OUTDOOR ENVIRONMENTS: ANNOTATED BIBLIOGRAPHY

Bill Benbow

January, 2013

- **Accessibility Design Guidelines**, City of Toronto, 2004: http://www1.toronto.ca/static_files/equity_diversity_and_human_rights_office/pdf/accessibility_design_guidelines.pdf

These guidelines consolidate the "best practices" identified during the extensive research on existing barrier-free standards and guidelines. It also includes some of the requirements of the Ontario Building Code (OBC 1997, Section 3.8) in accessibility planning and universal design (see definition in Appendix B). However, the most current version of the Ontario Building Code should be consulted during design and construction as these legislated minimum requirements may change over time.

The **City of Toronto Accessibility Design Guidelines** are based primarily on current Canadian federal and provincial legislation and published standards.

- **Building Access Handbook, BC,** 2007, Office of Housing and Construction Standards: based on 2006 BC Building Code: http://www.housing.gov.bc.ca/pub/building_access_handbook_2007.pdf

It is important for users of the B.C. Building Code to be reminded that the presence and participation of persons with disabilities in our communities is significant. The percentage of persons with disabilities of all ages will increase, especially over the next few decades. This growth will include persons with all types of disabilities, each type having their own specific design needs… Users of the code, specifically the sections dealing with building requirements for persons with disabilities, must be aware of the strong impact that proper application of the code has on the day-to-day lives of people with disabilities. Accessibility is paramount

- Beckwith, Margarette E. and Gilster, Susan D., **The Paradise Garden: A Model Garden Design for Those with Alzheimer's Disease,** Activities, Adaptation & Aging, Vol.22, No.1/, 1997.

ABSTRACT

This paper investigates the design of garden spaces for individuals with Alzheimer's disease. The paradise garden is used as a model for a restorative environment. This model for people with Alzheimer's Disease can be a resource for designers, healthcare providers and others interested in places which contribute to well-being. One of the key issues addressed is that of memory and the gradual decline experienced by those affected with Alzheimer's. Current and recent research provide a basis for integrating certain landscape elements into the garden design. Historical precedents further confirm the preference for similar elements. The components of the paradise garden are analyzed as they apply to the abilities of the population under consideration. Finally, the paradise garden model provides a basis for the design of three gardens at a specialized Alzheimer's facility in southwest Ohio. Each garden addresses the unique environmental, social and physical needs for each population along the continuum of Alzheimer's disease.

This article explores the hypothesis that older people and those who are ill or vulnerable prefer an environment such as a sheltered garden enclosed by a wall: such an oasis has historically been called a paradise garden.

- Bengstsson, Anna and Carlsson, Gunilla, **Outdoor Environments at Three Nursing Homes**, Journal of Housing for the Elderly, 2006, 19(3/4) (SHKN)

ABSTRACT.
This study investigated how the outdoor environments at nursing homes for older persons were experienced and used to gain knowledge with implications for design. Focus group methodology was used to explore staff's view of how the residents experienced and used the outdoors. Two main themes and ten sub-themes were the result when the focus group interviews were analyzed. Theme one, being comfortable in the outdoor environment, describe the residents' special needs to be able to and dare to use the outdoors. The theme suggests a precautionary design, which promotes security and safety and protects from disturbance and negative impressions. The second main theme, access to surrounding life, describes the residents' needs for change and variety in the everyday situation and suggests an inspiring design, which promotes stimulation of senses and mind and provides positive impressions.

Sensitivity to weather

- The staff reported that the outdoors kept the residents healthy and made them happier, but the residents were sensitive to the weather…Rain, wind, cold or snow were hindrances to going out since people felt cold and it could be slippery. Even if the staff pointed things out, the residents were not interested. *"They are totally occupied by being cold."*

Security

- According to the staff it was important that there were sheltered and secure outdoor environments right beside the most frequently used common rooms in the building where the residents could easily get out by themselves.

Calmness

- Focus groups two and three discussed calmness as a particularly important quality in the environment, especially with regard to people suffering from dementia. The staff considered calmness essential to prevent restlessness. Too many people counteracted the quality of calmness. Focus group three also mentioned the fountain as a certain source of calmness and relaxation.

Two themes emerged: being comfortable in the outdoor environment (protection from wind, rain, and barrier free); and access to surrounding life (outdoor activity - stimulation of senses and mind).

- Bengtsson, Anna and Carlsson, Gunilla, **Outdoor environments at three nursing homes – qualitative interviews with residents and next of kin**, Urban Forestry and Urban Greening, 2013.

ABSTRACT:
The present study aimed at describing older persons' experiences of outdoor environments at nursing homes in Sweden in terms of *what* factors are important and *in what way* they are important. Twelve residents and seven next of kin from three nursing homes participated in 16 interviews. Two main themes were identified. The first theme, *access to nature and surrounding life,* describes the outdoor environment as a means for change and as promoting a feeling of freedom. This theme calls for an *inspiring design.* The second theme, *being comfortable in the outdoor environment,* describes how important it is that going outdoors can be something easy and natural, and it calls for a *comfortable design.* The results are intended to facilitate practical knowledge that is useful to planners, decision-makers and care workers striving to create attractive and useable environments that are part of the daily life of nursing home residents. The themes also exemplify how the outdoor environment at nursing homes can serve as a resource in promoting restoration, a feeling of being at home and positive development late in life

This is an update of the 2006 study which was based on staff focus groups. The 2013 study is based on input from residents and families. Again two main themes organized the findings: Access to nature and surrounding life – calling for an inspiring design; and being comfortable in the outdoor environment – calling for a comfortable design.

- Brawley, Elizabeth, **Designing Successful Gardens and Outdoor Spaces for Individuals with Alzheimer's Disease**, Journal of Housing for the Elderly, Dec 2007, vol.21 (3-4).

SUMMARY
There are many benefits derived from exposure to the outdoors for older adults with Alzheimer's disease, which include exposure to fresh air, sunlight and opportunities for walking and other forms of exercise. There are also opportunities for socialization that can minimize feelings of isolation and vulnerability, improve depression, enhance self-esteem, and simply experience the joys and surprises of nature.
While there seems to be universal agreement of the health and quality of life benefits in getting institutionalized persons into appropriate outdoor settings, in many ways gardens and outside spaces have failed. Time after time visitors stroll through the gardens admiring the landscaped grounds, the abundance of beautiful and fragrant flowers and other features, while noting the absence of residents. Creditable research studies support the health benefits of exposure to the outdoors and nature. This discussion of design issues, barriers to use, the role of activity, the necessity of staff involvement, and design recommendations supports the urgent need for empirical research to inform the development of effective gardens and outdoor spaces to benefit older adults with Alzheimer's disease.

Good summary of design issues.
Gardens fail if they are not designed for activity.
Develop activity program as part of design process.
Involve staff in design process.

