

A Process Evaluation Framework for a Long-Term Care Garden Program

by

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Abstract

The purpose of this project is to develop a logic model and process evaluation framework for a therapeutic garden program at Banfield Pavilion, a residential long term care facility located in Vancouver, B.C. A six-step process evaluation design developed by Saunders, Evans, and Joshi (2005) is used to develop the evaluation framework. Steps of the framework include (1) describing the program, (2) describing complete and acceptable delivery of the program, (3) developing the potential list of questions, (4) determining methods, (5) considering the program's resources, context, and characteristics, and (6) the final process evaluation plan. The logic model connects program elements to concepts drawn from Ulrich's (1984) stress reduction theory (SRT) and theory of supportive garden design (1999). A central consideration of the evaluation is whether the program should focus more on spontaneous or structured activities and garden interactions. Both the logic model and evaluation framework can be used for the Banfield program and/or other therapeutic garden programs.

Keywords: process evaluations; horticultural therapy; LTC garden programs; Stress Reduction Theory

Dedication

For all of the older adults who have been kind enough to extend their friendship and mentorship to me, who have taught me many useful and admirable skills including how to nurture life and make things grow.

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List of Acronyms

ADLs	Activities of Daily Living
AHTA	American Horticultural Therapy Association
ART	Attention Restoration Theory
CHTA	Canadian Horticultural Therapy Association
HT	Horticultural Therapy
LTC	Long-Term Residential Care
PT	Participant
PWD	Persons with Dementia
SFU	Simon Fraser University
SRT	Stress Reduction Theory

Glossary

Eco-Therapy	The therapeutic application of eco-psychology, the study of the human-nature relationship and its healing benefits (Wang & MacMillian, 2013 Wang & MacMillian, 2013)
Eden Alternative	A philosophy of long-term care, established by Dr. William Thomas, that seeks to alleviate loneliness, helplessness, and boredom by creating environments that support biological and social diversity and harmony (Thomas, 1996).
Enabling gardens	Gardens that “facilitate the development, redevelopment, or maintenance of physical and cognitive skills and abilities through positive, hands-on interactions with plants” (Barnes, 2007).
Healing Gardens	Plant dominated environments that may include green plants, flowers, water, and other aspects of nature. Typically found within hospitals and other healthcare settings, they are designed to be accessible to all and meant as a retreat and a place of respite for clients, visitors, and staff (AHTA, 2012).
Horticultural Therapists	Specially educated and trained professionals who involve the client in any phase of gardening with the intent to improve health and well-being. As members of treatment or care teams, horticultural therapists determine individual goals and work plans to help clients improve skills and maximize abilities. Licensing and certification are not currently required (AHTA, 2012).

Horticultural Therapy	“The engagement of a client in horticultural activities facilitated by a trained therapist to achieve specific and documented treatment goals” (AHTA, 2012, p.1).
Long Term Residential Care	Facilities that provide 24-hour professional care services for people who have complex care needs and can no longer be cared for in their own homes or in an assisted living residence, (British Columbia Ministry of Health, n.d.).
Nature-Based Therapy	An umbrella term for nature-based methods of physical and psychological therapies.
Person-Centered Care	A philosophy of long-term care in opposition to traditional nursing homes which promotes homelike care environments that encourage feelings of connectedness, bondedness, and identity between residents and living space (McBride, 1999).
Restorative gardens	Gardens that “assist stress reduction, support emotional and cognitive equilibrium, and enhance well-being” (Barnes, 2007).
Social Horticulture	“A leisure or recreational activity related to plants and gardening. No treatment goals are defined, no therapist is present, and the focus is on social interaction and horticulture activities. A typical community garden or garden club is a good example of a social horticulture setting” (AHTA, 2012, p.1).
Therapeutic Gardens	For AHTA purposes, therapeutic gardens are designed to meet the needs of a specific user or population for use as a component of a treatment program and can be considered as a subcategory of a healing garden (AHTA, 2012). However, according to Barnes (2007), a therapeutic garden is any landscape designed specifically to bring physical, psychological, or social benefits, regardless of whether or not they are associated with a specific treatment program.
Therapeutic Horticulture	Using plants and plant-related activities with the intent to improve participant well-being through active or passive involvement. Goals are not clinically defined and documented but the leader will have training in the use of horticulture as a medium for human well-being (AHTA, 2012).

Introductory Image



Photo of the Banfield Patio Garden courtesy of Shelagh Smith

Chapter 1. Introduction

Background

Over the next two decades, as the large baby-boomer cohort continues to reach ages 65 and over, the senior population is expected to grow rapidly. By 2030, close to 25% of Canada's population will be aged 65 years or over compared with 15.3% in 2013 (Statistics Canada, 2014). The number of older seniors is also expected to increase. By 2063, the number of Canadians aged 80 years and over will reach nearly 5 million compared with 1.4 million in 2013 and the number of centenarians in Canada will reach more than 62,000 persons in 2063 compared with just fewer than 7,000 in 2013 (Statistics Canada, 2014). Older adults are much more likely to have chronic health conditions, in part because the prevalence of dementia and other illnesses increases with age. Consequently, many older adults will reside in long-term residential care facilities at some point in their lives, making their care an important area of study.

The elevated risk of dementia, greater complexity of health care needs, and rise in levels of disability that may occur with aging precipitate the loss of independent living resulting in older adults residing in long-term residential care institutions. Long-term residential care, or LTC, is defined by the government of British Columbia as a facility that provides 24-hour professional care services for people who have complex care needs and can no longer be cared for in their own homes or in an assisted living residence, for example people who have moderate to severe cognitive impairment, are physically dependent with medical needs requiring professional nursing care, or are clinically complex with multiple disabilities that require professional skilled care (British Columbia Ministry of Health, n.d.). The 2011 Census of Population found that 7.9% of all seniors aged 65 and over in Canada resided in collective dwellings, such as residences for seniors and health care facilities including long-term residential care (Statistics Canada, 2011). The proportion of seniors living in these residences increases with age

with 1.6% of seniors aged 65-69 in collective dwellings compared to 31.1% of seniors aged 85 and over. This is especially the case for Canada's oldest-old, with 43.5% of seniors in their nineties and two-thirds (66.1%) of centenarians living in residences for seniors and health care facilities (Statistics Canada, 2011).

These long-term residential care facilities are designed to protect and care for vulnerable people. However, they can have unintentional harmful effects common to institutionalization such as isolation from family and friends, lack of autonomy, and increased passivity (McBride, 1999). Traditional long-term residential care can be viewed as sterile and dehumanizing with residents spending much of their time doing nothing (McBride, 1999). Due to the focus on medical needs, standardized treatment plans with limited flexibility, and activities designed for groups versus individuals, the lives of nursing home residents lack variety and can lead to the development of loneliness, boredom, and helplessness (Hinman & Heyl, 2002). Indeed, symptoms of psychological distress have been found amongst older adults living in residential long-term care in Canada. For example, a cross-sectional descriptive study by Voyer et al. (2005) conducted among 1999 Canadian LTC residents found that nearly half (45.6%) displayed at least one symptom of psychological distress and 22.4% were identified as being psychologically distressed. Furthermore, Voyer et al. (2005) found an extrinsic cause of these symptoms to be the living environments of the participants. Thus as the senior population continues to grow, the design, care philosophy, and intervention programs of LTC facilities becomes an ever-increasing concern.

In response to the potential harmful effects of institutional-type facilities, there has been a shift towards more resident-centered care. Some facilities are now attempting to create homelike environments that encourage feelings of connectedness, bondedness, and identity between residents and living space (McBride, 1999). This is exhibited in the physical design of new facilities, for example dividing residents into smaller, cottage-like buildings or decorating interiors with familiar, homelike objects. Furthermore companies and governments that build and regulate LTC are turning towards emerging person-centered philosophies. One revolutionary example that has purposely sought to de-institutionalize long-term care is the Eden Alternative.

The Eden Alternative is a philosophy of care that seeks to alleviate loneliness, helplessness, and boredom by creating environments that support spontaneous and unpredictable activities and interactions with animals, plants, and children and to provide opportunities for residents to give care as well as receive care (Bergman-Evans, 2004, p.29). William Thomas, a Harvard graduate medical doctor, first established the Eden philosophy in 1991, when he began to consider the difference between providing treatment and providing care (Thomas, 1996). When looking to revolutionize the care home he was employed by, he and the other administrative staff took a habitat perspective, meaning they compared the characteristics of successful natural habitats with the nursing home setting. The comparison revealed that healthy natural habitats consist of layers of biological diversity while nursing homes, like other social institutions, seek complete control over the environment. From this understanding, they established the three principles of the Eden Alternative:

1. Biological diversity is as good for human habitats as it is for natural habitats
2. Social diversity is as important to a nursing home as it is to true human community
3. Human habitats must be driven by the same devotion to harmony that enlivens music and nature (Thomas, 1996, pp.32-33).

In 1992, Thomas received funding for the implementation of the Eden Philosophy in his care home from the New York State Department of Health. Thomas was able to show significant improvements in infection rates, medication use, death rates, and staff turnover (Sawyer & Rurak, 2004). Following the publication of his book titled *Life Worth Living*, he and his wife began teaching their philosophy to other LTC facilities. Since 1996, over five thousand Eden associates have been trained in the United States and Canada. Canada currently boasts over seven hundred associates with over five hundred of those located in Western Canada (Sawyer & Rurak, 2004).

Similarly, this paradigm shift that favours a more person-centered approach can be seen in the programs and interventions offered to residents for life enrichment, rehabilitative, and restorative purposes, for instance creative expression activities and sensory interventions. Creative expression (CE) activities are structured activities

identified by the characteristics of creativity, being failure-free, and group process (Rowe, Savundranayagam, Lang, & Montgomery, 2011). CE activities have been shown to have greater levels of participant involvement, staff-participant interaction, and positive affect than traditional activities (Rowe, Savundranayagam, Lang, & Montgomery, 2011). Examples of CE activities may include visual arts, such as drawing and painting, music, theater, dance, or storytelling.

Another form of non-pharmacological interventions, sensory interventions, uses the senses for therapeutic purposes. Senses include visual, auditory, tactile, olfactory, gustatory, proprioception, and vestibular. Sensory interventions can increase body awareness and improve the ability to regulate emotions (Moore, 2005; Sutton & Nicholson, 2011). Additionally, they can help individuals develop greater understanding and control of situational responses (Champagne & Stromberg, 2004). Both CE activities and sensory interventions are intuitive, easily accessible, and appropriate for residents in LTC. Gardens and horticulture-related activities qualify as an example of programming that manages to be both creative and sensory focused.

Horticulture or garden programs can qualify as CE activities and sensory interventions and can improve the health and well-being of LTC residents. Gardening activities can be creative and some activities are failure-free if the emphasis is on sensory engagement instead of production. For example, enjoying the sights, textures, and sounds of the garden versus being concerned about the amount of food production. Additionally, horticultural therapy (HT) activities in particular have been found to facilitate higher levels of engagement and positive affect than traditional scheduled activities (Rowe et al, 2011). HT activities are also a viable option for programs that have participants functioning at a variety of levels, as plant-based activities can easily be individually tailored to result in achievement of specified treatment goals (Gigliotti & Jarrott, 2005). Horticultural therapists are trained in altering the environment and activities to suit each program participant (Gigliotti & Jarrott, 2005). Additionally, because of HT's focus on increasing independence and autonomy, HT programs in institutional settings have been found to empower older adults to self-initiate participation and engagement in activities (Gigliotti & Jarrott, 2005).

Therapeutic horticulture may provide “an economically sound, non-pharmacological strategy” (Detweiler, et al., 2012) for improving the quality of life of persons living in residential LTC. As a physical enactment of the Eden philosophy, many facilities that adopt the Eden Alternative provide indoor plants and outside gardens or offer therapeutic garden programs. By doing so, they hope to encourage interaction with plants and animals in order to actively engage residents in a reciprocal caregiving relationship while also improving indoor air quality, increasing indoor humidity, and decreasing bacteria and harmful organic compounds in the air (Thomas, 1996). Additionally, the inclusion of indoor plants subdues the institutional character of LTC facilities and outdoor gardens provide beauty, accessibility, and productivity (Thomas, 1996). Gardens “foster restoration from stress and have other positive influences on patients, visitors, and staff or caregivers” (Ulrich, 1999, p.30) resulting in a more person-centered, supportive environment.

As previously discussed, the increase in the older adult population and their increased likelihood of placement in residential long-term care makes potential interventions and philosophies of care within these facilities an important area of study. Since many residents within long-term care are incapable of leaving the facility on their own to access the outdoors, they end up spending most of their time inside the building. As a result, the consideration of facilities’ indoor spaces has received greater attention than outdoors spaces. However, because of the potential positive benefits, relatively low-cost, and limited side effects of nearby nature on this population, we must begin to consider the profound impact of including accessible outdoor spaces and garden programs within LTC (Kearney & Winterbottom, 2005). Furthermore, we must also define and examine therapies and interventions related to nature and horticulture. This includes evaluating how to most appropriately and effectively administer these programs and how to best encourage participation and engagement of residents with gardens.

Therapeutic Gardens and Garden Programs Definition of Terms

Terms like “gardening”, “horticultural therapy”, and “therapeutic horticulture” are used almost interchangeably and have varied and inconsistent use throughout the

literature. In addition, research on the topics are scattered amongst multiple disciplines including psychology, gerontology, environmental design, nursing, and occupational therapy. There is a need for international consensus on the meaning of terms used in garden programs in healthcare. To increase understanding, the American Horticultural Therapy Association (AHTA) published an outline to define terms associated with people-plant relationships. The American Horticultural Therapy Association (2012) defines horticultural therapy as “the engagement of a client in horticultural activities facilitated by a trained therapist to achieve specific and documented treatment goals” (p.1). This is different than therapeutic horticulture which also uses horticultural activities to improve well-being but through active or passive involvement with goals that are not clinically defined and documented (AHTA, 2012). There also exists social horticulture and vocational horticulture, which provide social interactions and vocational training respectively.

