles away (Trinity), both of which operated under the traditional nursing home model. All residents in the GHs (40 at any time) and 40 randomly selected residents in each of the two comparison groups were included in the study. Part way through the study, however, the investigators decided to increase enrolment from the Cedars site. Outcomes were assessed at baseline and at three points during the follow-up period. Outcome measures included 11 domains of quality of life (physical comfort, functional competence, privacy, dignity, meaningful activity, relationship, autonomy, food enjoyment, spiritual well-being, security, and individuality), emotional well-being, satisfaction, self-rated health, and functional status. Quality of care was measured using indicators derived from the Minimum Data Set (MDS). All statistical analyses were adjusted for baseline characteristics (age, sex, activities of daily living, date of admission, and proxy interview status). The residents of the GHs and the comparison groups changed throughout the two year period, so at the end of the study period 52 GH residents, 70 Cedars residents, and 66 Trinity residents were evaluated.

The three groups differed on a number of baseline characteristics. The average age ranged from  $81.4 \pm 10.4$  years in the GH group to  $88.6 \pm 7.7$  years in the Trinity Home group. Seventy-five percent of the GH residents were white compared to 95% of the Cedars and Trinity sites. The percentage of females ranged from 75% of the Trinity site to 87.5% of the Cedars site.

At the end of follow-up, GH residents had statistically significantly higher quality of life scores than residents of the Cedars home for seven dimensions (privacy, dignity, meaningful activity, relationship, autonomy, food enjoyment, and individuality) and the Trinity home for four dimensions (privacy, dignity, autonomy, and food enjoyment). GH residents did not report lower quality of life scores than the Cedars or Trinity residents for any of the quality of life dimensions.

Emotional health was rated statistically significantly higher by GH residents than Cedars residents, but did not differ from the Trinity residents. Differences in self-rated health and functional status were not statistically significant across the three nursing homes. GH residents reported statistically significantly higher satisfaction with the nursing home as a place to live and receive care and were more likely to recommend the home to friends than residents of the comparison homes. There were few statistically significant differences in quality indicators between the homes, but fewer GH residents were on bed rest, had little or no activity, and had a decline in late-loss activities of daily living (ADLs; e.g. bed mobility, toileting, transferring, and eating) than Cedars residents. Further, the GH residents had a lower prevalence of depression and decline in late-loss ADLs than Trinity residents. The authors concluded that the GH model had promise in terms of improving quality of life for nursing home residents.

The authors identified a number of limitations to their study including the lack of randomization and subsequent baseline difference between groups. As well, they felt that the GH residents could be systematically different than other nursing home residents since they had volunteered to live in the GHs. They stated that their sample was small and in a state of flux. The authors recommended caution in generalizing the results to other settings establishing a GH or to a GH implemented across an entire nursing home. The residents of the GHs in this study moved to the GHs from a traditional nursing home. The authors felt that results might differ if individuals

moved to a GH from their own homes. Further, the generalizability beyond an experimental setting was questionable. The authors were concerned about a “Hawthorne effect” with the staff, meaning that the staff did a better job because they knew they were being evaluated, and felt this could limit the generalizability of the results.

Bergman-Evans<sup>7</sup> assessed loneliness, boredom, and helplessness of residents of a state veterans long-term care facility operating under the EA (n=21) compared to a control group consisting of residents of a private long-term care facility (n=13) in the Mid-West United States. The experimental facility was a certified EA facility with three employees who had completed a certified associate training course. The program was designed to be consistent with all ecological and anthropological principles of the EA. An interdisciplinary EA group was formed to plan and implement the project, overseeing plants and vegetation, birds, feline, and canine work teams. A day care for children of employees and others was established on site. Leadership retreats and staff training were led by the EA group and attended by all employees.

At baseline of this study, the EA had just been implemented in the facility. To be included in the study, residents had to be cognitively intact, able to understand and speak English, and have been in the nursing home for at least six months. It was not clear how the participants at either site were recruited or selected into the study. The Geriatric Depression Scale (which contains questions related to helplessness and boredom) and the UCLA Loneliness Scale version 3 were administered at baseline and one year after the EA was implemented. The baseline data were collected a minimum of two months prior to the final implementation of the EA. The two groups differed on a number of baseline demographic characteristics which were not adjusted for in the analysis. Baseline measures of loneliness, boredom, and helplessness were, however, similar between the two groups.

The residents of the EA home included 13 men and eight women with a mean age of 76.1 years. The residents of the control home included 11 women and 2 men with an average age of 85.7 years. One year after implementation of the EA, residents of the EA home had significantly lower boredom ( $p = 0.01$ ) and helplessness ( $p = 0.03$ ) scores, but loneliness did not differ between groups. The author concluded that the results suggested that there was opportunity to impact quality of life of long-term care residents through implementing the EA.

This study had a number of limitations, including its non-randomized design. There were baseline demographic differences which were not adjusted for in the analysis. Further, there was a high attrition rate in both groups (40% of the EA group and 56% of the control group). The sample size of the study would likely limit the generalizability. Further, given differences in health care and long-term care delivery in the United States and Canada, it is not clear if the results would be applicable to the Canadian context or to publicly funded long-term care facilities. As well, the staff in the EA group underwent specialized training, so it is not clear if similar results would be expected in absence of such training.