- Calkins, Margaret et al, **Effects of Increased Time Spent Outdoors on Individuals with Dementia Residing in Nursing Homes**, *Journal of Housing for the Elderly* (The Haworth Press, Inc.) Vol. 21, No.3/4, 2007

SUMMARY. There is growing evidence that exposure to bright light may improve circadian rhythms in individuals with dementia residing in shared residential settings. The vast majority of this research uses electric bright light boxes. However, the outdoor environment not only provides exposure to bright light but to natural elements which have been shown to have a restorative effect across a broad range of situations. Previous research that sought to explore the impact of time spent outdoors on sleep and/or agitation in individuals with dementia was hampered by low time spent outdoors. This project, conducted in three nursing homes (n = 17), used actigraphy, validated proxy measures of sleep and agitation and direct observation to explore the impact of increased time outdoors on sleep and agitation. The repeated measures design assessed residents with dementia under four conditions: winter/no activity, winter/inside activity, summer/no activity and summer/outside activity. Results suggest that increased time spent outdoors resulted in a modest improvement in sleep, and mixed or immeasurable impact on agitation.

Mild support for exposure to bright light: 10% increase in sleep efficiency and some modest improvement in behaviour.

- Chalfont, Garuth Eliot, **Creating enabling outdoor environments for residents**, Nursing & Residential Care, October 2005, Vol.7, No. 10. (SHKN)

SUMMARY:
As an experiment in creating an enabling environment, a project was undertaken to increase residents' contact with the natural world.

- The responsibility for success falls to the management, activities director, and care staff.
- The greatest barrier to going outdoors for many disabled and elderly clients is the process of going through the door. (hard to use doors, thresholds).

Three enabling principles:

- Make the place meaningful. Make an area to go to that is comfortable, pleasant and beautiful.
- Make spaces relate to each other: Make transitions effortless: Locate outdoor features and activity areas adjacent to the building edge and visible from indoor rooms.
- Find and support 'green' staff.

- Chalfont, Garuth Eliot, **Building Edge: An Ecological Approach to Research and Design of Environments for People with Dementia**, Alzheimer's Care Quarterly, 2005, 6(4). http://chalfontdesign.com/media/Building_Edge_pdf.pdf

ABSTRACT:
Designers and care practitioners are often frustrated by the underuse of outdoor areas by residents of dementia care facilities, in spite of the clear intention to design outdoor spaces that meet residents' needs. Even though many residents express enjoyment from contact with nature, and interdisciplinary research evidence strongly supports such interaction, investment in outdoor resources is often a gamble. Evidence-based design is the accepted norm, although gathering evidence and applying it to design requires creative strategies. This article suggests taking an ecological approach to research and design by engaging people, plants, and place in ways that stimulate curiosity and provide opportunities for normal life. Case studies illustrate how listening to the residents directly, and research by immersion rather than intervention, affords integrated design solutions that are embedded in day-to-day life. Suggestions are given for place making at the building's edge, to encourage enjoyment and human relationships, through which the use of outdoor environments by people with dementia and care staff is a happy consequence instead of a primary aim.

"The following list suggests some of the main factors that may influence the quality of outdoor experience in aging:

1. **Comfort**, in elements such as shade, temperature, and comfortable seating.
2. **Security**, in terms of the space having an appropri ate scale and level of enclosure.
3. **Visual appeal**, such as pleasant greenery, flowers, views, etc.
4. **Visual contact**, so residents do not feel isolated from the facility indoor areas.
5. **Easy access**, allowing residents to go outdoors without major effort.
6. **Safety** of elements, such as smooth, level paving, and absence of physical hazards.
7. **Accessibility** of elements, such as easy-to-open doors etc.
8. **Sensory** qualities, such as absence of paving glare, and presence of appealing textures.
9. **Activity** potential, such as paths for walking, or a fishpond to watch.
10. **Transition** zones that soften the disconnection between indoors and outdoors."

"design elements alone do not appear to guarantee success, particularly because the ability to initiate independent action diminishes. Whereas the building is obviously important, the staff and management are crucial to its success."

- Chapman, Nancy J. et al, **Gardens for People with Dementia: Increasing Access to the Natural Environment for Residents with Alzheimer's,** Journal of Housing for the Elderly, Vol.21, No. 3/4, 2007.

SUMMARY
Although exposure to the natural environment has therapeutic benefits for nursing home residents and residents with dementia (Cohen-Mansfield & Werner, 1998; Lovering et al., 2002; Mooney & Nicell, 1992), many elders living in congregate facilities have limited access to the natural world. Long-term care facilities often do not incorporate the use of plants and natural settings into their daily activities due to limited knowledge, time, and funding. A twenty-two hour training program was developed and tested to increase the knowledge of activity staff about horticulture and how to involve their residents in the outdoor environment. Staff members were able to introduce changes both to their activity programs and to the outdoor environments in their facilities as a result.

- "Simply building gardens does not guarantee that they will be used or that staff members have the knowledge they need to take full advantage of what the outdoor environment can offer to their residents."

"Lowering et al (2002) offered four components as central to the success of gardens in dementia facilities based on their three-year follow up of the success of such a garden. These components are

(1) Support from the organization, integrating the garden into its mission and use of resources,
(2) Application of design principles specific to people with dementia,
(3) Staff "creativity, knowledge and skill to design and implement programs that maximize the garden's potential and the client's well-being," and
(4) A good maintenance program."

Covers several issues such as Safety, Visual acuity, Auditory acuity, Physical mobility, Wayfinding, Social interaction and privacy.

- Cohen, Uriel and Day, Kristen, **Emerging trends in environments for people with dementia,** The American Journal of Alzheimer's Care and Related Disorders & Research, January/February, 1994.

ABSTRACT:
Using multiple methods, the authors conducted a review and analysis of 20 contemporary environments for people with dementia This article briefly reviews some of the major trends and developments in these facilities, as they relate to therapeutic principles ofdesign. A design application-the Helen Bader Center; Milwaukee, Wisconsin-is presented as an example of an environment that integrates many of these goal-driven, research-based principles.

- Individual outdoor spaces should be accessible from each of the households
- The use of outdoor parks, gardens, patios, and courtyards was found to be relatively neglected in environments for people with dementia…few facilities considered the outdoors an extension of the indoors or a major activity area integral to the facility program.

- Harsher climates in Northern states should not be considered an obstacle to outdoor development and use: and perhaps *because* of the short, seasonal use of outdoor parks and gardens, these increase in value to residents and staff members.
- The location and accessibility of the outdoor space, and its spatial and conceptual relationship to the facility critically impacted the use and success of outdoor environments.
- Recommends a balcony or terrace for households above ground level.
- "While presently somewhat overlooked, the outdoor environment represented one of the most significant potential foci for continued advances in the design of environments for people with dementia."

- Cohen-Mansfield, Jiska, **Outdoor Wandering Parks for Persons with Dementia**, Alzheimer,s Disease and Associated Disorders-An International Journal, 13(2), 1999, reprinted in Journal of Housing for the Elderly, 2007.

SUMMARY.