Like horticultural activities in treatment programs, gardens designed to support well-being have been referred to using multiple terms. The AHTA (2012) proposes that there are “some essential differences among garden types that can provide clarity to their design and purpose” (p.1) but also note that garden types are likely to have overlap. Healing gardens are generally associated with healthcare settings, are accessible to all, and are designed as places of retreat and respite (AHTA, 2012). Therapeutic gardens are used as components of a treatment program like occupational therapy, physical therapy, or horticultural therapy and can be considered a subcategory of a healing garden (AHTA, 2012). However, Barnes (2007) rejects the notion of “healing gardens” altogether and instead suggests that any landscape designed specifically to bring physical, psychological, or social benefits is a therapeutic garden, regardless of whether or not they are associated with a specific treatment program. Therapeutic gardens can be assigned to two categories, restorative or enabling, or be a combination of both. Restorative gardens “assist stress reduction, support emotional and cognitive equilibrium, and enhance well-being” (Barnes, 2007). Enabling gardens “facilitate the development, redevelopment, or maintenance of physical and cognitive skills and abilities through positive, hands-on interactions with plants” (Barnes, 2007). The type of garden and how it is used is heavily influenced by its design.

Garden Design and Interactions

A garden placed within a long-term care facility does not automatically contribute to the healing of or therapeutic use by residents if certain design facets are not considered. This can be especially challenging if the garden or HT program was not established at the time of the building's construction, which may be typical, as outdoor environments are often not given significant attention since residents typically spend the majority of their time indoors. Design features that should apply to every component of all outdoor spaces within LTC include: safety and accessibility, physical and emotional comfort, positive distraction and engagement with nature, and sustainability (Cooper-Marcus & Sachs, 2013).

All aspects of outdoor spaces must ensure the physical and emotional safety of the users, same as the indoor spaces of facilities. Since older adults within LTC facilities have likely experienced changes in strength, agility, and mobility, careful attention should be paid to the details of the garden's egress, paths, handrails, steps, ramps, availability of seating, and shelter (Cooper-Marcus & Sachs, 2013; Kearney & Winterbottom, 2006; McBride, 1999; Rodiek, 2006). Furthermore, in order for gardens to be accessible to residents, it is recommended that all or the majority of outdoor spaces conform at least to the minimum standards regulated by the Americans with Disabilities Act (ADA) (Cooper-Marcus & Sachs, 2013). The importance of accessibility becomes clear when considered alongside Kearney and Winterbottom's (2006) research where interviews of residents from three LTC facilities in Seattle, WA found that residents' physical limitations and lack of staff assistance were the primary reasons why they did not go outside as much as they would like to. While the limited time and availability of staff within LTC facilities will likely always be an issue, thoughtful design can help mitigate the physical limitations of residents (Cooper-Marcus & Sachs, 2013).

Beyond safety, garden areas should be comfortable and evoke feelings of being nurtured and cared for. If people are physically and emotionally comfortable they are likely to stay in the garden longer and benefit more from the experience (Cooper-Marcus & Sachs, 2013). Design elements for comfort can include providing safe and comfortable places to walk and sit, creating opportunities for choice and a sense of control, elements that enable direct interaction with plants or wildlife, and opportunities for social

connection (Cooper-Marcus & Sachs, 2013). Another application of comfort within a garden setting is the inclusion of different cultural groups' preferences. This is particularly true within the multi-cultural setting of Canada. For example, in a study by Alves, Gulwadi, and Cohen (2006), Hispanic elders favored "furnished" garden settings such as plazas and courtyards that catered to their preferred activities of group-oriented socializing, whereas white older adults preferred more "authentic" natural settings like lawns and water features that satisfied the desire for quiet reflection. Additionally, the location of nature elements and furniture are important to residents who adhere to Feng Shui principles (Cranz & Young, 2006) and Japanese seniors may prefer the inclusion of traditional elements of Japanese gardens, for example symbols of the lotus or Buddha and spaces for meditation and drum concerts (Cooper-Marcus & Sachs, 2013).

Outdoor spaces should help users "get away" from interior environments that can be alienating, stressful, threatening, and intimidating. One of the most effective forms of positive distraction is the use of natural elements including plants, natural materials, nature sounds, and the presence of water (Cooper-Marcus & Sachs, 2013). Plants and greenery should be provided at varying heights with a variety of colors, textures, and shapes (Cooper-Marcus & Sachs, 2013; Kwak et al, 2005). The use of water features is commonly mentioned within the literature (Cooper-Marcus & Barnes, 1995; Cooper-Marcus & Sachs, 2013; Kwak et al., 2005; McBride, 1999) as it can be used to provide visual motion and activity and soothing, restorative sounds.

Lastly, outdoor spaces should be sustainable, meaning they benefit the environment and are easy to care for. Maintenance and aesthetics of gardens in LTC must be properly given attention to. Broken or damaged walkways or seating and poorly maintained vegetation can jeopardize safety and convey negative messages regarding healthcare staff, for example that they "just don't care" or are inept (Cooper-Marcus & Sachs, 2013). On the other hand, a well-maintained garden can deliver a message that residents are in good hands and that they are in an environment that supports health (Cooper-Marcus & Sachs, 2013).

Safety and accessibility, physical and emotional comfort, positive distraction and engagement with nature, and sustainability are design elements that are required in the creation of outdoor spaces within healthcare settings if they are to be used for healing

and therapeutic purposes. However, does the presence of well-designed garden space guarantee high-usage among residents? In other words, if you simply build gardens under specific design guidelines will residents interact with the garden in beneficial and meaningful ways? Or do residents within LTC require structured and formalized activities to encourage engagement with nature-based occupations?

When discussing the potential benefits of interacting with therapeutic gardens, it is important to realize that activities in garden spaces can range from indirect to incidental to intentional and can include a range of potential occupations (Keniger, Gaston, Irvine, & Fuller, 2013). Indirect interactions do not require an individual to be physically in nature and can include activities such as viewing nature through a window or watching a motion picture of nature. Incidental interactions occur when a person is physically present in nature but the interaction is the unintended result of another activity, for example encountering vegetation while traveling from one destination to the next. Intentional interactions occur when a person has the intent to interact with nature, for example seeking out wildlife or gardening. What style and level of engagement do LTC residents prefer? Does the level of intention affect the potential benefits one receives? For example, do the benefits vary for an incidental walk through a garden space versus an intentional planting and watering session?

Evidence surrounding the typology of people-nature interactions is few (Keniger, Gaston, Irvine, & Fuller, 2013). One review of the scientific literature on nature deficits by Kuo (2013) revealed three general themes when it comes to addressing effective nature exposure: (1) maximize minutes; (2) all forms, all doses help; and (3) the greener, the better. Maximizing minutes refers to the importance of time and frequency of exposure, not the intensity of the exposure. This means that it is more important to have access to daily views of a few plants and trees than to have infrequent immersion in large-scale wilderness. "All forms, all doses help" suggests that even the smallest bit of exposure to natural settings can have beneficial effects. However, the final theme of the greener the better, suggests that larger, wilder green spaces provide greater benefits. This means that while even a slight view of greenery from a window is better than none, more greenery and greater immersion is associated with greater benefits. However, the review by Kuo (2013) does not address the issue of intention behind nature exposure. Further research is still needed on the effects of intention on nature interactions, as it has been

argued that the intent behind an interaction may be critical in influencing ongoing behaviours (Keniger, Gaston, Irvine, & Fuller, 2013).

Much of the literature that targets gardens and horticultural activities focus on garden design and post-occupancy evaluations or on the outcomes of horticultural interventions rather than on the design, processes, and strategies of garden intervention programs. Horticultural therapy is a comparatively young profession and continues to evolve. Practitioners seek to “elevate the profession out of its youth and into a recognized position within the health care community” (Davis, 1998, p.13) by bringing validation and growth to the profession through clinical practice, education, and research. Because evaluations of horticultural therapy programs are rare, especially process evaluations, a process evaluation of a HT program would be beneficial to the field and could assist others in implementing or evaluating garden programs of their own, growing horticultural therapy into an established and recognized field within health care.

Purpose of the Project

The purpose of this project is to create a logic model of and process evaluation framework for a therapeutic garden program at Banfield Pavilion, a residential long-term care facility located in Vancouver, B.C. operating under the Eden philosophy. The logic model provides a visible representation of how engagement with the garden program results in improved health and quality of life of LTC residents. Additionally, a process evaluation can further aid in understanding the relationship between specific program elements and program outcomes (Saunders, Evans, & Joshi, 2005). This understanding can assist in determining the future organization of a program and what elements to continue to offer and what to discard.

The care needs of Banfield’s residents have become increasingly more complex and their overall ability to care for their individual containers and the shared garden areas has declined over the last twenty years that their garden program has been in effect. This has transferred a lot of the responsibility of garden upkeep and improvement work onto the part-time horticultural therapy worker and the volunteers and students that the horticultural therapist oversees, taking time and resources away from actively

engaging residents in intentional nature-based occupations. In order to respond to this shift, a process evaluation should take place to explore how to fine-tune the program to make the best use of program resources.

In addition to assisting Banfield with its program development and improvement, this project was chosen with the intent of contributing to the understanding of garden programs in long-term care facilities by providing a framework to assist in the evaluation of such programs and to assist in the development of future garden programs within healthcare settings. Specifically, this framework considers the following questions:

1. What engagement strategies best encourage interaction of residents with garden programs within LTC?
2. Should garden programs focus more on providing environments for spontaneous interactions or planning and implementing structured activities?

Methods

This project connects elements of Banfield's garden program to concepts from the theoretical foundations of Ulrich's conceptual models (1984; 1999) while organizing the program's processes and characteristics into a format that can be used for evaluative purposes. When describing the program and its delivery, official Banfield documents obtained from the program written by horticultural therapist Shelagh Smith are used in addition to personal observation and experience obtained during a student internship.

First, this capstone project examines the historical background of nature-based health interventions. Then, Ulrich's (1984) stress reduction theory (SRT) and theory of supportive garden design (1999) are introduced and connected as the specific theoretical approach used for Banfield's garden program. In the third chapter, the empirical research findings related to nature benefits are divided into subsections addressing Ulrich's theories. Additionally, nature benefits specific to residents with dementia are discussed. In chapter four, the process evaluation framework of Banfield's garden program is discussed in detail. The process evaluation framework presented

here is based on a six-step generic process evaluation design developed by Saunders, Evans, and Joshi (2005), based on a previous model designed by Steckler and Linnan (2002). These steps include (1) describing the program; (2) describing complete and acceptable delivery of the program; (3) developing the potential list of questions; (4) determining methods; (5) considering the program's resources, context, and characteristics; and (6) the final process evaluation plan. Finally, a discussion of the integration of Ulrich's theories with the process evaluation framework will be presented along with the limitations, future research and applications of this project.

Chapter 2. Historical Foundations of Therapeutic Horticulture Interventions and Theoretical Framework of Banfield’s Garden Program

Historical Foundations of Therapeutic Horticulture Interventions

While horticultural therapy is a relatively new profession, the concepts upon which it is built have been around for centuries. The oldest recorded use of gardens for therapeutic effect occurred in ancient Egypt, where court physicians prescribed walks in palace gardens to mentally unwell royalty (Davis, 1998). Yet the clinical use of gardens was first published in academic journals beginning in the 19th century, with Dr. Benjamin Rush, the “Father of American Psychiatry”, describing gardening as a recognized treatment for persons with mental disabilities and mental illness (AHTA, 2016; Davis, 1998). In the 1930s and 1940s, training in horticulture for health care professionals in university settings became available and in 1936, the Association of Occupational Therapists in England formally acknowledged the use of horticulture as a treatment for psychiatric disorders (Davis, 1998). After World War II, the rehabilitative treatment of war veterans confirmed that HT was not limited to treating mental illness, resulting in a growth of horticultural programming and educational opportunities (AHTA, 2016). In the 1970s a number of individuals involved in horticultural therapy began to see a need for a formal professional organization and in 1973 the American Horticultural Therapy Association (AHTA) was formed (Davis, 1998). Following the United State’s lead, the Canadian Horticultural Therapy Association (CHTA) was incorporated in 1987, providing voluntary professional registration for individuals offering horticultural therapy services throughout Canada (CHTA, n.d.).

The past 200-300 years have defined progress as modernization, moving human society from “rural and agrarian to secular, urban, and industrial” (Canadian Public

Health Association, 2015, p.1). Maller, et al. (2005) states that, “Never in history have humans spent so little time in physical contact with animals and plants, and the consequences are unknown” (p.46). Modernization has provided us with a greater life expectancy but also changed our way of living establishing the domination of non-communicable diseases like coronary heart disease, diabetes, and cancer (Maller, et al., 2005). Additionally, mental, behavioural, and social problems are increasing, with mental health disorders currently constituting 10% of the global burden of disease (Maller, et al., 2005). Some researchers (e.g. Hicken, Lee, Morenoff, House, & Williams, 2014; Jennings & Johnson-Gaither, 2015; Maller et al., 2005; Mays, Cochran, & Barnes, 2007) go so far as to suggest that a lack of opportunity to experience contact with nature could be recognized as a powerful determinant of health and should be seen as a social justice issue. Therefore, modern health promotion programs and interventions should consider the potential abundance of positive health effects from interacting with nature.

Theoretical Framework of Banfield’s Garden Program

The therapeutic application of gardens and horticultural activities is centuries old. However as a field, horticultural therapy is poorly theorized. While there are many empirical studies that suggest beneficial results from horticultural activities, theoretical approaches and concepts are often taken from broader fields like eco-psychology. Eco-psychology is the study of our innate connection to nature and its healing benefits (Wang & MacMillian, 2013). Eco-psychology pushes the boundaries of subjectivity and questions where the “me” ends and the “other” begins. It asserts that “being in a bad place” may not only refer to a depressed or anxious mental state but could just as easily refer to a sealed-up, isolating, noisy nursing home, and that alterations in the external world may be just as therapeutic as alterations in subjective feelings (Hillman, 1995). Hillman (1995) tells us, “As there are happy places beneficial to well-being, so there are others that seem to harbour demons, miasmas, and melancholy” (p.xxi). Based on the principles of eco-psychology, human well-being and our surrounding environment are inherently linked.

