

# Application Fields and Innovative Technologies

## Hydroponic Green Walls in Long-Term Care: Workload, Engagement and Lessons from a Multi-Site Evaluation S. Otalvaro Zapata, A. Panahi, S. Freeman. *Gerontechnology* 25(s)

**Purpose** Older adults living in long-term care (LTC) facilities are at high risk for social isolation, loneliness and depressive symptoms, with clear consequences for quality of life and wellbeing. Nature-based activities such as gardening have emerged as promising approaches to support mood, social connection and engagement; both active participation and passive exposure to plants have been associated with reduced depression, anxiety and loneliness. In residential care, gardening is more than recreation, as it can sustain identity, evoke reminiscence and foster shared interaction among residents, families and staff [1]. Yet the sustainability of such programs depends on staff and volunteer engagement, training and ongoing maintenance support, and little is known about the workload and financial implications of operating hydroponic systems in LTC [2]. Against this backdrop, the present project aims to evaluate the feasibility, staff and volunteer workload, and perceived benefits of integrating hydroponic green walls into four long-term care facilities in northern and rural British Columbia (BC). **Method** : A prospective, multi-site observational quantitative service evaluation was conducted in four LTC facilities in northern and rural BC from March to September 2024. Each facility installed one wall-mounted hydroponic green walls in common areas, and the staff and volunteers were trained on how to perform maintenance to the green wall. iPads were placed next to the walls so staff and volunteers could complete standardized logs whenever they interacted with the units, recording task type, duration, and staff role. Data analysis summarized the frequency and duration of maintenance tasks, distribution of workload and estimated labour costs by role. **Results and Discussion:** The evaluation generated 150 responses from staff and volunteers, most from therapists/dietitians (34%, n=51) and care aides (25%, n=38), with additional input from management, volunteers and registered nurses. Across sites, 421 actions with the hydroponic units were logged, mainly low-burden activities such as checking water levels (17%) and appreciating the plants (15%), while more technical tasks like adding or germinating seeds were rare ( $\leq 3\%$ ). Overall, 1,092 minutes of interaction were recorded over 83 active weeks, equivalent to about 13 minutes per week, with nearly half of encounters lasting under five minutes. Facility-level cost estimates based on provincial wage data indicated modest monthly labour costs, ranging from approximately CAD \$15.80 to \$33.30 per site (See Figure 1.), with volunteers contributing comparable time at no financial cost. These findings suggest that hydroponic green walls can be maintained with minimal additional workload and low ongoing staffing costs, while simultaneously creating frequent opportunities for visual, tactile and conversational engagement in long-term care settings.

### References

1. Freeman S, Banner D, Labron M, Betkus G, Wood T, Branco E, Skinner K. I see beauty, I see art, I see design, I see love: findings from a resident-driven, co-designed gardening program in a long-term care facility. *Health Promot Chronic Dis Prev Can.* 2022;42(7):288–300. doi:10.24095/hpcdp.42.7.03
2. Steensma R, van den Bogerd N, Dijkstra K, Janssen-Heijnen M, Krabbendam L, de Vries R, Maas J. How to implement nature-based interventions in hospitals, long-term care facilities for elderly, and rehabilitation centers: a scoping review. *Urban For Urban Green.* 2025;103:128587. doi:10.1016/j.ufug.2024.128587

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**Figure 1.** Estimated monthly labour costs for hydroponic green wall maintenance by site under low, median and high wage scenarios.