Purpose: This study aimed to characterize the features of outdoor areas for persons suffering from dementia, and to clarify the relationship between design features, utilization and satisfaction with these areas.
Methods: A national survey of long-term care facilities with outdoor areas investigated the characteristics and features of these areas, and how those relate to their perceived impact on their users.
Results: The majority of the respondents rated outdoor spaces as very useful, and as having a great benefit for users. The perceived benefit was related to the presence of more design features, such as the presence of gazebos and to the number of activities offered in the area. Despite these positive findings, respondents stated the areas were not used as much as possible and indicated several problems, mostly related to the safety of the residents.
Conclusion: The results of this survey can assist facilities in better designing or improving their outdoor areas to increase utilization and satisfaction

- Outdoor areas used primarily in the summer

- Main barriers:

    - weather related: too hot, too sunny, too windy,
    - Accessibility: not designed for non-ambulatory, heavy doors,
    - Not designed for independent use (69% relied on staff accompanying resident)
    - limited convenience features (handrails, bathroom, drinking fountain, coffee cart),
    - limited shade,
    - Lack of appropriate view or activity

- Connell, Bettye Rose et al, **Therapeutic Effects of an Outdoor Activity Program on Nursing Home Residents with Dementia**, Journal of Housing for the Elderly, 2007, vol.21, No.3/4.

ABSTRACT

Objective: The purpose of this one-year pilot study was to obtain preliminary information on the effects of an outdoor activity program, in comparison to an indoor activity program, on sleep and behavior in nursing home residents with dementia. Structured activity programs have been shown to improve dementia-related behavior problems, and there are some indications that improved behavior is associated with improved sleep. Previous research has shown that sleep disturbance is common in nursing home residents, and that limited exposure to light bright enough to entrain circadian rhythms contributes to their sleep problems. Thus, we expected to see improvements in behavior in both the outdoor and indoor activity groups, but improvements in sleep in the outdoor activity group only. Methodology: A two-group (outdoor program, indoor program) two phase (baseline, intervention) design was used. Subjects were randomized to the outdoor or indoor program groups. Sleep and behavior disturbance were assessed over a 10-day period at baseline (usual activity conditions, which were expected to include little or no time spent outdoors) and at intervention (daily structured activity program offered outdoors or indoors). Sleep was assessed with wrist actigraphs with photocells, which also allowed for monitoring of light exposure. Behavior disturbance was assessed with the Cohen-Mansfield Agitation Inventory. Both activity programs were offered Monday-Friday over a 2 week period, included similar content and were offered by research project staff. The analytical approach emphasized primary changes between baseline and intervention measures of sleep and behavioral symptoms in the two activity groups. Because this was a pilot study, the significance level was set a priori at $p < 0.10$. Findings: The outdoor activity group experienced significant improvements in maximum sleep duration. Both groups showed significant improvements in total sleep minutes. There also was a significant improvement in verbal agitation in the outdoor activity group.

Build it and they will come: initially planned outdoor spaces conceived as staffing-neutral – but self-initiated outdoor space use by residents with dementia is quite limited. People with dementia have problems in planning and carrying out activities. Outdoor space use is far more likely if structured activities are provided.

- Cutler, Lois and Kane, Rosalie**, As Great as All Outdoors: A Study of Outdoor Spaces as a Neglected Resource for Nursing Home Residents**, Journal of Housing for the Elderly, Vol.19, No.3/4, 2005.

ABSTRACT

Purpose. Previously, most information on outdoor amenities in nursing homes and the use of outdoor space by nursing home residents has been anecdotal. Using data collected from the Center for Medicare and Medicaid Services (CMS) study on Quality of Life (QOL), this paper describes the availability of outdoor amenities in 40 nursing homes and the resident's perception of their use of that space. *Design and Methods*. Resident data were collected from nineteen hundred and eighty-eight residents in 131 nursing units in 40 nursing homes located in 5 states on a broad array of topics including how often they get outdoors and if that amount was as much as they want, too much, or not enough. For each of

those nineteen hundred and eighty-eight residents, staff was questioned on how often the resident participated in planned outdoor activities. Environmental data were collected using theoretically-derived observational tools that were developed to observe in detail the physical environments experienced by those nineteen hundred and eighty-eight nursing home residents at three nested levels: their rooms (112 items), the nursing unit (140 items); and the facility as a whole (134 items). These analyses focus on the presence or absence of items specific to outdoor space at the unit and facility level.

Results. Descriptive statistics showed great variation in outdoor amenities and access to those amenities across facilities. The majority, 55.7% (n = 73), of the environments of the 131 units had no items featured on the outdoor amenities index. Of the residents who are physically able to go outdoors, thirty two percent do so less than once a month.

Implications. Only recently have the effects of the outdoor environment on well being been systematically studied. This resident-specific data collection on the availability of outdoor amenities and research at the resident level permits hierarchical analysis to examine the effects of outdoor space on resident quality of life.

Outdoor spaces have been ignored in the design phase or cut out of a project due to cost…often functionality and accessibility of those spaces are ignored. Of 1068 residents surveyed: 32% went outdoors less than once a month: only 21% went outdoors every day.

TABLE 3. Outdoor Amenities at Unit and Facility Level

Outdoor Features at Unit Level (10 items) (n = 131units)	% of 131 nursing units with item	Outdoor features at Facility Level (10 items) (n = 40 facilities)	% of 40 facilities with item
Direct access to outdoor area from unit	44.3	Outdoor patio area	97.5
Outdoor seating	39.7	Flower garden	97.5
Outdoor table	35.9	Outdoor seating	95.0
Covered seating	33.6	Outdoor table	92.5
Covered patio area	33.6	Hard surface walking path at least 3'	87.5
Flower garden	33.6	Equipment for recreational activities	82.5
Outdoor area secured	33.6	Covered seating	82.5
Covered table	32.1	Covered patio area	82.5
Hard surface walking path at least 3'	26.0	Secured outdoor area	65.0
Raised garden planter	20.6	Raised garden planters	52.5

Recommendations:

- Provide direct access from household: 55% of residents had no access to an outdoor environment directly from their household.
- Consider an accessible solarium for households in multistory buildings.
- Consider automatic doors for easy access to gardens.
- Provide comfortable seating immediately inside the garden area.
- limit views out of the garden to reduce exit behaviour: i.e. camouflage the fence.
- Encourage facility policies that permit residents to be outside on their own and aggressively encourage use and activities outdoors.

- Detweiler, Mark et al, **What is the Evidence to Support the use of Therapeutic Gardens for the Elderly?** Psychiatry Investigation, 2012, June: http://dx.doi.org/10.4306/pi.2012.9.2.100 (SHKN)

ABSTRACT:
Horticulture therapy employs plants and gardening activities in therapeutic and rehabilitation activities and could be utilized to improve the quality of life of the worldwide aging population, possibly reducing costs for long-term, assisted living and dementia unit residents. Preliminary studies have reported the benefits of horticultural therapy and garden settings in reduction of pain, improvement in attention, lessening of stress, modulation of agitation, lowering of as needed medications, antipsychotics and reduction of falls. This is especially relevant for both the United States and the Republic of Korea since aging is occurring at an unprecedented rate, with Korea experiencing some of the world's greatest increases in elderly populations. In support of the role of nature as a therapeutic modality in geriatrics, most of the existing studies of garden settings have utilized views of nature or indoor plants with sparse studies employing therapeutic gardens and rehabilitation greenhouses. With few controlled clinical trials demonstrating the positive or negative effects of the use of garden settings for the rehabilitation of the aging populations, a more vigorous quantitative analysis of the benefits is long overdue. This literature review presents the data supporting future studies of the effects of natural settings for the long term care and rehabilitation of the elderly having the medical and mental health problems frequently occurring with aging.