The theoretical foundation used for this project is Ulrich’s (1984) stress reduction theory (SRT) and theory of supportive garden design (1999). While Ulrich’s stress

reduction theory posits that outdoor environments provide positive stimulation and reduce stress, the supportive garden theory provides a description of how specific garden elements can improve well-being for individuals within healthcare settings. Roger Ulrich was one of the first to empirically study the relationship between humans and nature, first by comparing the psychological effects of nature versus urban scenes on outcomes of wellbeing (1979). He later applied this concept to healthcare environments by studying the effects of window views of nature on participants recovering from surgery and found that they experienced shorter recovery times, had fewer complications, and required less pain medication than participants without nature views (1984).

This research evolved into Ulrich's stress reduction theory (SRT) (1984), which suggests that interactions with nature promote a reduction in the arousal of the sympathetic nervous system thereby improving psychological and physiological functioning. Stress, while being a health outcome itself, also directly affects psychological, physiological, neuroendocrine, and behavioural health. The psychological effects of stress include negative emotional reactions like fear, anger, and sadness. Physiologically there may be increases in blood pressure, skin conductance, and respiration rate. The neuroendocrine effects include secretion of the stress hormones epinephrine, norepinephrine, and cortisol, which stimulate the heart, constrict blood vessels, and suppress the immune system. Behavioural effects include sleeplessness, substance abuse, outbursts, helplessness and passivity, and medical noncompliance. Ulrich suggests that humans have an evolutionary preference for natural environments over urban environments and this psychological response can provide restoration from stress. Ulrich's work focuses on an individual's response to stress and healing and SRT has been used specifically in research within healthcare environments (Park & Mattson, 2009; Ulrich, 1984; Ulrich, 1992; Ulrich, 1997; Ulrich, 1999; Ulrich, 2000; Ulrich, Lunden, & Eltinge, 1993; Ulrich et al, 1991).

In *Healing Gardens: Therapeutic Benefits and Design Recommendations* (1999), Ulrich introduces the theory of supportive garden design which describes in detail how interacting with gardens in healthcare environments potentially provides physiological benefits through the mitigation of stress. Specifically, stressful events that can occur in healthcare include pain, loss of control, loss of privacy, depersonalization through

bureaucratic processing, and the uniform structuring of activities including meals and sleep. Healthcare environments are stressful due to noisiness, difficult way finding, lack of privacy, and lack of personal control over one's environment. Gardens in healthcare environments help mitigate stress by providing a sense of control and access to privacy, social support, physical movement and exercise, and access to nature and other positive distractions. These potentially restorative and coping resources provided by gardens in healthcare facilities leads to stress restoration and buffering which in turn result in improved health outcomes. Unfortunately, the theory of supportive garden design has not been empirically studied and is rarely discussed within the literature. However, because this theory is the most relevant to the design of garden programs and is clearly an expansion of SRT, which has been empirically tested, the specific aspects of the theory of supportive garden design were included as the theoretical basis for Banfield's garden program. While the theory provides suggestions for the physical design of a therapeutic garden, it has been adapted as the conceptual design of the garden's activity program for the purpose of this evaluation framework.

Conclusion

To summarize, though theoretical and conceptual work within horticultural therapy is limited, the longstanding history of using gardens as health interventions suggests their therapeutic potential. Additionally, theories like Ulrich's stress reduction theory and theory of supportive garden design provide the rationale for Banfield's garden program. These eco-psychologically based theories acknowledge the deep-rooted attraction humans have towards the natural environment and the potential impact this preference may have on the health and well-being of long-term care residents.

Chapter 3. The Literature

Introduction

While evaluative research is still in its formative years, evidence has been accumulating showing many potential benefits received from nature-based interventions. This literature review reviews evidence for gardens and gardening as a beneficial activity for older adults in order to draw support for activity programming within LTC that includes gardens and gardening activities. Cooper-Marcus (2007) states that in regards to healthcare and healing gardens, “‘healing’ is not synonymous with ‘cure’” (pg.4). While a garden cannot cure cancer or Alzheimer’s disease, studies suggest that it can facilitate stress reduction, which has psychological and physiological benefits. According to Ulrich’s theory of supportive garden design (1999), gardens help mitigate stress by creating opportunities for (i) physical movement and exercise, (ii) providing opportunities to make choices and experience a sense of control, (iii) providing settings that encourage social interaction and social support, and (iv) providing access to nature and other positive distractions. The following sections will address each of these as separate outcomes in support of Ulrich’s theory. In addition to these effects, this chapter will also address gardens’ direct effect on stress levels as well as specific effects on persons with dementia.

This review includes articles that assessed the benefits of gardening for both community dwelling and institutionalized older adults. Studies included in this review are empirical articles that have examined gardens and gardening activities for older adults, originally published in English in peer-reviewed journals. Gardening activities included both indoor and outdoor activities. Because knowledge is limited in this area, interventions, longitudinal studies, cross-sectional studies, observational studies, and qualitative studies are all included. Additionally, the time frame in which the articles were published was not limited. This review focuses on gardens and horticultural therapy

outcomes, as there currently remain no known process evaluations of garden programs within LTC.

Physical Movement and Exercise

Exercise has been associated with a wide variety of physical and psychological benefits. Regular physical exercise for adults of any age reduces the risk of cardiovascular disease, stroke, hypertension, type 2 diabetes, osteoporosis, obesity, colon cancer, breast cancer, anxiety, and depression (Haskell et al., 2007). Particularly for older adults, there is substantial evidence that physical activity can reduce risk of falls and injuries from falls (American Geriatrics Society, British Geriatrics Society, & American Academy of Orthopedic Surgeons, 2001), prevent or mitigate functional limitations (Keysor, 2003; Nelson et al., 2004) and is considered an effective therapy for many chronic diseases. Physical activity has also been shown to be associated with mental well-being in later life (Lampinen, Heikkinen, Kauppinen, & Heikkinen, 2006) and can aid in the management of depression and anxiety disorders (Brosse et al., 2002) and dementia (Doody et al., 2001).

Gardening provides opportunities for physical movement and exercise and has demonstrated a positive effect on physical functioning (D'Andrea, Batabia, & Sasson, 2007; Park, Shoemaker, & Haub, 2009). Park, Shoemaker, & Haub (2009) compared the physical and psychological health conditions and leisure-time activities of older gardeners and non-gardeners and found that among fifty-three community dwelling older adults aged 58 to 86 years old, gardeners had greater hand strength and pinch force and reported less bodily pain than non-gardeners. A larger cross-sectional study of 298 community-dwelling adults aged 50+ revealed that personal reports of physical activity and perceptions of personal health were statistically significantly more positive among gardeners when compared to non-gardeners (Somerfield, Waliczek, & Zajick, 2010). Gardeners when compared to non-gardeners have also reported better health status, improved body strength, and flexibility (Park & Shoemaker, 2009). Additionally, gardening has been shown to provide a significantly reduced risk of morbidity and lowered mortality rates among older men with cardiovascular disease (Wannamethee, Shaper, and Walker, 2000).

Gardening has also been shown to have a positive effect on Activities of Daily Living for older adults. Measures of Activities of Daily Living (ADLs) are used within LTC facilities, as a way to assess residents' physical functioning. ADLs include eating, bathing, dressing, toileting, and transferring/walking. Residents' ability to perform these tasks can fall into five categories: independent, supervision, limited assistance, extensive assistance, and total dependence. A positive relationship between functional health status and the performance of instrumental ADLs has been documented (Upchurch, 1999) and independence in performing ADLs is important to older individuals to facilitate social contacts and reduce loneliness (Bondevik & Skogstad, 1998). In a study by Brown, Allen, Dwozan, Mercer, and Warren (2004), 66 residents from two nursing homes participated in a two-phase randomly controlled trial that examined the effects of indoor gardening. The results demonstrated that gardening interventions had a significant effect on three ADLs (transferring, eating, and toileting). Perhaps because the gardening activities improved ADL functioning, the study also showed significant pretest-posttest differences within groups on loneliness and guidance, reassurance of worth, social integration, and reliable alliance. However, it should be noted that in a random controlled trial by Tse (2010), activities of daily living were unchanged for both the control and experimental groups after an eight-week indoor gardening program. More research is needed to explore how gardening programs affect activities of daily living and how ADLs affect other aspects of residents' quality of life and socialization.

While most studies on gardening and physical activity focus on health benefits, the body positions involved with the activity (i.e. stooping, kneeling, squatting, etc.) may have health risks and cause pain for older adults. To investigate this, Park and Shoemaker (2009) observed fourteen community-dwelling gardeners over the age of 62 and recorded the kinds of gardening tasks and body positions used during each garden task, the time spent on each task, and the tools used by the gardeners. A follow-up questionnaire asked participants to report on any bodily pain or injuries experienced during gardening activities. Seventeen total different garden tasks were observed. While conducting these tasks, six body positions were used by gardeners 90% of the time: gripping, bending, walking, lifting, stretching, and standing. Ten different bodily pains were reported with lower back pain being most reported. This study also showed that older gardeners performed a significant amount of walking, meaning older gardeners

can experience similar cardiorespiratory benefits as those who walk for fitness. This study shows that while gardening can provide health benefits for older adults, we must take into consideration the potential health risks of this activity.

In spite of some health risks and pain caused by physical movements used in gardening, the literature reveals substantial physical health benefits associated with this activity. Physical activity and exercise often declines with age, and even more so for older adults in institutional LTC. Gardens provide opportunities for lifelong engagement in an occupation that offers physical movement and exercise and the potential resulting abundance of health outcomes.

Sense of Control/Access to Privacy

Upon admission to a LTC facility, many residents experience a loss of control and privacy. Most facilities determine residents' daily schedule including when and what they eat, when they take medication, when they shower, etc. Hospital patients experience a similar loss of control and privacy and Ulrich (1999) suggests that the resulting stress has negative effects on immune system functioning and other physiological measures. The loss of certain abilities and dependency on staff may impact self-esteem and the maintenance of self-esteem can be supported through independent, familiar horticultural activities (Rappe & Topo, 2007). Additionally, gardens that offer comfortable seating in relatively private and shady areas can offer an important sense of privacy for residents (Grant & Wineman, 2007).

Bengtsson & Carlsson (2006) conducted focus groups with staff members from three nursing home facilities in order to investigate how outdoor environments at these facilities are experienced and used by residents. Transcriptions of the focus groups were systematized and condensed for meaning resulting in two main themes: Being Comfortable in the Outdoor Environment and Access to Surrounding Life. Both of these themes relate to sense of control and access to privacy. Control is described as the ability of persons to affect their situation and determine what to do and what others might do to them (Ulrich, 1999). Having the ability to access outdoor environments on one's own and feeling safe and comfortable to do so connects to the concept of

instorativeness, meaning an environment can help a person become more self-confident or self-reliant. Bengtsson & Carlsson (2006) suggest, "The ability to use the outdoor environment can restore a person to a more positive view of himself and his capacities" (p.65). For the other main theme, Access to Surrounding Life, staff reported that it was important for the residents to go outdoors to sense freedom, with one staff member stating "You do not feel confined in a garden. When you come to the garden you feel somewhat more alive." (Bengtsson & Carlsson, 2006, p.60). This study also speaks to the need for privacy, with staff suggesting that people with visible disabilities may have discomfort when being viewed by outsiders and therefore require places they can retreat to that prevent them from being looked at.

Some authors suggest that gardening may help facilitate place attachment for older adults who relocate to a new setting. Koons Trentleman (2009) describes place attachment as "an affective relationship between people and the landscape that goes beyond cognition, preference, or judgment" (p.20). These emotions are created and maintained through long-term interactions with an environment, both natural and built (Koons Trentleman, 2009), and have been associated with well-being in older adults (Gilleard, Hyde, & Higgs, 2007; Wiles et al, 2009). Sugihara and Evans (2000) found that residents in a retirement community who shared nearby outdoor garden spaces felt more attached to their community. Brook (2003) suggests that introducing familiar plants and wildlife into a newly relocated to environment is a common emotional response for displaced people and can make them feel more at home. By introducing elements of the attached environment, for example a familiar plant, older adults can correct their experience of feeling stress in a new environment. This ability to make a new environment feel safe, comfortable, and home-like may provide a sense of control for residents in long-term care.

Outdoor activities that include independent tasks can enhance feelings of confidence and independence and gardens can provide feelings of escape and a sense of control. The desire to "get away" is important to residents who spend a great majority of their time within the LTC facility and in fact, a study of 40 residents in three different LTC facilities found that 15% of participants cited "getting away from facility" as a perceived benefit from interaction with facility gardens (Kearney & Winterbottom, 2006). However, just having a garden present does not guarantee a sense of control and

access to privacy. Cooper-Marcus (2007) clarifies that in order for a garden to facilitate this form of stress reduction users must know that it exists, be able to gain access to it, and use it in ways that they prefer. Cooper-Marcus (2007) states that, "Above all, the garden design must offer choice- places to be alone or with others; places to sit in the sun or shade; with an expansive or close-in view; fixed and moveable seating; different walking routes- all subtly reinforce a sense of autonomy" (p.7).

Social Support

Research indicates that individuals with higher levels of social support are less stressed and have better health than those who are more isolated, and these higher levels of social support can improve recovery and survival rates for a variety of medical conditions (Ulrich, 1999). Many older adults living in long-term care settings experience a high degree of loneliness and social isolation (Tse, 2010). Gardens can offer opportunities for increased social interaction (Cox, Burns, & Savage, 2004; Gurski, 2004; Hernandez, 2007; Wang & MacMillian, 2013).

Being outside provides opportunities for people to interact in a location away from established indoor routines and shared gardens are used by residents from multiple wards or floors increasing the potential for interaction between residents (Bengtsson & Carlsson, 2006). In a study previously mentioned by Bengtsson and Carlsson (2006), which conducted focus groups with nursing home staff, staff reported that camaraderie amongst residents increased outdoors. Seating outdoors was more mixed compared to inside, where residents tended to be protective of their own areas. Staff reported that residents never visited each other's rooms but in the gardens they met and mixed with people from different floor levels. Gardens provide a venue for meetings and allow opportunities for socialization that would otherwise not occur.