Coleman et al.<sup>6</sup> examined the impact of introducing the EA into a nursing home on quality of life, infection rates, functional status, and costs one year following its introduction. The study site into which the EA was introduced was a 126-bed, skilled nursing facility located in an urban area in a southern state, while the control site was a 114-bed, skilled nursing facility located in a rural area in the same state. The two sites were operated by the same organization. The control site continued with traditional care throughout the study period. The EA site began implementing

the EA after planning and preparing staff for more than a year. Implementation consisted of adding plants, eight dogs, 12 cats, 15 birds, and one rabbit. It was not clear if other aspects of the EA philosophy were also implemented. Staff caregivers at the two sites were described as being similar in terms of training and numbers; however, providers at the Eden site were academic physicians, a nurse practitioner, and residents training in family medicine, in addition to providers from the community. All providers at the control site were community physicians. Participants were included if they were permanent residents who were not terminally ill, had resided at the site longer than 60 days, and had MDS data available.

Initially there were 115 residents enrolled in the EA group and 91 residents in the control group. Baseline demographic characteristics were reported for those participants with complete data at follow-up (95 in the EA group and 79 in the control group) and differed statistically in terms of age (EA: 82.6  $\pm$  1.4 years versus control: 88.0  $\pm$  0.7 years;  $p=0.001$ ), race (EA: 78% white versus control: 100% white;  $p<0.001$ ) and marital status (EA: 57% widowed versus control: 79% widowed,  $p=0.001$ ). After the one-year follow-up period, survival did not differ between the two groups, with 28.7% of the EA residents dying compared to 23.5% of the residents of the control site (odds ratio 1.19, 95% CI 0.61 to 2.34,  $p=0.698$ ). In an analysis adjusted for baseline characteristics, differences between the two sites for MDS scales of cognition, ADLs, oral problems, and nutritional problems were not statistically significantly different. Falls in the 30 days before the one-year follow-up survey was administered were statistically significantly higher in the EA group (21%) than in the control group (6%;  $p=0.011$ ). However, the two groups did not differ statistically in terms of falls in the prior 31 to 180 days. There were no differences in the infection rates between the two sites. A larger proportion of the EA group required skilled nursing care, but the hospitalization rate was higher in the control group (at baseline and throughout the follow-up period). The rate of anxiolytic drug use was higher at the control site, while the use of hypnotics was higher at the EA site. The authors concluded that one year following implementation of the EA there were no improvements in functional status, infection rate, or cost of care outcomes.

One limitation to this study included a 17% attrition rate in the EA group and 13% in the control group. Most of this attrition was due to death. Other limitations to this study were the baseline differences between groups and the lack of randomization. There were also differences between the type and training of staff at the two facilities and the location (urban versus rural), which could affect the study outcomes. As well, it was not clear to what extent all of the principles of the EA were implemented or adhered to throughout the study period, aside from simply introducing animals. As well, it is not clear whether the results would be applicable to the Canadian context or to a publicly funded health care facility. Finally, the authors felt that the duration of follow-up may have been insufficient to fully assess outcomes of the EA concept. This could impact the generalizability of the results.

## **Limitations**

The literature in which the outcomes of the EA<sup>6,7</sup> and the GH concept<sup>5</sup> were evaluated was limited to three controlled clinical trials. These trials were non-randomized and had differences in the intervention and control groups at baseline. Two of these studies adjusted for differences statistically,<sup>5,6</sup> but one did not.<sup>7</sup> Conducting a randomized controlled trial in this setting was considered infeasible by the studies' authors. Attrition rates were high in the studies,<sup>5-7</sup> mainly due to death, which could compromise the generalizability of the results in that follow-up data

were likely more representative of the residents who had better health status at baseline. It was unclear to what extent the EA principles were adhered to in one study,<sup>6</sup> so its results may not be representative of those that could be achieved by fully adopting the EA philosophy. There were no studies of cost-effectiveness or evidence-based guidelines identified.

#### **CONCLUSIONS AND IMPLICATIONS FOR DECISION OR POLICY MAKING:**

Overall, the evidence upon which to base decisions about the adoption of the EA or GH concept is limited. One study demonstrated that the GH concept had a positive impact on quality of life and satisfaction with care in residents of long-term care facilities, with the quality of care being comparable to the traditional nursing home model. This conclusion is based on the observation that there were few statistically significant differences in quality indicators between the different long-term care models.<sup>5</sup> A study of the EA demonstrated lower levels of boredom and helplessness with this model of care compared to the traditional nursing home model.<sup>7</sup> However, another study that looked at functional status, infection rate, and cost of care outcomes found no differences between the EA and traditional model of long-term care.<sup>6</sup> These results should be interpreted with a degree of caution, however, given the limitations of the studies. No studies of cost-effectiveness were identified, but one study did find that the cost of care with the EA did not differ from the traditional nursing home model.<sup>6</sup> No evidence-based guidelines regarding the EA or GH concept were identified, so no conclusions can be made in this regard. The lack of evidence and the limitations in the identified studies may be a consideration for decision making about the use of the EA or GH concept for residents of long-term care facilities.

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