- Namazi and Johnson reported that having access to unlocked doors leading into a garden might increase autonomy and quality of life. The autonomy of choosing to exit from the residence may reduce the frequency of agitated behavior.
- Mather, Nemecek, and Oliver reported that a therapeutic garden reduced the incidence of inappropriate behaviors in a long-term dementia care facility in Canada.
- McMinn and Hinton reported decreased inappropriate behaviors following 32 days of confinement of dementia patients when access to an outdoor area was granted. In addition, access to sunlight in the garden can naturally increase production of Vitamin D and help balance a resident's circadian rhythms.
- Detweiler et al investigated whether a garden had a positive effect on fall frequency and severity and whether it reduced the number and doses of scheduled psychiatric medications used to treat dementia unit residents. The 28 residents experienced about a 30% decrease for both the raw number of falls and fall severity scores after the garden opened. There was a significantly decreased need for high dose anti- psychotics.
- Need for curbs: there is a higher probability of having wheelchairs and merry walkers slide off the paths to become stuck in the adjacent mulch or grass after inclement weather.

- Detweiler, M et al, **Does a Wander Garden Influence Inappropriate Behaviors in Dementia Residents**, American Journal of Alzheimer's Disease and Other Dementias, Feb. 2008.

BACKGROUND:
The effect on resident behaviors of adding a wander garden to an existing dementia facility was investigated. *Methods:* 34 male residents were observed for 12 months before and after opening the garden. Behaviors were assessed using the Cohen-Mansfield Agitation Inventory Short Form (CMAI), incident reports, as needed medications (pro re nata [PRN]), and surveys of staff and residents' family members as indices of affect. *Results:* Final CMAI scores and total PRNs employed were lower than baseline values with a trend for residents who used the garden more often to have less agitated behavior. Verbal inappropriate behaviors did not change significantly whereas physical incidents increased. Staff and family members felt that the wander garden decreased inappropriate behaviors and improved mood and quality of life of the dementia residents. *Conclusions:* Study design characteristics and garden management may have affected behaviors both positively and negatively. Additional studies are needed to explore the benefits of wander gardens for dementia residents.

- Detweiler, M et al, **Scheduled Medications and Falls in Dementia Patients Utilizing a Wander Garden**, American Journal of Alzheimer's Disease and Other Dementias, August 2009.

ABSTRACT:
Little has been reported about the relationship of a dementia wander garden with scheduled psychiatric medications in addition to changes in fall number and severity. The 28 participating residents of a dementia unit were divided into high (HUG) and low (LUG) wander garden user groups and assessed for the number and severity of falls. The type and dose of scheduled psychiatric medications were monitored for 12 months before and 12 months after the wander garden was opened. Results indicated that the residents experienced about a 30% decrease for the raw number of falls and fall severity scores. The HUG had a significant reduction in high-dose antipsychotics, whereas there was relatively no change in antidepressant, hypnotic, and anxiolytic use. High wander garden user group required fewer scheduled medications and experienced reduced falls and lower fall morbidity than the LUG. The most significant changes in scheduled psychiatric medications were reductions in scheduled antipsychotics and an increase in residents requiring no antipsychotics.

- Fleming, Richard and Crookes, Patrick, **A review of the empirical literature on the design of physical environments for people with dementia**, *University of Wollongong*, Research on Line, 2008: http://ro.uow.edu.au/hbspapers/2874/

"EXECUTIVE SUMMARY

In summarising the literature up to 2001 on designing environments for people with dementia Professor Mary Marshal of the Dementia Services Development Centre in the University of Stirling, Scotland recommended that dementia specific residential facilities should be:

- small in size;
- domestic and home like;
- providing scope for ordinary activities (unit kitchens, washing lines, garden sheds);
- include unobtrusive safety features;
- have rooms for different functions with furniture and fittings familiar to the age and generation of the residents;
- provide a safe outside space;
- have single rooms big enough for a reasonable amount of personal belongings;
- with good signage and multiple cues where possible; eg. sight, smell, sound;
- use of objects rather than colour for orientation;
- enhance visual access; and
- control stimuli, especially noise.

This advice forms the basis of the guidelines offered by the Alzheimer's Australia and has been taken up by many aged care providers.
This report reviews the literature relevant to these guidelines with a view to ascertaining the strength of the empirical evidence supporting them. Of 148 relevant articles located, 57 were considered to have a sufficiently strong methodology to be included in this review. The strength of the evidence was systematically assessed so that attention could be drawn to those recommendations that have strong empirical support and to identify areas of uncertainty and gaps in knowledge that may benefit from further research."

This is a literature review for design of dementia facilities: it includes a brief two pages on Outside Space covering studies that supported the benefits of a garden.

A pertinent comment re staff influence on garden use: "The lack of access to outside areas when they are present is usually associated with staff practices. In common with other architectural features of the facility the presence of a pleasant, safe outside space had no affect that could be attributed to it that was not secondary to the impact of the relationships with the staff (Wood, Harris et al. 2005).

- Grant, C. **Factors influencing the use of outdoor space by residents with dementia in long-term care facilities**. Ph.D thesis, Dept. of Architecture, Georgia Institute of Technology, 2003. Retrieved Nov, 2013: http://herg.coa.gatech.edu/files/thesis/Grant_thesis.pdf

- Grant, Charlotte F. and Wineman, Jean D., **The Garden-Use Model – An Environmental Tool for Increasing the Use of Outdoor Space by Residents with Dementia in Long-Term Care Facilities**, Journal of Housing for the Elderly, Vol.21, No. 1/2 2007.

SUMMARY.:
The Garden-Use Model is the result of a multi-case study involving five sites that was designed to develop a better understanding and holistic description of the interrelationship among organizational/ programming policies and spatial/physical attributes of the outdoor space in influencing how much this space was used by residents with dementia in long-term care facilities. The protocol replicated at each site involved an initial site analysis, distribution of staff questionnaires, and behavior observations for six days, including five weekdays and Saturday at every site but one. The results of the study discussed the alignment and findings based on descriptive analysis and collected data at each site regarding the following factors: organizational policy, staff attitudes, visual access, physical access and garden design.