A random controlled trial by Tse (2010) sought to examine the effectiveness of a garden program in enhancing socialization and life satisfaction on older adults living in nursing homes. Twenty-six older people in the experiment group and 27 older adults in the control group provided demographic data in addition to data on life satisfaction, loneliness, physical activity, and social network before and after an eight week garden

program. The experimental group also received open interviews to further elicit information about their experience participating in the garden program. Significant improvements were found in life satisfaction and social network and a significant decrease was found in the perception of loneliness for older people in the experimental group, thus suggesting that garden programs be promoted more widely among nursing home residents.

Residents within LTC often experience role and relationship losses including the loss of spouses, relatives, and friends. These losses can lead to social isolation and loneliness. Gardens can be an important meeting space and site for social interaction for residents within LTC. A study of 40 residents in three different LTC facilities found that 20% of residents enjoyed engaging/watching people outdoors, 10% stated that meeting people was a benefit of spending time outdoors, and 5% enjoyed participating in outdoor social events (Kearney & Winterbottom, 2006). Even residents who have difficulty with communicating or who lack verbal skills can receive social benefits from horticultural programs. Kwack et al. (2005) suggest that non-communicative residents are able to nonverbally relay their opinion of their sensory experience of plants, thereby contributing to the conversation and experiencing the benefits of social interaction. It has also been suggested that gardening is an appropriate activity for intergenerational programming, as it is an activity that is available to all ages and therefore can be used to promote intergenerational communication and socialization (Kerrigan & Stevenson, 1997). Social connection is a basic need of people of all ages, even for individuals who are nonverbal. This requirement of social support and connection can be seen in Maslow's hierarchy of needs which places the desire for love and belonging second only to survival and safety (Maslow, 1954). The literature suggests that gardens in LTC facilities can assist residents in meeting this basic psychological need.

Positive distraction

Psychologists Kaplan and Kaplan (1989) proposed that the modern Western lifestyle requires a great amount of psychological attention, which leads to mental and emotional fatigue. Kaplan and Kaplan (1989) developed the attention restoration theory (ART) to describe the healing we receive from being in environments, like gardens, that

promote (i) 'being away' from the demands of regular life; (ii) 'soft fascination', sensory aspects that have an (evolutionary-based) inherent appeal; and (iii) 'extent or scope', a sense of vastness or connection between the experience and one's knowledge of the world. Nature provides inherently intriguing stimuli that involuntarily capture our attention. This is in opposition to directed attention, a cognitive-control process we use when one needs to suppress distracting stimulation.

Kaplan (1995) describes directed attention as a mechanism that is used when something in itself does not attract attention, but is important to attend to nonetheless. Directed attention "requires effort, plays a central role in achieving focus, is under voluntary control (at least some of the time), is susceptible to fatigue, and controls distraction through the use of inhibition" (Kaplan, pg.170, 1995). According to ART (1989), interactions with nature give the directed attention cognitive mechanism a chance to replenish by engaging the senses and providing natural distraction.

The focus groups with staff conducted by Bengtsson and Carlsson (2006) revealed that smelling, feeling, and discussing garden elements were a source of great pleasure for the residents. Staff discussed experiences with residents, with one staff member describing how one resident "took so much pleasure in being out in the summer rain, to hear the drops and feel the splash against her skin" (p.60). Another staff member described a walk with a resident stating, "When she saw the lilac we had to cross the street and take the wheelchair right up to the bush for her to really smell the fragrance. It was very important to her. To feel the flowers, to somehow come close." (p.60). These vivid anecdotes reveal the desire residents have to receive sensual pleasure from natural elements found in gardens. This is also supported by the Kearney and Winterbottom study (2005), as the most cited activity for residents to do in outdoor spaces was simply to observe plants/nature.

Numerous research studies have provided support for Kaplan and Kaplan's attention restoration theory, showing that engaging with natural distractions improves attention and memory in the general population (Berman, Jonies, & Kaplan, 2008; Berto, 2005; Cimprich, 1992, 1993; Cimprich & Ronis, 2003; Hartig et al., 2003; Mayer, Frantz, Bruehlman-Senecal, & Dolliver, 2009; Ottosson & Grahn, 2002; Tennessen & Cimprich, 1995). However, studies that specifically look at nature's effects on attention in the older

adult population are rare. Gamble, Howard, & Howard (2013) conducted one such study, although they used simulated nature (a picture) instead of physical immersion in a garden. However, due to the scarcity of literature that examines ART in relation to older adults, this study is included. Gamble et al. (2013) looked specifically at executive attention, a form of directed attention that is used when planning or making decisions, correcting errors, and when determining if conditions are dangerous. The study of thirty healthy older adults, aged 64-79 years, completed an attention test before and after 6 minutes of viewing either nature or urban pictures, with random assignment into a picture type. Results showed that viewing nature, but not urban, pictures significantly improved executive attention in older adults.

Another study by Ottosson, Grahn, and Sveriges (2005) measured concentration, blood pressure, and heart rate in fifteen older adults living in LTC before and after an hour of rest in a garden or in their favorite indoor setting. Concentration was measured using multiple tests that have demonstrated reliability and validity in previous research and included: the Necker Cube Pattern Control test, Digit Span Forward, Digit Span Backward, and the Symbol Digit Modalities Test. Results indicated that powers of concentration increased for participants after a visit to a garden outside compared to resting indoors. The results did not show any effects on blood pressure or heart rate, which is in disagreement with Ulrich's theory of stress reduction. The author's suggest that rest in a garden setting plays an important role in older adults' powers of concentration.

The Kaplans' theory of attention restoration states that being outdoors in a green recreational space restores attention fatigue and allows people to become more focused. This theory has seldom been tested outside a laboratory and even more rarely in relation to older adults in LTC. However, based on the studies mentioned above, older adults do have a preference for outdoor sensory experiences (i.e. feeling fresh air, seeing, touching, and smelling plants, etc.) and it is possible that older adults can experience attention restoration from spending a period of leisure time in an outdoor garden. Additionally, it is worth mentioning the role of the aesthetic experience of gardens for older adults. Gardens can be considered inherently attractive and being in a beautiful nature setting has an evolutionary appeal that may provide soothing distraction

and comfort for older adults who spend most of their time in sterile and artificial environments.

Stress Reduction

According to Ulrich's theory (1999), gardens help mitigate stress by creating opportunities for physical movement and exercise, providing opportunities to make choices and experience a sense of control, providing settings that encourage social interaction and social support, and providing access to nature and other positive distractions. In addition to these mitigating effects, gardens have been shown to have a direct effect on stress levels. Interaction with natural settings has been shown to have preventative or reductive effects on stress and anxiety in the general population (Hartig et al., 2003; Hartig, Mang, & Evans, 1991; Laumann, Garling, & Stormark, 2003; Mayer et al., 2009; Parsons et al., 1998; Rubinstein, 1997; Ulrich et al., 1991; van den Berg & Custers, 2011; van den Berg, Maas, Verheij, & Groenewegen, 2010). Studies not specific to older adults have provided evidence of natural settings' (including gardens') measurable effects on stress and anxiety including reduced cortisol levels (Rodiek, 2002; Ulrich et al., 1991; van den Berg & Custers, 2011), changes in muscle tension and skin conductance (Ulrich et al., 1991), decreased blood pressure (Hartig et al., 2003; Laumann et al., 2003; Ulrich et al., 1991), and decreased heart rate (Ulrich et al., 1991). Additionally, qualitative support for stress reduction and gardens can be seen in a large interview study of five outdoor healthcare gardens which found that over 75% of garden visitors expressed reduced stress, 60% reported feeling calmer, and over 20% reported feeling more rejuvenated (Cooper-Marcus & Barnes, 1995). While studies on the effects of nature and stress reduction specifically for the older adult population is less common, stress is a prevalent experience for residents within LTC facilities and gardens may present one solution to reduce stress and increase restoration.

Rodiek (2002) conducted a study of seventeen LTC residents aged 71 to 98 years old to assess measurable psychological and physiological outcomes associated with natural environments, including positive and negative mood, anxiety, and salivary cortisol levels. Participants engaged in the same activities at an outdoor horticultural garden or an indoor classroom. Measures were assessed before and after each

experience. No significant change was found in mood or anxiety level, however cortisol levels were significantly lower in the garden environment compared with the indoor settings, indicating greater reduction in stress levels.

A study of 94 individuals aged 50 to 88 years old reported that gardeners had significantly less perceived stress than participants of indoor exercise classes (Hawkins, Thirlaway, Backx, & Clayton, 2011). Participants were members of various indoor and outdoor activity groups and completed physiological measures and psychometric scales of self-rated health, perceived stress, physical activity level, and perceived social support. Allotment gardeners reported significantly less perceived stress than participants of indoor exercise classes. There were no significant differences in reported levels of social support and physical activity amongst the groups which further suggests that the allotment gardeners' lower stress levels may come from engagement with nature and psychological restoration instead of social support or physical activity received during group activities.

Although the studies mentioned contribute to the state of knowledge regarding older adults' stress reduction and interaction with nature, the literature on this topic still lacks a sufficient number of controlled, measurable outcome-based studies that look at the effects of plants and nature elements on older adults' stress levels. Future studies should continue to find tangible health outcomes, thus implicating the value of plants' and garden settings' inclusion within LTC environments.

Dementia

Along with the previously mentioned outcomes, gardening has benefits specific to persons with dementia (PWD). Gardening can slow down the deterioration of mental capacities and reduce disruptive behaviour and sleep disturbances in patients with Alzheimer's and other forms of dementia (Greenleaf et al, 2013; Lee & Kim, 2008), provide a sense of accomplishment and control (Lee & Kim, 2008; Rappe and Topo, 2007), and increase the potential for social support (Roshier & Robinson, 2005).

Sleep disturbance is prevalent among dementia patients and is often associated with behavioural symptoms. Nocturnal sleep disturbances and behaviour symptoms are the main causes of caregiver burden and institutionalization of persons with dementia (Lee & Kim, 2008). Oftentimes, persons with dementia are given sedative-hypnotics and neuroleptics as treatment for these symptoms, however non-pharmacological interventions are needed due to the high-risk of adverse effects of those drugs (Lee & Kim, 2008). Lee & Kim (2008) found in a study of 23 institutionalized dementia patients, those who had sleep disturbance and/or agitation had significant improvements in wake after sleep onset, nap, nocturnal sleep time, and nocturnal sleep efficiency after participating in a 5 week indoor gardening study. Additionally, agitation and cognition outcomes significantly improved. Gardening can be easily integrated into existing environments and be enjoyable for both caregivers and dementia patients (Lee & Kim, 2008). Thus, indoor gardening may be an appropriate intervention to enhance or maintain compliance of dementia patients and provide a sense of accomplishment without creating extra caregiving workload (Lee & Kim, 2008).

Rappe and Topo (2007) presented findings on two studies that suggest contact with outdoor environments can support a sense of control and competence in persons with dementia within institutional facilities. One study surveyed 65 nursing staff from ten residential care homes while the other involved observations of 123 people with dementia from two day care units and six residential LTC units. According to nursing staff's opinions, plants in the facilities and horticultural activities promoted the well-being of residents. The residents with dementia seemed to be calmed by being in garden environments, but the gardens also evoked memories and initiated activity and social interaction. This is suggested to occur because plants, with their multisensory characteristics, were able to trigger memories and create associations in the mind of the PWD. Rappe and Topo (2007) suggest that visits to gardens can support the feeling of competence of people with dementia in two ways. One way gardens support PWD is by providing environments that are easy to interpret even with diminishing cognitive capability. Gardens provide abundant information and cues about time, place, and purpose that assist in orienting PWD toward reality. The other way gardens can assist is by providing meaningful activities that are interesting to persons with dementia and can consolidate self-esteem.

Another way nature-based programs may assist persons with dementia in long-term care is through increased involvement and satisfaction of their family members, thus potentially increasing social support for the PWD. Seventy-five percent of nursing home residents have some degree of dementia and conversations during visits can be difficult for family members (Rosher & Robinson, 2005). After the implementation of the Eden Alternative in a 150-bed nursing home in the Midwest USA, Rosher & Robinson (2005) found a significant improvement in family satisfaction and an increase in the number of visitors. The authors suggest that the introduction of plants and animals provided a meaningful activity for family members and PWD.

The current field of research on gardens and persons with dementia is promising. Gardens and gardening programs have the potential to slow down the deterioration of mental capacities, reduce disruptive behaviour and sleep issues, provide a sense of accomplishment and control, and increase social interaction. And while special gardens designed for persons with dementia, or “memory gardens”, are increasingly popular in special care units and in communities, more research on the effects of gardening on dementia is needed.

Conclusion

The literature discussed in this chapter suggests a wide range of benefits associated with resident use of facility outdoor gardens. Nature-based interventions have a strong theoretical basis from ecopsychology and the empirical support for gardens continues to grow. Overall, there are a few commonalities amongst the literature, which were organized for the purposes of this project under Ulrich’s (1984) stress reduction theory (SRT) and theory of supportive garden design (1999): namely physical movement and exercise, sense of control and access to privacy, social support, and positive distraction. Also included was stress reduction as a direct outcome as well as benefits particular to persons with dementia. However, it is important to note that each benefit category is not mutually exclusive and some studies resulted in outcomes that impacted more than one aspect, for example the Bengtsson and Carlsson (2006) focus group study and the Kearney and Winterbottom (2006) interviews reported on benefits that related to a sense of control and access to privacy, natural distraction, and

social support. Additionally the Brown et al. (2004) RCT study suggested outcomes related to both physical movement and exercise as well as social support. Indeed, according to Ulrich's theories, a well-designed and utilized garden space should in fact result in overlap of all the aforementioned benefits.

There are several limitations found within the literature, mainly research design and sample size. Almost all of the studies mentioned in the literature review show interesting results but due to the small sample size are not generalizable and require additional study. In addition to small sample size, many studies lacked control groups for comparison. Future research should include more random controlled trials to ensure that study findings are the result of the intervention and cannot be explained by other variables.

Many long-term care facilities are beginning to offer therapeutic garden programs. For residents, family, and/or staff the environment of a LTC facility can be experienced as stressful. Additionally, residents living in LTC are challenged by many health conditions, including chronic illnesses and dementia. One role of gerontology is to discover the most supportive and enjoyable environments for the later years of life while being conscious of the economics of providing care to older adults. The recent attention to person-centered care philosophies has revealed more natural and creative ways to achieve better health and quality of life within LTC facilities. Therapeutic or healing gardens within LTC facilities provide a non-pharmacological intervention that can improve the health and quality of life of residents. Common physical and mental health-related concerns addressed by nearby access to gardens include physical movement and exercise, providing a sense of control and access to privacy, social support, positive distraction, overall stress reduction, and support for persons with dementia. While research supports the use of gardens for reducing negative physiological, psychological, and behavioural symptoms, further research is needed, specifically how best to encourage resident involvement in nature-based occupations so that they may be exposed to the aforementioned beneficial effects. One possible way of illuminating this issue is through a process evaluation of a garden program in long-term care.

Chapter 4. A Process Evaluation Framework of the Banfield Garden Activity Program

Introduction

Many residential long-term care institutions are experiencing a culture change from traditional institutional environments to environments that are person-centered and home-like. The Eden Alternative is one approach that seeks to alleviate loneliness, helplessness, and boredom by creating environments that support spontaneous and unpredictable activities and interactions with animals, plants, and children and to provide opportunities for residents to give care as well as receive care (Bergman-Evans, 2004, p.29). Banfield Pavilion, located in Vancouver, B.C., is a residential long-term care home that attempts to apply Eden Alternative principles. While age is not a criterion for admission, most residents are over 65 years of age and all have complex mental and/or physical health problems that prevent them from living in their own homes. Open since 1972, Banfield is home to approximately 156 residents.

As guided by Eden Alternative philosophies, most views from Banfield include trees and green landscapes and indoor plants, cut flowers, murals, and nature-based artwork to contribute to residents' engagement with plants and nature. However, the Banfield garden program remains the most visible representation of Eden philosophies within the facility. Gardens are a central feature to the facility including a front entrance garden, a 3,000 square foot second-floor restorative and enabling patio garden, a small greenhouse, and north-facing balcony gardens located on each floor outside the common dining areas. Most activity takes place on the restorative and enabling patio garden, which contains a large number of planter boxes and containers in a variety of sizes, heights, and shapes in order to increase accessibility for differing ability levels. Also included are a variety of shady nooks and patio furniture. Residents, visitors, staff, and volunteers are all encouraged to contribute and participate in all gardens on site. Some residents garden independently on a regular basis while others require assistance from staff, family, or volunteers. Some residents choose to garden in separate

containers labelled with their names while others choose to contribute through general maintenance of shared areas by planting, sweeping, weeding, watering, and pruning. The patio garden is also frequently used for visiting with family and friends or passive enjoyment of fresh air, sunshine, plants, and animals like mason bees, chickadees, and hummingbirds which frequent the garden. Staff also regularly spend time in the garden socializing, taking breaks, and eating lunches.

While the program and gardens were specifically designed for therapeutic and rehabilitative uses and, as previously discussed, have potential benefits for the residents, there remains some ambiguity regarding what style of activity programs are best for institutionalized older adults. A central concept to the Eden philosophy is the encouragement of spontaneous activities and interaction, yet the absence of planned activities for persons with dementia can be troublesome as they may be unable to plan or initiate activities on their own (Gigliotti & Jarrott, 2005). On the other hand, scheduled programming for institutionalized older adults can be difficult to facilitate. If programs are targeted to the lowest functioning individuals, the higher functioning individuals may become bored and more likely to engage in disruptive behaviors (Gigliotti & Jarrott, 2005). However, if programs are too challenging for lower functioning participants, they may experience confusion, agitation, embarrassment, withdrawal, or apathy (Gigliotti & Jarrott, 2005). Thus there is some controversy over the style and method of activity programming of institutionalized older adults.

In addition to the ambiguity over what style of activity program is best within a long-term care facility that attempts to practice the Eden philosophy, Banfield's garden program has experienced an increase in residents' complex health issues and a decline in residents' ability to care for their garden. This has resulted in an increase in time and resources spent in garden upkeep and maintenance, taking time and resources away from actively engaging residents in intentional garden occupations. Because of this and the general uncertainty over program style, a process evaluation should occur using the following guiding research questions:

1. What engagement strategies best encourage interaction of residents with garden programs within LTC?
2. Should garden programs focus more on providing environments for

spontaneous interactions or planning and implementing structured activities?

The process evaluation framework presented here is based on a six-step generic process evaluation design developed by Saunders, Evans, and Joshi (2005). In the following sections, this chapter will: (1) describe the program; (2) describe complete and acceptable delivery of the program; (3) reveal the potential list of evaluation questions; (4) discuss methods to address the evaluation questions; (5) consider the program's resources, context, and characteristics; and (6) refine the evaluation questions and present the final process evaluation plan.

Overview of the Evaluation Design

Step 1: The Program

The history of the garden as told by Smith (2014a) in an account for a case study in *Therapeutic Landscapes* reveals that the garden program was born from a volunteer, Ann Clement, who in 1990 was asked by a resident to provide some soil in order to grow a few beans on the patio garden. At the time, the garden was not actively used and contained a single row of planter boxes and three arbour structures. From this request, a gradual design process began for the garden, which followed three guiding principles: "(1) to imbue life into an unused outdoor space, (2) to provide a home garden that welcomed more residents to garden to putter around and (3) to be responsive to resident desires (and staff needs), allowing for individual creativity rather than an ordered design" (Smith, 2014a, p.143-144). Additions to the garden included more plants, the use of lattices to create private areas, and a shed with tools. In 1997 Banfield hired a horticultural therapist for the newly created position of part-time horticulture activity worker. The garden program continues to have the intention of being resident-centered; meaning residents should direct what gets planted and how the space is used. Accessibility is a main focus of the garden's physical design in order to provide opportunities for residents to use the space according to their individual interests, needs, and abilities. The planned formal activities were designed by a horticultural therapist and seek to provide opportunities for residents to achieve each of Ulrich's garden effects

(1999): movement and exercise, sense of control/access to privacy, social support, and positive distraction.

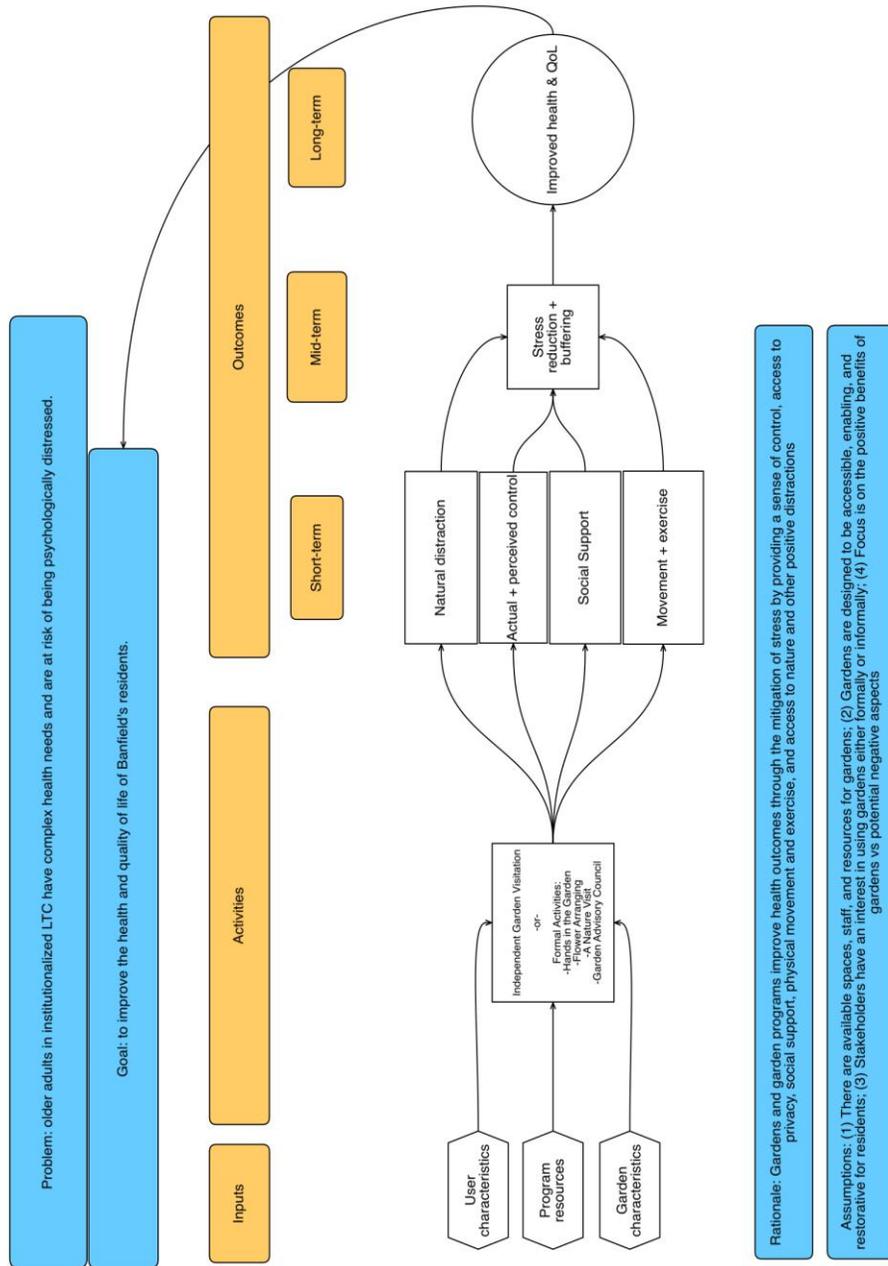
Figure 1 displays the Logic Model for the Banfield garden program, including the problem, goal, rationale, assumptions, inputs, activities, and short/mid/long-term outcomes. Saunders, Evans, and Joshi (2005) tell us that, “having a well-planned and theory-based health-promotion program is the beginning point for planning process evaluation” (p.135-135). Thus, having a well-designed logic model that clearly organizes the program and connects to its underlying theory is the first step in this process evaluation framework. The logic model’s program theory draws upon Ulrich’s (1984) stress reduction theory (SRT) and theory of supportive garden design (1999).

While not explicit, the logic model assumes an ecological view of health behavior. Ecological models of health behavior refer to the interactions between individuals and their physical and sociocultural surroundings (Salis, Owen, & Fisher, 2008). Ecological models assume that there are multiple levels of influence on health behaviors and that these influences interact across these different levels (Salis, Owen, & Fisher, 2008). This can be seen in the Banfield garden program logic model as user characteristics, program resources, and garden characteristics are interacting influences on individual, program, and physical environmental levels that help determine if a resident will interact with the garden with either independent visits or participation in formal activities. Ecological models are considered to be comprehensive (Salis, Owen, & Fisher, 2008) and are used frequently in environmental gerontology.

Figure 1

Logic mode
of supportiv

d theory



Step 2: Complete and Acceptable Program Delivery (who, what, when, where, how)

As described by Saunders et al. (2005), the specific details that make up the elements of the program are described in more detail in this second-step of process evaluation planning. These elements are included in the program's logic model (see Figure 1). In addition to providing and maintaining the physical outdoor environments for residents', staff's, and family's unplanned enjoyment and socializing, other program strategies include the planned activities A Nature Visit, Flower Arranging, Garden Advisory Council, and Hands in the Garden. All planned activities have resident participation observed and documented in an Activity Tracker. Residents' declines are also documented. Programmed activities provide an accessible physical, social, and cognitive experience of gardening and nature that, using plants as the catalyst, prompts interaction and engagement. While each individual activity has specific objectives attached to it, all outcomes are directly related to Ulrich's (1984) stress reduction theory (SRT) and theory of supportive garden design (1999), which describes gardens' mitigation of stress through Natural Distraction, Actual and Perceived Control, Social Support, and Movement and Exercise (Ulrich, 1999). I will use these factors to assess the above activities at Banfield.

A Nature Visit is an activity between one to three residents and a staff member, student, or volunteer that focuses on interactions with plants and nature and commonly includes a trip to one of the garden areas (Smith, 2015a). The activity occurs 1 to 4 times a month in the morning or afternoon and lasts 5 to 20 minutes as tolerated by the resident. This activity provides opportunities for residents to engage with nature; build rapport with staff, volunteers, and other residents; and receive supplies and assistance with gardening. Residents observing, using their senses, and/or being hands-on with plants and tools provide opportunities for Natural Distraction, Actual and Perceived Control, and Movement and Exercise. Residents also socialize with other residents, volunteers, and staff, thus providing the additional outcome of Social Support.

Flower Arranging is a one-to-one activity that focuses on the sensory experience of arranging cut flowers (Smith, 2015b). The activity occurs once a week on alternating

floors and lasts 3 to 20 minutes per resident. This activity provides residents with opportunities to see, smell, touch, and comment on flowers, make choices about which vase and flowers to use, cut and place stems in the vase, and choose where to place the finished arrangement. Residents engaging with flowers through sight, touch, and/or smell, making choices about arrangements, cutting and placing stems in vases, and having conversations with staff, residents, and visitors about their arrangement provide the outcomes of Natural Distraction, Actual and Perceived Control, Social Support, and Movement and Exercise.

Garden Advisory Council is a group activity with 4 to 20 residents where residents participate in sensory engagement with plants and nature while having related discussion and planning for planting and use of the garden (Smith, 2015c). This activity occurs every-other week for 1.5 hours or as tolerated by the residents. Meetings are documented by minutes. This activity provides residents with the opportunity to see, smell, touch, and comment on plant material, to make choices for the garden from predetermined options, and to observe and interact with other residents, volunteers, and staff, providing opportunities to achieve the outcomes of Natural Distraction, Actual and Perceived Control, Social Support, and Movement and Exercise.