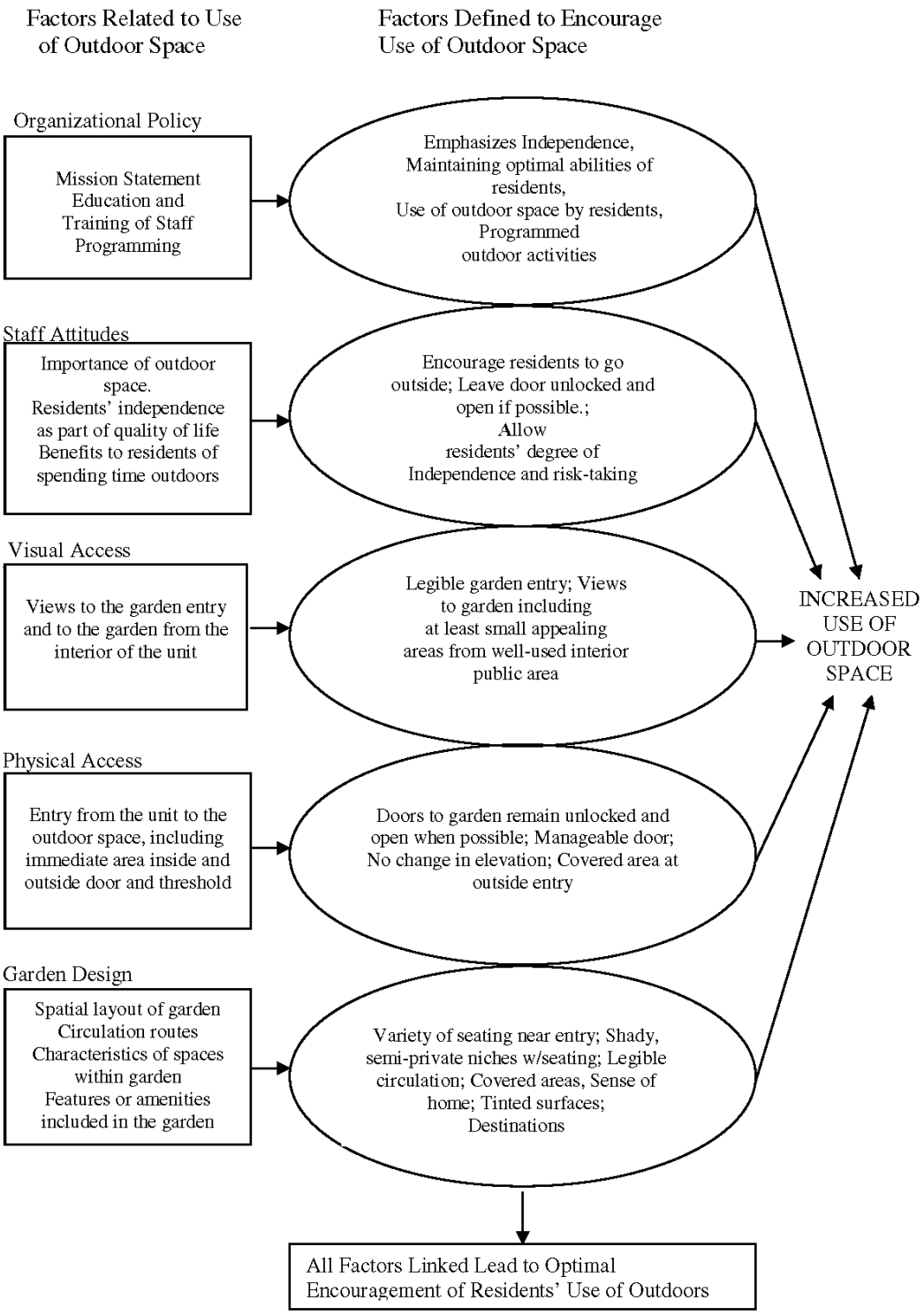
This paper summarizes the results of the study related to the above factors and use of available outdoor space. The ultimate focus and conclusion of the paper addresses findings and recommendations for designers, healthcare administrators and others interested in achieving optimal use of the outdoor space among residents with dementia in long-term care facilities. The theoretical framework diagrammed in the "Garden-Use Model" is based on data collected and rich description at each of the five sites that made up the study. This model is presented and serves as the structural basis from which discussion of the factors influencing use of outdoor space ensues. The Garden-use Model also serves in the paper as a tool for facilities that seek to increase garden use among residents and to offer a means for evaluation such facilities.

Several particular design elements stressed physical and visual access: shelter from harsh weather, easy to open doors (unlocked, automatic, propped open), transition from inside to outside, covered entrance patio with seating, destination shade areas with seating, layout with legible circulation and visible access: views to a legible garden entry and to the garden from the interior of the household.

Residents accessed the outdoors twice as much when the door was propped open. Residents used the entry patio most, and secondly, shade areas (both require seating).

Added to design features was the importance of an aggressive management policy and staff practice to get residents outside both independently and as part of programmed activities.

The Garden-Use Model



- Grant-Savela, Stacey, **Outdoor Spaces** (White Paper, University of Wisconsin-Milwaukee), https://www4.uwm.edu/dementiadesigninfo/data/white_papers/Outdoor%20Spaces.pdf

- Outdoor spaces in care communities have the potential to provide opportunities for sensory stimulation, socialization, and meaningful activity.
- Views of Outdoor Spaces: encourage engagement, transitions for visual adjustment, and staff supervision.
- Gardens: types of plants discussed.
- Orientation and Accessibility: direct access, close washrooms, easy to open legible doors; railings, frequent opportunities for seating, smooth, level paths of tinted brushed concrete 6 feet wide with contoured edges to minimize drop-off. Single access point with simple path configurations.
- Safety and Security: enclosed by building walls or fencing (6 – 8 feet). Lighting perimeter at night. Bollard type fixtures that are 2 – 3 feet high to light paths without glare.
- Connection and Flexibility: create flexible and intimate spaces for different levels of social interaction.
- Shelter and Shade: porches, gazebos, arbors, trellises, awnings, trees. Consider heat lamps in cooler weather and shelter from wind.
- Furnishings: avoid materials that conduct heat or cold for furnishings and railings.

- Grove, Kim, **Gardens for People with Dementia, A guide to make them safe and suitable,** 2012: http://www.kimgrove-gardendesigner.co.uk/resources/Gardens%20for%20people%20with%20dementia%20-%20A%20guide%20to%20make%20them%20safe%20and%20suitable.pdf

This guide is written for people with dementia, their families, friends and carers, and formal home care and care home staff, to offer suggestions about the adaptations that could be made so that people with dementia can continue to use their gardens safely and securely.

A good detailed how-to guide with many dementia sensitive suggestions including a list of toxic plants and safer alternatives.

- Guaita, A., et al, **Exploring the use of two different Gardens by Residents in a Special Care Unit for People with Dementia**, Non-pharmacological Therapies in Dementia, Vol.2 (1), 2011.

Background: The purpose of this study is to examine the use of two different Alzheimer's gardens, one designed as a "quiet space" and the other as an "activity" garden, by direct observations of behavior of the forty two residents in a Special Care Unit for people with dementia.
Method: Observations were conducted within the gardens to evaluate whether they were used by residents and how, including frequency of visit, way in which the gardens were used for individual and

social activities. Since residents are persons with dementia with clinically diagnosed Alzheimer disease,k other dementias or psychosis, we compared the recorded behaviors of these three groups.
Results: Findings suggest that the two gardens are used differently in the activities performed according to gender diagnosis and garden characteristics, while frequency is different only for the time of the day.
Conclusion: These data confirm the importance of the connection between persons with dementia and environment, that can be considered essential part of the therapeutic protocol.

Persons with dementia used the gardens more in the mornings, and more when other persons were also in the garden. They showed a preference for the activity garden over the quiet garden.

- Heath, Yuko and Gifford, Robert, **Post-Occupancy Evaluation of Therapeutic Gardens in a Multi-Level Care Facility for the Aged,** Activities, Adaptation & Aging, Vol. 25(2), 2001.