Hands in the Garden is a unique activity in that it focuses more on the physical garden than the residents (Smith, 2015d). This activity typically involves 2 to 6 residents and occurs once a week for 1.5 hours. Hands in the Garden is a scheduled time for the care of Banfield's gardens with residents being encouraged to participate to their interest and abilities. Its purpose is to provide residents, visitors, and staff with well-maintained gardens, to provide residents with the opportunity to garden independently or semi-independently, and to encourage a sense of ownership of the gardens. Residents are expected to be engaged in garden care and socializing, providing opportunities for Natural Distraction, Actual and Perceived Control, Social Support, and Movement and Exercise.

Hands in the Garden ensures that garden tasks are up to date and that plants are in good health so that residents may enjoy unscheduled garden activities at other times during the week. An important feature of the garden program that distinguishes it from other activity programs is that the garden is always available. While activities like

arts and crafts or cooking must be organized and facilitated by staff, the garden provides opportunities for autonomous and spontaneous interactions to the extent that residents are able to find and ambulate to the garden areas, though it is important to note that some residents have cognitive or physical impairments that make independent visits more challenging. Independent, unscheduled garden visits are expected to provide at least Natural Distraction and Actual and Perceived Control based upon the environmental design and nature of gardens. However, the degree to which the outcomes of Social Support and Movement and Exercise are currently unknown during these visits and could be explored during the evaluation.

Step 3: List of Potential Process-Evaluation Questions

The third step in the process evaluation plan is to develop a wish list of possible questions without full consideration of resources (Saunders et al., 2005). Questions are based on the program’s underlying theory and goals and address components of fidelity (quality), dose delivered (completeness), dose received (exposure and satisfaction), reach (participation rate), recruitment, and context. Also noted is the information needed to answer each process evaluation question. Table 1 includes the components, purpose, potential questions, and information needed to answer each question.

Table 1 Evaluation Questions for Fidelity, Program Delivered, Program Received, Reach, Recruitment, and Context

Component	Purpose	Potential Questions	Information Needed
Fidelity (quality)	Extent to which intervention was implemented as planned.	1. To what extent is the program implemented consistently with Ulrich’s theories?	1. What specific, observable behaviors reflect the Ulrich’s theories?
Dose Delivered (completeness)	Amount or number of intended units of each component delivered or provided.	1. What communication/engagement techniques are being used? 2. Who delivers the services (staff, volunteers, students)?	1. What specific engagement materials/techniques should be used and when? 2. Who is qualified to deliver what services? Do they understand the underlying theory and expected outcomes?
Dose Received (exposure)	Extents to which pts actively engage with, interact with, are receptive to, and/or use materials or recommended resources; includes both “initial use” and “continued use.”	1. In what ways are pts present at formal activities interacting with the garden? 2. To what extent do pts interact with the garden outside of formalized activities? How is unstructured time in the garden spent? 3. Are intended	1. What pt behaviors indicate being engaged in outcomes during a formal activity? 2. What pt behaviors indicate being engaged in outcomes outside of formal activities? 3. What offered communication/engagement

		engagement strategies effective?	strategies have been received and used by pts? How many times?
Dose Received (satisfaction)	Pt satisfaction with program and interactions with staff	1. How satisfied are the pts with formal activities? With unstructured time in the garden?	1. What aspect of the program do we want to measure satisfaction for (activities, staff, physical environment, available materials)?
Reach (participation rate)	Proportion of the intended priority audience that participates; often measured by attendance; includes documentation of barriers to participation.	1. How many people are participating in formal activities? What factors do they have in common? 2. How many people who once participated in formal activities have dropped out? What factors do they have in common? 3. How many people have declined participation in formal activities? What factors do they have in common?	1. What is the total number of residents participating? What are their demographic and clinical characteristics? 2. What proportion of pts have dropped out? What are their demographic and clinical characteristics? 3. What are the barriers to participation? What are the demographic and clinical characteristics of those who decline?
Recruitment	Procedures used to approach and attract pts at individual and organizational levels; includes maintenance of pt involvement.	1. What planned and actual recruitment procedures are used to attract pts? 2. What planned and actual recruitment procedures are used to encourage continued involvement of pts? 3. What are the barriers to recruitment?	1. What mechanisms should be in place to document recruitment? 2. How will we document efforts for encouraging continued involvement? 3. How will we identify and document barriers to participation?
Context	Aspects of environment that may influence implementation or outcomes.	1. To what extent is the garden program compatible with other activity programs and other departments within Banfield? To what extent does the garden complement, contribute, or build on existing programs?	1. What approaches will be used to identify and systematically assess compatibility with other activity programs and departments? 2. How much of staff time/resources go into each

2. What is the most efficient use of staff time and resources?

scheduled activity? How much into training and educating other staff, students, volunteers, etc.? How much for implementing engagement techniques for independent garden use?

Step 4: Methods of Evaluation

In this step, the methods for answering each question in the list of process evaluation questions were considered, including issues of data sources, tools/procedures, timing of data collection, data analysis or synthesis and reporting. Design (when data are to be collected) is a unique and primary consideration as the garden program is directly influenced by the seasons, with most activity taking place during the spring and summer months. Therefore, evaluation should take place during the most active months of gardening (e.g. April-September). For each process evaluation question, the most appropriate data sources were identified, and the instruments and methods were outlined. Multiple methods are suggested, as “different data sources may yield different conclusions” (Saunders et al, 2005, p.145), for example reports from staff regarding activities vs. observation of those activities. Surveys, activity and resident records, and observations are all suggested for use. The list of evaluation methods can be seen in the finalized process evaluation plan (see Table 2). For the reporting of findings, a formal report with feedback post-evaluation would be provided to residents, program staff, and facility administration, summarized by activity including findings regarding unstructured time in the garden.

Step 5: Program Resources, Context, and Characteristics

For this step, program resources, context, and characteristics were reviewed. Banfield has some systems in place to support the garden program. One is the physical structure of the building, which has space reserved for the multiple gardens used by the program. Additionally, the facility has budgeted for a part-time horticulture activity worker whose role it is to implement all aspects of the program and is ultimately responsible for the care and maintenance of the garden. The Vancouver Coastal Health authority processes and receives volunteers and student interns to assist with program activities and there are occasional corporate volunteer groups to assist with garden maintenance. The facility’s adoption of the Eden Alternative philosophy demonstrates an intention to

create a diverse habitat for the residents. While the gardens existed before the formal adoption of this philosophy, the continued support of the gardens can be viewed as one aspect of this objective. The program was designed specifically for Banfield's residents by a CHTA and AHTA registered horticultural therapist experienced in implementing garden programs and who is aware of potential barriers for participants with mental and physical impairments.

Resource consideration for the evaluation includes the personnel and time needed for data collection, entry, analysis, and reporting. It is important that the evaluation not add additional burden to activity staff, students, and volunteers delivering the program. Several of the evaluation questions rely on activity logs for data. These logs are already required by the facility for all scheduled activities and should not be disruptive to current operations. Observations will be unobtrusive, as the evaluator would be already familiar with staff and residents and will fit within the program's current schedule. While in-depth interviews with residents, family, and staff would provide more detailed data, the additional time required for this method is beyond the scope of this evaluation. Therefore, a survey for residents, family, and staff and one informal interview with the horticultural therapist is suggested.

Step 6: Finalized Process Evaluation Plan

Due to resource considerations of both the program and the process evaluation itself, it is necessary to prioritize and reduce the number of process evaluation questions (Saunders, Evans, & Joshi, 2005). Priorities for process evaluations vary amongst different projects (Saunders, Evans, & Joshi, 2005). Due to the concerns over Banfield's shift in resident capabilities, the program's resource limitations, and general ambiguity over program style (spontaneous versus planned activities), the priorities and guiding research questions for this framework are:

1. What engagement strategies best encourage interaction of residents with garden programs within LTC?
2. Should garden programs focus more on providing environments for spontaneous interactions or planning and implementing structured activities?

The previous wish list of evaluation questions that focused on addressing all aspects of complete and acceptable program delivery were then compared and contrasted with the framework's guiding research questions. Evaluation questions that did not specifically address engagement strategies or the comparison of formalized activities and unstructured independent use of the garden were discarded or adapted to reflect the program's evaluation priorities.

The final evaluation plan is detailed in Table 2, which describes the collection and handling of data including data sources, tools/procedures, timing of data collection, data analysis or synthesis, and the final reporting of the evaluation. It is important to note that process evaluation planning is an iterative rather than linear process (Saunders, Evans, & Joshi, 2005), so while a finalized process evaluation plan is presented here for the purposes of this capstone project, should the evaluation take place, evaluation questions could be further edited and refined, preferably in some form of a participatory process with key stakeholders of the program.

Table 2 Finalized Process Evaluation Plan for Banfield Pavilion’s Garden Program

	Process Evaluation Questions	Data Sources	Tools/Procedures	Timing	Data Analysis or Synthesis	Reporting
Fidelity	1. To what extent is the program implemented consistently with Ulrich’s theories?	Staff	Observation with checklist	At least 2 observation sessions per scheduled activity	Calculate score based on percentage of intended behaviors observed	Formal report and feedback after evaluation is completed, summarized by activity
Dose Delivered	2. What types of communication/engagement techniques are being used? 3. Who delivers the services (staff, volunteers, students)?	Staff	Informal interview with HT; Activity logs;	Informal interview with staff during month 1; staff and volunteer logs recorded daily	Narrative description of communication/engagement techniques and training procedures; Calculate score based on intended service delivery (what engagement strategies are planned) and what is delivered	
Dose Received (exposure)	4. In what ways are pts present at formal activities interacting with the garden? 5. To what extent do pts interact with the garden outside of formalized activities or How is unstructured time in the garden spent? 6. Are intended engagement strategies effective?	Residents Family	Observation with checklist; survey	At least 2 observation sessions per scheduled activity; 1 observation per month of unstructured time in garden; Survey monthly	Calculate score based on percentage of intended behaviors observed; Calculate score based on survey scale	

Dose Received (satisfaction)	7. How satisfied are the pts with formal activities? With unstructured time in the garden?	Residents Family	Survey	Survey monthly	Calculate score based on survey scale
Reach	8. How many people are participating in formal activities? 9. How many people interact with the garden outside of formalized activities?	Staff	Activity logs and resident records Observations	Logs recorded daily; 1 observation per month of unstructured time in garden	Look at numbers and characteristics of residents who are participating in formal activities and numbers of residents using the garden outside of formal activities.
Recruitment	11. What planned and actual recruitment procedures are used to attract pts to formal activities? 12. What planned and actual recruitment procedures are used to encourage interaction outside of formal activities?	Staff/Volunteers Family Residents	Interview with HT; Activity logs; Survey	Informal interview with HT conducted month 1; Logs recorded daily; Survey monthly	Narrative description of procedures; Score based on intended service delivery and what is delivered;

Context	<p>14. To what extent is the garden program compatible with other activity programs and other departments within Banfield? To what extent does the garden complement, contribute, or build on existing programs?</p> <p>15. What is the most efficient use of staff time and resources?</p>	<p>Staff/Volunteers Family Residents</p>	<p>Activity logs; Survey</p>	<p>Activity logs recorded daily; Survey monthly</p>	<p>Scores based on percentage that elements of garden or garden program were included in other activities; Scores based on ratio of time/resources and pt engagement</p>
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Chapter 5. Discussion and Conclusion

The garden program at Banfield Pavilion is based on Ulrich's (1984) stress reduction theory (SRT) and theory of supportive garden design (1999). These theories consider nature's role in residents' responses to stress, proposing that engagement with the natural world may counteract the negative physiological and psychological effects of stress by offering natural distraction, actual and perceived control, social support, and movement and exercise. The logic model presented in this project provides a visible representation of how engagement with the garden results in improved health and quality of life for LTC residents. The gardens at Banfield are considered therapeutic by both the AHTA (2012) and Barnes (2007) definitions and include both restorative and rehabilitative features. Based upon the garden's design, garden visitation automatically results in opportunities for natural distraction and access to private spaces away from the often noisy and busy indoor environment of the facility. Further interaction with the garden offers the additional outcomes of social support by interacting with staff, volunteers, and other residents and movement and exercise through the physical labour of gardening.

This proposed process evaluation is intended to provide a framework for investigating the processes of a therapeutic garden program within a LTC setting, including which engagement strategies work (or do not work) and whether or not the program's organization and implementation can be improved. This evaluation framework could assess whether the Eden Alternative's principles of creating environments that support spontaneous activities and interactions is being met and takes into account the program's context and resources, including the existing structures and organization of the program and the characteristics of the staff and residents.

This capstone's more expansive aim is to bring attention to the profession of horticultural therapy within the healthcare system. While the effects of interacting with nature have been studied and post-occupancy evaluations of gardens within healthcare

environments are prevalent in the literature, no process evaluations of therapeutic horticulture programs are known to the writer. Therefore, rather than examining garden design or outcomes of the garden program, this project instead focused on processes, organizational structure, how stakeholders engage with specific components of the program, and how the program correlates to its underlying program theory.

Assumptions and Background

As the writer of this project, it is necessary to consider personal biases and assumptions. Firstly, before beginning the capstone project, I was a student intern in the garden program at Banfield Pavilion. While not an integral part of the residential LTC facility, I established relationships with staff, volunteers, students, family members, and garden participants. This could be seen as beneficial to the project, as it allows for a more experiential understanding of the program. However, it also resulted in the development of a largely positive attitude towards garden programs. Throughout the creation of this project, I engaged in an ongoing process of reflection, being mindful of whether my relationships and interest in the program were leading me to view the intervention too positively or critically. Additionally, while the literature seems to support potentially positive rather than negative aspects of interacting with nature, it is important to reveal, as the writer, that I have had personal positive experiences with gardening. However, during the writing of this project I ensured that assumptions and personal experience were checked throughout so that the research and writing remained as objective as possible.