Abstract
A post-occupancy evaluation of eight therapeutic gardens at a multi-level care facility was conducted. Staff, volunteers, and families of residents were surveyed, and residents were interviewed. Of the 190 participants, 96.5% either strongly liked or liked the gardens. More than 80% believed that four of the five overall design goals of the gardens were achieved. However, participants' evaluations of specific garden features varied, and staff members were more critical than others. About 75% said the money to build the gardens was well-spent. About 20% of users offered extra comments. Implications for the planning of therapeutic gardens are discussed.

Heath found the Gardens were not well utilized: the most frequently requested addition was for more shade, followed by a roof over the garden to protect from rain. Reasons for poor utilization were that there were not enough staff to take residents into the gardens, the gardens had poor accessibility such as the lack of an automatic doors, a lack of signs orienting the way to the gardens and a lack of awareness and encouragement to use the gardens.

Heath recommended educating staff and volunteers about the gardens and how to access them, and encouraging them to take residents to the gardens often in order to increase garden use.

- Lovering, Mary Jane, **Alzheimer's disease and outdoor space: Issues in environmental design**, The American Journal of Alzheimer's Care and Related Disorders & Research, May/June 1990.

Abstract
As special care units for individuals with Alzheimer's disease become established, there is a growing interest in creating outdoor space to complement the interior program. At present, little information exists concerning appropriate design principles for outdoor spaces. This paper discusses the design implications for outdoor environments based upon the changes in physical and mental abilities that are associated with aging and Alzheimer's disease. Methods of compensating for limited physical and mental capabilities are explored, including the provision of prosthetic supports and orientation aids to increase an individual's independence and sense of well being.

"As an example of the importance of microclimatic factors, a survey of nursing homes and homes for the aged found four external environmental factors crucial to the use of these facilities' outdoor space:
* Protection from wind,
* Availability of shade,
* Protection from glare and
* Absence of temperature extremes.
It is worth noting, however, that even with the presence of favourable environmental conditions, the above noted survey found that resident and staff motivation were the most important factors in determining whether outdoor spaces were actually used. The greatest motivating factors identified were the opportunities to observe activity (e.g., visitor arrival areas, exercise or recreation facilities) and to observe change in seasonal landscapes." (Lovering, 1983)

- Lovering, M.J., et al**, A Study of a Secure Garden in the Care of People with Alzheimer's Disease**, Canadian Journal on Aging, 2002, Vol.21 (No.3).

ABSTRACT
Specially designed outdoor spaces (SDOS) have been developed to improve the quality of life of people with dementia. However, few follow-up studies have been done to examine their use once implemented. The purpose of this study was to gain a better understanding of how SDOS are used and the objectives of their design fulfilled. A qualitative descriptive study was conducted of a SDOS 3 years after it was built to answer the following questions: How has the garden changed from the original design? What are the current patterns of use of the garden? What factors facilitate use of the garden? What are the barriers to use of the garden? Four main sources of data were used: landscape architectural drawings, non-participant observation, focus groups, and in-depth interviews. The results lend support to the theoretical principles of garden design in the literature. The garden was considered an important part of the service program. However, factors such as garden maintenance, organizational support, staff training, and accessibility may limit its impact.

Eight design principles reiterated from 1983 CMHC report - garden design should:

a) Provide motivation to encourage older persons to use it;
b) Avoid microclimatic problems such as heat traps and sun and glare;
c) Provide a barrier free environment that allows participants to be as independent and comfortable as possible;
d) Be a safe environment that accommodates the physical changes associated with aging, or dementia , such as diminished vision, physical mobility, and strength and endurance, and cognitive deficits;
e) Provide ease of supervision so that individuals can wander yet still be supervised by staff;
f) Provide a peaceful, calm, quiet environment that facilitates communication;
g) Provide opportunities for both social interaction and privacy
h) Facilitate maintenance of the garden by the staff.

- Issues that facilitate garden use: motivating staff and residents: opportunity for casual and organized activities, enjoy stimulation of nature, fountain, and barrier free;
- Issues that are barriers: heavy door, black entry mat, poor maintenance – safety hazards, lack of washroom, difficulty in visibility of garden for supervision – solid door, limited windows, climate, lack of staff preparation/training.

- Marcus, Clare Cooper, **Garden of the Family Life Center**, Journal of Housing for the Elderly, Vol.21, No.3/4, 2007.

ABSTRACT:
Landscape architects are often asked to design and install outdoor space for older adults with Alzheimer's disease and other dementias. This paper explores behavioral issues and the process of outdoor design for dementia, from the perspective of a landscape architect focused on therapeutic use of outdoor gardens. Specific design recommendations are followed by a case study of an exemplary garden, with experiential descriptions of usage by residents, staff and families. Adapted from the source document.

Essential Qualities of Gardens for people with dementia:

- Visibility and accessibility: visible from inside and easy access through one door,
- Provide a covered patio or terrace,
- A simple path system: looped, can be inside/outside,
- Path design: tinted brushed concrete, strong edges, six feet wide,
- Destination points (gazebo, seating arbor),
- Ample seating,
- Domestic in scale,
- Ample shade,
- Perennials,
- Avoid poisonous plants
- A sense of enclosure (screened with vegetation),
- Involve management and staff: the success of outdoor space in a facility for dementia patients depends on policies and staff attitudes and training.

- Marcus, Clare Cooper, **Alzheimer's Garden Audit Tool (AGAT),** *Journal of Housing for the Elderly, 2007,* 21 (1-2): 179-191

ABSTRACT
Increasing numbers of dementia units are being built, many with attached outdoor space. Some are successful in providing for users' needs; others less so. The Alzheimer's Garden Audit Tool (AGAT) provides a relatively simple evaluative framework for assessing whether a garden incorporates those design elements and qualities that are necessary for a successful dementia care garden. The rationale for including items on this checklist-tool is explained. The possible uses are discussed. The tool is presented in its relatively preliminary state in the hope that people will use it and send their comments to the author for modification and improvement.

Excellent Checklist (see also Dementia Therapeutic Garden Audit Tool)
Seven sections:
Location and Entry
Layout and Pathways
Planting
Seating
Overall Design and Details
Maintenance
Amenities

- **Dementia Therapeutic Garden Audit Tool,** Alzheimer's Australia, The Dementia Therapeutic Garden Audit Tool is adapted from the Alzheimer's Garden Audit Tool (AGAT) developed by Professor Clare Cooper Marcus in 2007.

http://www.enablingenvironments.com.au/Portals/0/pdf%20docs/Dementia%20Therapeutic%20Garden%20Audit%20Tool%202013.pdf

This adaptation adds Meaningful Activity and Sensory Stimulation.

- McMinn, Bryan and Hinton, Lorraine, **Confined to barracks: The effects of indoor confinement on aggressive behavior among inpatients of an acute psychogeriatric unit**, American Journal of Alzheimer's Disease, Vol.15:1, January/February, 2000.