Despite the restraint on personal bias, several limitations must be taken into account. Firstly, this framework's intention is not to evaluate the outcomes of the program. Secondly, the theoretical foundation of the logic model was chosen by the writer and includes several assumptions regarding garden programs including: (1) There are available spaces, staff, and resources for gardens; (2) Gardens are accessible to all residents; (3) Stakeholders have an interest in using gardens either actively or passively; and (4) Focus is on the positive benefits of gardens instead of potential negative aspects. In addition, the evaluative framework and logic model was created specifically for Banfield, therefore it is unknown if it can be applied to other settings.

Future Research and Applications

There is a clear need for more research on gardens and garden programs within healthcare environments and specifically within long-term care facilities. Ulrich (1999) recognizes this stating, “There is no question that the future importance of gardens in healthcare facilities will be strongly affected by the extent to which sound and credible research shows that gardens can promote improved health outcomes, foster higher patient/consumer satisfaction with healthcare providers, and be acceptably cost-effective” (p.31).

Garden programs within long-term care facilities are at the intersection between environmental design and health promotion. Designers may know how to create gardens that are universally accessible to persons with a variety of physical and cognitive abilities but this does not address the issue of how to best elicit visitation and participation from residents within these facilities.

This project provides support for the continued refinement and evaluation of horticultural therapy programs both within LTC and other types of healthcare settings. The self-evident next step would be to carry out the process evaluation detailed in this project. The findings could then be used to provide suggestions to stakeholders regarding what works and what doesn't work for engagement strategies in addition to examining what aspects of the program seem site-specific and what could be more generalized. Future research should include evaluations in similar settings designed to look at both processes and outcomes in order to test the logic model and better understand the effects of this type of intervention. Additionally, future evaluations could explore the financial costs of gardens within long term care in order to determine the affordability of this type of intervention.

Conclusion

Health and wellbeing are obvious goals of healthcare settings, including long-term care facilities. However, without social and physical environmental support residents of long-term care facilities can exhibit symptoms of psychological distress, thus

affecting their mental and physical health. Incorporating the natural world into residential long-term care settings is one possible way to achieve increased well-being. As definitions of health and healing are broadened to incorporate all aspects of well-being including physical, mental, emotional, social and spiritual, it becomes time to reconsider the role of the nature in healthcare. While other health interventions and activity programs have been found to improve well-being (e.g. music, art, drama, sensory stimulation), gardens offer residents a familiar environment that supports spontaneous and unpredictable activities and interactions with plants and animals thus potentially alleviating loneliness, helplessness, and boredom.

A unique aspect of gardens versus other activity programs is that gardens exist outside of scheduled activities and residents and visitors have the choice to use the garden on their own time and terms. Gardens are integrated directly into the facility environment and can be interacted with passively or actively. Other common activity programs like art, music, cooking, etc. do not have this ability because they are typically performed only as group activities and often require the assistance of staff. Thus, garden programs are in a unique position to explore spontaneous versus formal activity program styles.

The goal of this project was to present a logic model and process evaluation framework for the Banfield garden program in order to explore horticultural therapy programs within the context of a long-term residential care facility. While numerous research studies have presented possible benefits from engagement with nature, little is known regarding how to best encourage this interaction with nature-based occupations. Therefore, this process evaluation sought to examine the Eden Alternative's elevation of spontaneous activity over traditional scheduled activity programs as well as engagement strategies used for nature-based therapeutic activities.

Despite the possibility of being “an effective and affordable health promotion intervention” (Maller et al., 2005, p.46), nature continues to be an underutilized resource. Modern health interventions should consider the potential abundance of beneficial health effects from interacting with nature, which includes the spectrum from wilderness to parks to farms and gardens and can refer to any single element including plants and animals (wild or domestic), soil, water, air, etc. (Maller, et al, 2005). Engaging in nature-

based activities and viewing ourselves as situated within a larger ecological system has direct environmental outcomes in addition to health and quality of life implications. Hillman (1995) tells us we must wake up “to one of the most ancient human truths: we cannot be studied or cured apart from the planet” (p.xxii). We must begin to view the needs of the planet and the needs of the individual as being intrinsically linked.

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Appendix A.

Literature Review Matrix

Literature Review STUDY SUMMARIES

Author/title	Purpose	Focus	Sample	Design	Variables/ instruments	Results	Controversies/disagreeme nts with other authors	Limitations	Implications for practice, research, theory
Bengtsson, A., & Carlsson, G. (2006). Outdoor environments at three nursing homes: Focus group interviews with staff.	To investigate how outdoor environments at nursing homes are experienced and used to gain knowledge with implications for design.	Sense of control/Access to privacy Positive Distraction Social Support	14 staff members, aged 20 to 60 years, from three nursing home facilities	Focus groups conducted through open-ended questions for qualitative data analysis	Transcriptions of focus groups were systematized into different themes using Meaning condensation.	Two main themes and ten sub-themes. The first theme, being comfortable in the outdoor environment, is represented with four sub-themes: sensitivity to weather, familiarity, security and calmness. The second theme, access to surrounding life, consists of six sub-themes: capacity for outdoor activity, sensual pleasures of nature,		Does not elicit the opinions/perceptions of the older adults themselves. Small sample size. Not generalizable.	Results from the focus group give implications for garden design within nursing homes.

Author/title	Purpose	Focus	Sample	Design	Variables/ instruments	Results	Controversies/disagreements with other authors	Limitations	Implications for practice, research, theory
						following the rhythm of life in nature, surroundings as a way to keep up to date, surroundings as a source to relate to past times and social potential of outdoor environments			
Brown, V. M., Allen, A. C., Dwozan, M., Mercer, I., & Warren, K. (2004). Indoor gardening and older adults: Effects on socialization, activities of daily living, and loneliness.	To examine the effects of indoor gardening on socialization, activities of daily living (ADLs), and perceptions of loneliness in elderly nursing home residents.	Physical movement and exercise Social support	66 residents from two nursing homes, aged 60-96	2 phase RCT intervention	Demographic data sheet. UCLA Loneliness Scale (Version 3). Revised Social Provisions Scale. Minimum Data	No significant differences were found between groups in socialization or perceptions of loneliness, there were significant pretest-posttest differences within groups on loneliness and guidance, reassurance of worth, social	Tse (2010) found no improvement in ADLs in RCT	Small sample size, the short length of time for evaluation of the gardening intervention, and the lack of a control group receiving no social visits. Replication of this study would benefit by having a control group that receives no visits.	Gardening is one form of physical activity that offers older adults the opportunity to promote health by encouraging physical functioning and socialization.

Author/title	Purpose	Focus	Sample	Design	Variables/ instruments	Results	Controversies/disagreeme nts with other authors	Limitations	Implications for practice, research, theory
					Set for ADLs	integration, and reliable alliance. The results also demonstrated gardening interventions had a significant effect on three ADLs (transfer, eating, and toileting). 5-week versus a 2-week intervention program, the 5-week program was more effective in increasing socialization and physical functioning. No significant differences were noted in socialization, loneliness, or ADLs for 5-week versus a 2-week.			
Gamble, K. R., Howard, J. H., &	To investigate Kaplan and	Positive distraction	Thirty healthy older adults	Intervention	Attention Network Test	Results showed that viewing			This was the first study to show that

Author/title	Purpose	Focus	Sample	Design	Variables/ instruments	Results	Controversies/disagreements with other authors	Limitations	Implications for practice, research, theory
Howard, D. V. (2014). Not just scenery: Viewing nature pictures improves executive attention in older adults.	Kaplan's ART in older adults.		(64–79 years old) and 26 young university students (18–25 years old) participated.		conducted before and after 6 min of viewing either nature or urban pictures, with random assignment into a picture type. Attention immediately before (most fatigued) and after (most restored) picture viewing was measured, and change in attention was compared between age groups and picture types.	nature, but not urban, pictures significantly improved executive attention in both older and young adults as measured by the Attention Network Test, with similar effects seen in the two age groups. Alerting and orienting attention scores were not affected by picture viewing.			viewing nature pictures improves attention in older adults, and to show that it is executive attention, specifically, that is improved. Among a growing number of interventions, nature exposure offers a quick, inexpensive, and enjoyable means to provide a temporary boost in executive attention.
Grant, C., & Wineman, J. (2007). The garden-use model.	To develop a better understanding and holistic description of the interrelationship among organizational/	Sense of control/ Access to privacy	A multi-case study design involving five different facilities	An initial site analysis, distribution of staff questionnaires, and behavior	Organizational policy, staff attitudes, visual access, physical access and	It is proposed that the greatest amount of outdoor space use will occur in a facility in which the operating			Results of the study form the basis of a theoretical framework, Garden-Use Model. This model

Author/title	Purpose	Focus	Sample	Design	Variables/ instruments	Results	Controversies/disagreeme nts with other authors	Limitations	Implications for practice, research, theory
	programming policies and spatial/physical attributes of the outdoor space in influencing resident use.			observations for six days	garden design.	philosophy, including the mission statement, goals, and beliefs of administrators, are supportive of residents going outside; there exists adequate visual access to the garden entry and to at least a portion of the outdoor space that is pleasing; and has easy physical access—defined as being unlocked, having a manageable door, on one level. It is conceivable that the overall design is not as important as is the provision of legible spaces that are comfortable in terms of seating			serves as a summary of the findings as well as a tool for facilities that seek to increase garden use among residents.

Author/title	Purpose	Focus	Sample	Design	Variables/ instruments	Results	Controversies/disagreements with other authors	Limitations	Implications for practice, research, theory
						and shade.			
Hawkins, J.L., Thirlaway, K.J., Backx, K., & Clayton, D.A. (2011). Allotment gardening and other leisure activities for stress reduction and healthy aging.	To explore the potential benefits of allotment gardening for healthy aging, focusing on the opportunities for outdoor physical activity, social support, and contact with nature that allotment gardening provides.	Stress reduction	Participants included 94 individuals aged between 50 and 88 years who were members of various indoor and outdoor activity groups.	Cross sectional survey	Pts completed physiological measures and psychometric scales of self-rated health, perceived stress, physical activity level, and perceived social support.	Allotment gardeners reported significantly less perceived stress than participants of indoor exercise classes ($P<0.05$). As there were no significant differences in reported levels of social support and physical activity, explanations for the allotment gardeners' lower stress levels focus on the potential contribution of engagement with nature and psychological restoration.			These findings represent a step toward understanding the benefits of allotment gardening activity as a health-promoting behavior in later life.

Author/title	Purpose	Focus	Sample	Design	Variables/ instruments	Results	Controversies/disagreements with other authors	Limitations	Implications for practice, research, theory
Kearney, A. R., & Winterbottom, D. (2006). Nearby nature and long-term care facility residents: Benefits and design recommendations.	To explore if elderly residents of long-term care facilities benefit from access to outdoor areas and explore what design characteristics are most important for this unique population.	Sense of control/Access to privacy Social Support Natural distraction	Forty elderly residents of three different urban long-term care facilities	Structured interviews	Interviews consisted of a series of structured open and close-ended questions (including Likert scale items) designed to assess participants' use of, satisfaction with, and perceived importance of the facility green spaces.	Results show that overall residents place a high value on access to green spaces and derive a number of benefits from these spaces, yet they spend relatively little time in these settings. Barriers to greater use of outdoor spaces included physical limitations, lack of staff assistance, and design issues		Has no objective measures of the health and QoL of residents or staff	Provides some empirical evidence that residents of long-term care facilities do have much to benefit from nearby nature and that they place a high value on access to nature.
Lee, Y., & Kim, S. (2008). Effects of indoor gardening on sleep, agitation, and cognition of	To examine the efficacy of indoor gardening on sleep, agitation and cognition of	Dementia	Twenty-three institutionalized dementia patients who had sleep	Intervention. 5-week study protocol of 1 week of baseline and	For the first and fifth week of the study period, sleep patterns, agitation, and	Significant improvement in wake after sleep onset, nap, nocturnal sleep		Results cannot be generalized because of small sample size, lack of appropriate	Indoor gardening was found to be effective for sleep, agitation, and cognition of

Author/title	Purpose	Focus	Sample	Design	Variables/ instruments	Results	Controversies/disagreements with other authors	Limitations	Implications for practice, research, theory
and cognition in dementia patients--A pilot study.	dementia patients.		disturbance and/or agitation	4 weeks of treatment. The study design was a one group repeated measures study.	cognition were evaluated using a sleep diary, Modified Cohen-Mansfield Agitation Inventory and revised Hasegawa Dementia Scale respectively.	time, and nocturnal sleep efficiency was identified. On the contrary sleep onset time, wake-up time, total sleep time did not change after indoor gardening. Agitation and cognition score was significantly improved.		controls and randomization.	dementia patients. Randomized controlled studies of larger sample size are needed to confirm treatment effect.
Park S., Shoemaker, C., & Haub, M. (2009). Physical and psychological health conditions of older adults classified as gardeners or nongardeners.	To compare the physical and psychological health conditions and leisure-time activities, particularly physical activities (PAs), of older gardeners and nongardeners	Physical movement & exercise	Fifty-three community dwelling older adults aged 58 to 86 years old	Cross-sectional survey	Three groups classified: active gardeners (n = 11); gardeners (n = 14); and nongardeners (n = 28). Physical and mental health conditions determined by Short-Form 36 Health Survey,	No differences in mental health or BMD among the groups. Active gardeners + gardeners had greater hand strength and pinch force than nongardeners.		Small sample size, non-intervention	In addition to the health benefits linked to regular PA, this study showed that gardening promotes hand strength, pinch force, and overall physical health.

Author/title	Purpose	Focus	Sample	Design	Variables/ instruments	Results	Controversies/disagreeme nts with other authors	Limitations	Implications for practice, research, theory
					hand function by dynamometers, bone mineral density determined by dual-energy x-ray absorptiometry				
Park, S. & Shoemaker, C. (2009). Observing body position of older adults while gardening for health benefits and risks.	To characterize types of gardening tasks done by older adults and their body positions so that safe and effective programs can be designed.	Physical movement & exercise	Fourteen community dwelling gardeners over age 62.	Observational study	Two observers observed pts gardening on two separate occasions. Recorded kinds of gardening tasks and body position used during each garden task, the time spent on each gardening task, tools used. A questionnaire asked pts to report on any bodily pain or injuries experienced during	Seventeen different garden tasks were observed. While conducting these tasks, six body positions were used by 90% of the subjects: gripping, bending, walking, lifting, stretching, and standing. Ten different bodily pains were reported with lower back pain reported the most. Older gardeners performed significant walking	Most studies focus on health benefits of gardening, however, body positions, such as stooping, kneeling, and squatting, may have health risks and cause pain.	Small sample size	Older gardeners use body positions during gardening that can provide both health benefits and risks

Author/title	Purpose	Focus	Sample	Design	Variables/ instruments	Results	Controversies/disagreeme nts with other authors	Limitations	Implications for practice, research, theory
					gardening activities.	positions meaning gardeners can experience improvement of cardiorespiratory fitness.			
Rappe, E., & Topo, P. (2007). Contact with outdoor greenery can support competence among people with dementia.	To present findings on the impact of plants on well-being of PWD and on how nursing staff experience plants in the care environment and to describe qualitative findings on well- being associated with visiting and seeing outdoors by PWD in day care and in residential care.	Sense of control/Acce ss to privacy Dementia	Two studies: The first study is based on a survey of 65 nursing staff from ten residential care homes. The second study involved 123 people with dementia from two day care units and six residential care units.	First study with staff is cross- sectional survey. Second study with PWD is observational	First staff study: The questionnaire included both scaled responses and open-ended questions. The data from the scaled responses shown here were analyzed using descriptive statistics, cross tabulation and Chi-Square-test. Answers to openended questions were analyzed by qualitative	According to nursing staff's opinions, plants in the homes promoted the well- being of the elderly with dementia. The health-related benefits the staff reported were derived from the positive impact on the physical environment caused by the plants and from horticultural or other activities associated with plants. Experiences of nature seemed to			Contact with outdoor greenery can support the well-being of people with dementia.

Author/title	Purpose	Focus	Sample	Design	Variables/ instruments	Results	Controversies/disagreements with other authors	Limitations	Implications for practice, research, theory
					<p>content analysis and using a phenomenological approach.</p> <p>Second study: The method used was Dementia Care Mapping 7th (DCM) (Evaluating Dementia Care 1997) in combination with field notes.</p>	<p>have two-fold consequences for people with dementia: on the one hand seeing nature or being in it calmed them, but it also evoked memories and initiated activity and social interaction. Especially plants with their multisensory characteristics triggered memories and created associations in the mind.</p>			
Rodiek, S. (2002). Influence of an outdoor garden on mood and stress in	To explore methods for assessing psychological and physiological outcomes associated with	Stress reduction	Seventeen residents ranging from 71 to 98 years of age	RCT	Before and after, subjects were assessed for positive and negative mood, anxiety, and	No significant change was found in mood or anxiety level. Cortisol was significantly lower		Small sample size, voluntary selection	This pilot study supports previous research finding health-related outcomes associated with

Author/title	Purpose	Focus	Sample	Design	Variables/ instruments	Results	Controversies/disagreements with other authors	Limitations	Implications for practice, research, theory
older persons.	natural environments.		(mean 84.7)		salivary cortisol level.	in the garden environment compared with the indoor settings, indicating greater reduction in stress level.			brief exposure to natural environments
Rosher, R. B., & Robinson, S. (2005). Impact of the Eden alternative on family satisfaction.	To determine the impact of the Eden Alternative on family satisfaction.	Social support Dementia	78 family members of residents in 150-bed nursing home in the Midwest.	Intervention	Family Questionnaire developed by Ransom administered before and after Eden implementation	There was a significant improvement in family satisfaction, as measured by the Family Questionnaire ($P < .0001$) after implementation of the Eden Alternative.		The ability to generalize the findings is limited because the study was completed at only one nursing home and was a pre-post design.	The Eden Alternative provided many opportunities for family involvement. The improved satisfaction scores reflected greater communication and interaction among families, staff, and residents.
Somerfield, A., Waliczek, T., & Zajick, J. (2010).	To determine if gardening had a positive impact on	Physical movement	298 community dwelling	Cross-sectional	Life Satisfaction Inventory A (LSIA).	Results indicated statistically significant		Self-reported. Not RCT.	Gardening can be used as an effective tool with

Author/title	Purpose	Focus	Sample	Design	Variables/instruments	Results	Controversies/disagreements with other authors	Limitations	Implications for practice, research, theory
Growing minds: Evaluating the effect of gardening on quality of life and physical activity of older adults.	perceptions of quality of life and levels of physical activity of older adults when compared with nongardeners in a study evaluating the effect of gardening on older adults	and exercise	gardeners and nongardeners aged 50+	survey	Additional multiple-choice questions to determine level of physical activity, perceptions of overall health and well-being, and demographic info.	differences in comparisons of overall life satisfaction scores with gardeners receiving higher mean scores indicating more positive results on the LSIA. Four individual quality-of-life statements included in the LSIA yielded statistically significantly more positive answers by gardeners when compared with nongardeners. Other questions regarding healthful practices revealed that personal reports of physical activity and perceptions of personal health were statistically significantly more			adults aged 50 years or older to increase life satisfaction while also increasing physical activity levels in a population that may otherwise begin to lose mobility and/or exercise less.

Author/title	Purpose	Focus	Sample	Design	Variables/ instruments	Results	Controversies/disagreeme nts with other authors	Limitations	Implications for practice, research, theory
						positive among gardeners when compared with nongardeners.			
Tse, M. M. Y. (2010). Therapeutic effects of an indoor gardening programme for older people living in nursing homes.	To explore the activities of daily living and psychological well-being of older people living in nursing homes and also to examine the effectiveness of a gardening programme in enhancing socialisation and life satisfaction, reducing loneliness and promoting activities of daily living for older people living in nursing homes.	Social Support	26 older people (25 female and one male; mean age 85 years) in the experimental group and 27 (20 female and seven male; mean age 82 years) in the control group.	RCT	Demographic data in addition to life satisfaction, loneliness, physical activity and social network situation, before and after the eight week indoor gardening programme for both the experimental and control groups. Also, experimental group received open-ended interviews about	Significant improvements in life satisfaction and social network and a significant decrease in perception of loneliness for older people in the experimental group after the eight week indoor gardening programme, while the activities of daily living were unchanged for both groups after the programme.	Brown et al (2004) did find improvement in 3 ADLs after garden program.	Small sample size.	Given the positive effects of gardening activities, it is suggested that they be promoted more widely among nursing home residents.

Author/title	Purpose	Focus	Sample	Design	Variables/ instruments	Results	Controversies/disagreements with other authors	Limitations	Implications for practice, research, theory
					experience.				
Wannamethee, S. G., Shaper, A. G., & Walker, M. (2000). Physical activity and mortality in older men with diagnosed coronary heart disease.	To study the relations between physical activity, types of physical activity, and changes in physical activity and all-cause mortality in men with established coronary heart disease (CHD).	Physical movement and exercise	In 1992, 12 to 14 years after the initial screening (Q1) of 7735 men 40 to 59 years of age from general practices in 24 British towns, 5934 (91% of available survivors, mean age 63 years) provided further information on physical activity (Q92) and were followed up for 5 years; 963 had a physician's diagnosis of	Large, longitudinal survey	A standard questionnaire including questions on smoking, alcohol, physical activity, and medical history (Q1). In 1992, 12 to 14 years after screening, a similar but more comprehensive questionnaire (Q92) was posted to surviving participants, now 52 to 73 years of age (average 63 years). In addition to questions on current illness and medication,	The lowest risks for all-cause and cardiovascular mortality were seen in light and moderate activity groups (adjusted relative risk compared with inactive/occasionally active: light, 0.42 (0.25, 0.71); moderate, 0.47 (0.24, 0.92); and moderately vigorous/vigorous, 0.63 (0.39, 1.03). Recreational activity of ≥ 4 hours per weekend, moderate or heavy gardening, and regular walking (>40 min/d) were all associated with a		Self-reported	Light or moderate activity in men with established CHD is associated with a significantly lower risk of all-cause mortality. Regular walking and moderate or heavy gardening were sufficient to achieve this benefit.

Author/title	Purpose	Focus	Sample	Design	Variables/ instruments	Results	Controversies/disagreeme nts with other authors	Limitations	Implications for practice, research, theory
			CHD (myocardial infarction or angina). After exclusions, there were 772 men with established CHD, 131 of whom died of all causes.		detailed information was collected on changes in smoking and drinking and in leisure-time physical activity.	significant reduction in all- cause mortality. Nonsporting activity was more beneficial than sporting activities. Men sedentary at Q1 who began at least light activity by Q92 showed lower mortality rates on follow-up than those who remained sedentary (relative risk 0.58, 95% CI 0.33 to 1.03; $P=0.06$).			

Appendix B.

Example Survey Tool

1. First, I'd like to know how you know about the garden and/or garden program. Please think over the past month, since _____ (Enter date 1 month ago today).

As I read each item, please tell me whether or not you used it as a way of knowing about the garden or garden program this past month. Did you...

	Y	N
A. Read way-finding signage, i.e. signs for the garden in the elevator, signs on the 2 nd floor, welcome sign?		
B. Read about the garden areas and program in the handbook for new residents?		
C. Read about a garden program activity on the activity calendar?		
D. Hear about the garden from staff, residents, students, volunteers, or families (word-of-mouth)?		
E. Receive a personal invitation and escort from staff/students/volunteers to one of the scheduled activities?		

F. Hear about a garden activity over the intercom?		
G. See the garden from a window?		

2. Now, I'd like to get a general idea about the specific kinds of things you do in the garden during scheduled activities. These are activities that have been organized and planned by staff, volunteers, and/or students that are scheduled on the activity calendar. I have a list of activities people sometimes do. Please think over the past month, since _____ (Enter date 1 month ago today).

As I read each activity, please tell me whether or not you have done it this past month. Did you...

	Y	N
A. Visit the garden with a staff member, student, or volunteer?		
B. Receive assistance gardening from a staff member, student, or volunteer?		
C. Participate in Flower Arranging by making your own floral arrangement (with or without assistance)?		
D. Attend Garden Advisory Council?		

E. Provide garden care to one of the shared garden areas during a scheduled group activity?		
F. Garden in your own garden container during a scheduled group activity?		
G. Use the garden or plants from the garden in a non-garden program, i.e. cooking, music, ice cream socials, picnics, BBQs, etc.?		

3. Now I'd like to ask how satisfied are you generally with scheduled activities that involve the garden. Please, tell me on a scale of 1 to 5 with 1 being "not at all satisfied" and 5 being "very satisfied", how satisfied are you generally with scheduled activities involving the garden?

1 2 3 4 5

4. Now I'd like to ask you satisfied you are with specific scheduled activities that involve the garden.

Please, tell me on a scale of 1 to 5 with 1 being "not at all satisfied" and 5 being "very satisfied", how satisfied are you with the activity A Nature Visit?

1 2 3 4 5

5. Please, tell me on a scale of 1 to 5 with 1 being “not at all satisfied” and 5 being “very satisfied”, how satisfied are you with the Flower Arranging?

1 2 3 4 5

6. Please, tell me on a scale of 1 to 5 with 1 being “not at all satisfied” and 5 being “very satisfied”, how satisfied are you with the activity Garden Advisory Council?

1 2 3 4 5

7. Please, tell me on a scale of 1 to 5 with 1 being “not at all satisfied” and 5 being “very satisfied”, how satisfied are you with the activity Hands in the Garden?

1 2 3 4 5

8. How important are scheduled garden activities to you? Please, tell me on a scale of 1 to 5 with 1 being “not at all important” and 5 being “very important”, how important are scheduled activities to you?

1 2 3 4 5

9. Now, I'd like to get a general idea about the specific kinds of things you do in the garden outside of scheduled activities. This means anytime you visit the garden outside of activities that have been organized and planned by staff, volunteers, and/or students. I have a list of activities people sometimes do. Please think over the past month, since _____ (Enter date 1 month ago today).

As I read each activity, please tell me whether or not you have done it this past month. Did you...

	Y	N
A. Visit the garden outside of a scheduled group activity?		
B. Provide garden care to one of the shared garden areas outside of scheduled activities?		
C. Garden in your own garden container outside of scheduled activities?		
D. Provide care to garden wildlife, i.e. birds or bees?		
E. Go for a walk/roll around the garden?		
F. Visit with friends, family, staff, or residents in the garden?		
G. Read signs or posters in the garden?		
H. Use garden tools that were left out?		

I. Get garden tools out of the shed?		
J. Touch plants or soil in the garden?		
K. Smell plants in the garden?		
L. Taste plants in the garden?		
M. Sit in the garden for viewing/watching?		
N. Exercise in the garden?		
O. Relax in the garden?		
P. Meditate in the garden?		
Q. Read in the garden?		
R. Nap in the garden?		

10. Now I'd like to ask how satisfied are you with the garden in that it provides you with opportunities to do activities you enjoy outside of scheduled group activities. Please, tell me on a scale of 1 to 5 with 1 being "not at all satisfied" and 5 being "very satisfied", how satisfied are you with the garden?

1 2 3 4 5

Appendix C

Example Observation Tool

Location: (specific garden area) _____ Date: _____
 Time: _____ to _____ Weather: Temp _____ Rain? _____

Participant	Time spent in garden		Physical Movement & Exercise	Actual and Perceived Control	Social Support	Natural Distraction
	Arrival	Departure				
Participant A						
Participant B						
Participant C						

Physical Movement & Exercise: Physical gardening Exercise Walking/rolling along garden pathways	Social Support: Socializing with friends, family, staff members, volunteers, students, other residents Spending time with pets
Actual & Perceived Control: Making choices Choosing what plants to add/remove from garden Choosing where something gets planted Deciding if something needs watering Deciding if something needs pruning Altering the environment- moving planters, patio furniture	Natural Distraction: Using the senses to engage with nature and nature materials. Touch plants/soil/natural materials Smell plants/soil/natural materials Taste plants Viewing/watching Sunbathing