ABSTRACT

While there is evidence to suggest that in long term residential care settings the provision of more choices and better designed environments have a positive effect on agitation and disturbed behaviors, there are no controlled studies on the effect of imposed confinement in these settings or in acute units. The effect of mandatory confinement indoors on the incidence of verbal and physical aggression and psychotropic medication use among patients with dementia and associated psychiatric and behavioral disturbance was studied. The setting was an acute psychogeriatric admission unit accommodated in a colonial building originally built as a military barracks. A convenience sample was studied to assess changes in levels of aggression and nurse-initiated psychotropic medication use during and after a 32-day period of indoor confinement. Correlations with gender, diagnosis, pre-admission disturbed behavior and ultimate discharge outcome were examined. Release from mandatory confinement indoors was correlated with decreases in both verbal and physical aggression as well as medication use. Correlations could be identified between decreases in aggression and male gender, pre-admission aggressive behavior and discharge outcome. Decreased medication use was correlated with discharge outcome. The freedom to go outdoors or have access to extra space should be an important component of the environmental design and care philosophy for the acute admission of people who experience dementia and associated psychiatric and behavioral disturbance.

Study supports Namazi et al.

Possible explanation: that confinement indoors results in more opportunity for invasion of space which is known to be correlated with increased disruptive behavior.

- Mather, Jennifer et al, **The effect of a walled garden on behavior of individuals with Alzheimer's**, American Journal of Alzheimer's Disease, November/December, 1997.

ABSTRACT:

Provision of Special Care Units for people with Alzheimer's is seen as a solution to difficulties with their behavior, but the effect of such a unit is rarely tested. After Southland Care Center built an enclosed garden next to such a locked-in unit, residents' behavior was observed to look for such an effect. No pre-

post-differences in disruptive behaviors were observed over the summer high-use period However, residents averaged only 14 percent of the peak afternoon use time in the garden, and those using it more displayed less disruptive behavior. As well, residents slept less in the daytime in summer compared to winter and spent more time in winter looking out the window and trying the handle of the door to the garden. Garden use appeared to have had a general positive effect on morale but little effect on disruptive behaviors, perhaps because of limited use by residents.

Canadian study (Alberta)

The residents who showed the greatest changes over the observation period were those who used the garden the most. They showed less sleep disruption and less overall disruptive behaviors when compared to infrequent users of the garden.

Lovering stated that staff motivation is an important factor in determining if outdoor spaces get used, so perhaps the garden would be used more if the staff planned more activities outdoors.

- Murphy, Pamela et al, (Detweiler) **Longitudinal analysis of differential effects on agitation of a therapeutic wander garden for dementia patients based on ambulation ability**, Dementia, August 2010.

ABSTRACT
A growth model within the framework of hierarchical linear modeling was used to assess the impact of visiting a wander garden on monthly agitation levels of a group of elderly veterans diagnosed with dementia, with attention to their ambulatory ability. A sample of 34 veterans residing in a locked ward in a dementia unit was observed for a baseline period and for twelve months after a wander garden was opened in their facility. Findings suggest that visiting the wander garden helped lower agitation levels in the dementia patients and that there was a differential effect based on the patient's ability to walk unassisted.

- Namazi, Kevan and Johnson, Beth, **Pertinent autonomy for residents with dementias: Modification of the physical environment to enhance independence**, The American Journal of Alzheimer's Disease and Related Disorders &b Research, Jan/Feb, 1992.

ABSTRACT:
Autonomy and independence have recently become important issues for the elderly, but have not been applied to Alzheimer's disease patients. This project explores pertinent autonomy for the cognitively disabled by studying exit door behaviors. A specially designed environment satisfied safety and health concerns and enabled residents to have free access to the outdoors during daylight hours. Twenty two residents in early to advanced stages of the disease participated in the project. The results indicate that the number of agitated behaviors in five categories decreased under the unlocked door condition.

- Study conducted in Ohio, in October and early November, in mild weather only.
- The need for autonomy and independence does not diminish with the deterioration of cognitive abilities.

- Under the unlocked door condition, there was a dramatic decline in agitated behaviors.
- This does not preclude the need to develop appropriate policy guidelines for the safety and health of residents. AD patients may be unable to dress appropriately for outdoor weather conditions, and may be oblivious to heat and cold. Caregiving staff obviously must supervise residents at all times to see that appropriate clothing is worn and that residents are not outside for extended periods of time.
- Pertinent autonomy, within safe parameters, offers residents the opportunity to make relevant decisions without jeopardizing their own or other residents' safety or security.

- Rodiek, Susan and Lee, Chanam, **Elderly care: Increasing outdoor usage in residential facilities,** World Health Design, Gateways to Health, October 2009, p. 49 – 55, retrieved November 2013, http://www.designandhealth.com/uploaded/documents/Magazine/whdoct09.pdf

SUMMARY:
The purpose of this study was to learn how the designed environment can encourage or discourage elderly residents from spending time outdoors in long-term care settings. The research was conducted at 68 randomly-selected assisted living facilities in three diverse climate regions of the US (Houston, Chicago and Seattle). Residents and staff (N=1560) filled in written surveys on outdoor usage and preferences, with corresponding staff questions to confirm the validity of resident responses. The outdoor areas at each facility were evaluated with a 63-item environmental audit tool, testing seven core design principles derived from previous research and practical experience.
After controlling for factors such as gender and mobility, the study found several environmental features that significantly influenced how much time residents spent outdoors. Features associated with increased outdoor usage were: high accessibility, clear indoor-outdoor connections, safe paving, good maintenance, round-trip walkways and a choice of comfortable sitting areas with appealing views. There was strong correlation between outdoor usage, walking, physical activity, environmental satisfaction and self reported health of the residents surveyed.
The implications of this study are that well designed outdoor environments can have a major impact on health-related behaviour in long-term care settings, potentially leading to substantial therapeutic benefits. By better understanding specific features that promote outdoor usage, environmental designers may significantly impact the health and well-being of a growing population of frail elderly residents.

Seven core principles tested:

1. Indoor-outdoor connections: how well does the outdoor area connect with the common indoor areas and circulation routes?
2. Contact with the world beyond the facility: are residents able to view off-site features such as landscaped areas, roads or human activities?
3. Safety and security: is the outdoor area safe and secure, with good visual contact with the indoors and designed to minimise the risk of falling?
4. Comfort and accessibility: does the outdoor area comfortably support the physical needs and reduced functional abilities of older residents?
5. Freedom, choice and variety: does the outdoor area provide opportunities for stimulation, autonomy and personal choice?
6. Enjoyment of nature: does the outdoor area offer an abundance of appealing nature elements, presented in ways older adults could enjoy them?

7. Place for activity: does the outdoor area afford safe, comfortable, inviting opportunities for walking or other activities?

Tables 5, 6, and 7 extrapolate the effect of individual environmental features on average minutes outdoors per resident per week compared to the 'Base' (118 minutes):

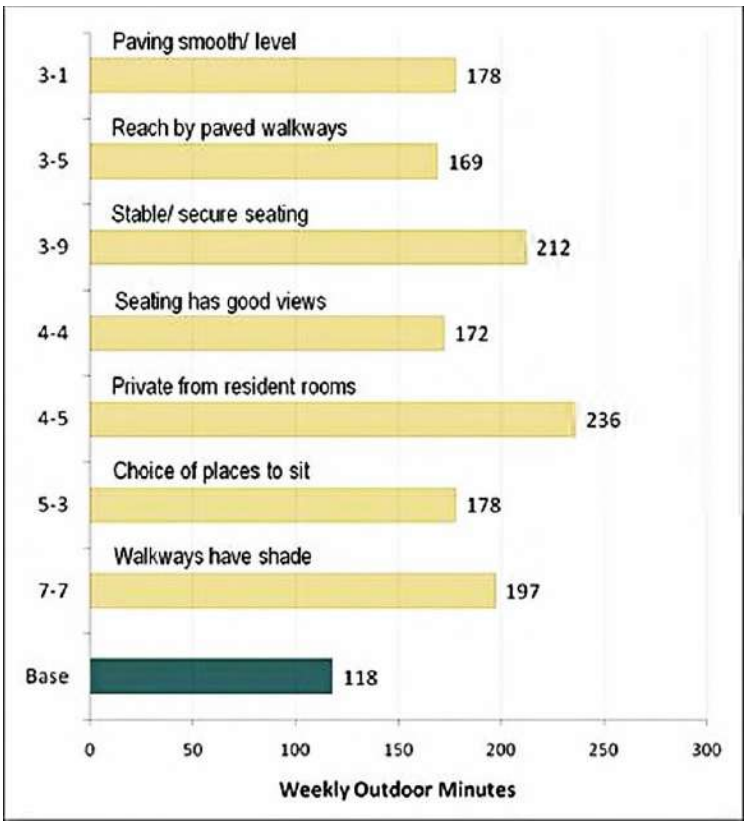


Figure 5: Environmental features with the lowest impact
(Increased usage up to two times)

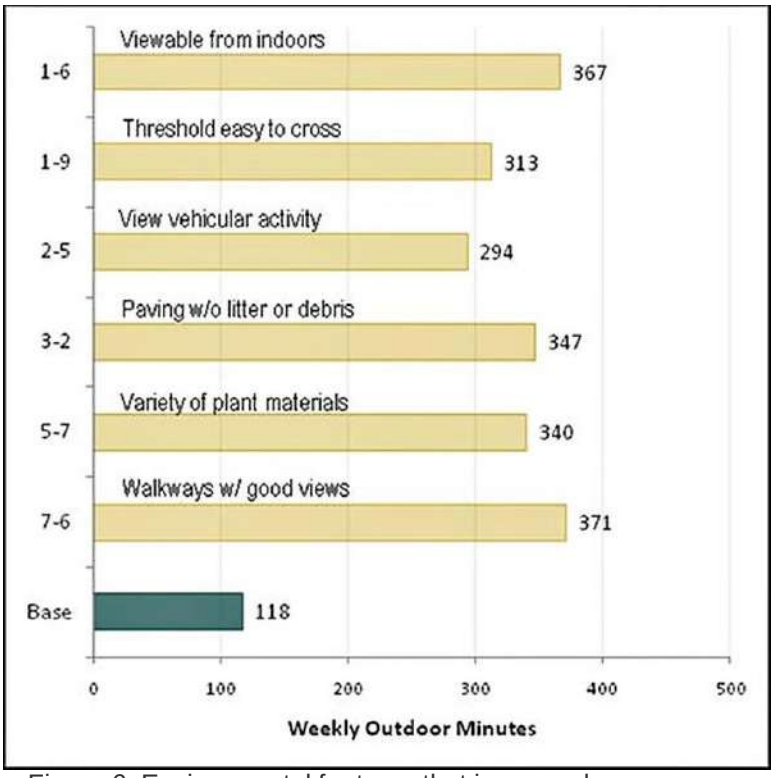


Figure 6: Environmental features that increased outdoor usage by up to 3.5 times

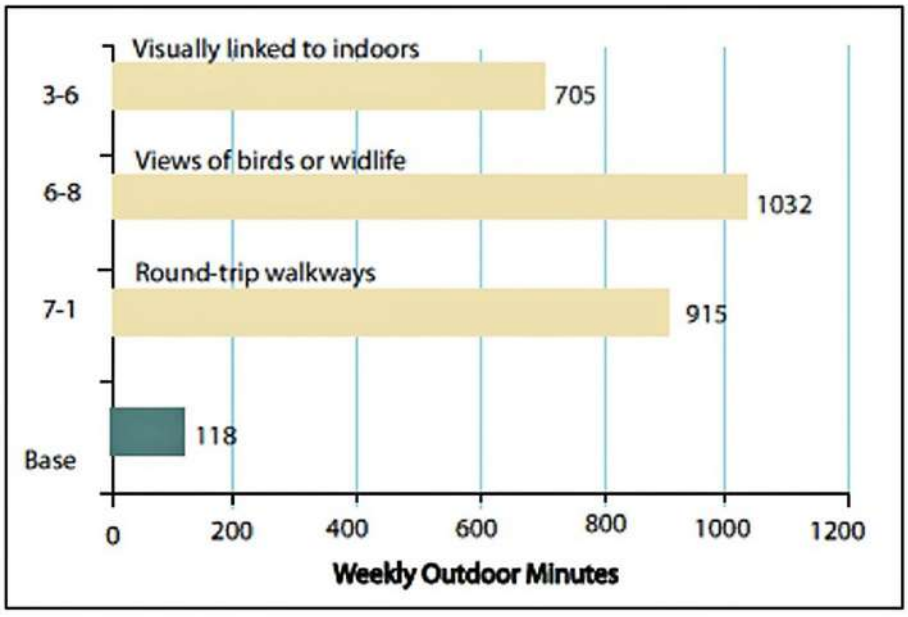


Figure 7: Environmental features with the greatest impact on outdoor usage

Note: Figure 7 includes items that increase usage up to ten times the base: e.g.: “the outdoor area has good views of birds and wildlife” .

- Rodiek, Susan, **Outdoor Evaluation Tool (Version 0.1),** 2009, Center for Health Systems & Design, Texas A&M University, College Station, TX. http://www.healingarden.it/Outdoor%20Evaluation%20Tool.pdf

SUMMARY: This tool is designed to use evidence-based design principles to evaluate outdoor areas for seniors. Based on ongoing research and analysis, the tool is being updated periodically – check to see if a later version may be available. This checklist can help identify the strengths and weaknesses of existing outdoor areas, and plan future developments. www.accesstonature.org

Excellent checklist.
Seven Principles:

- Indoor-Outdoor Connections
- Contact with Community
- Safety and Security
- Comfort and Accessibility
- Freedom, Choice and Variety,
- Contact with Nature
- Support for Activities.

- Rodiek, Susan, **Seniors' Outdoor Survey: Staff version (SOS-1),** 2013, Center for Health Systems & Design, Texas: http://www.accesstonature.org/SOS_Staff.pdf
  Updated tool with five sections:

  - Lush Garden Setting
  - Safe and Comfortable
  - Outdoor Walking and Activities
  - Easy to See and Reach
  - Connect to the World

- Rodiek, Susan, **Resident Perceptions of Physical Environment Features that Influence Outdoor Usage at Assisted Living Facilities**, Journal of Housing for the Elderly, Vol.19, No.3/4, 2005.

ABSTRACT
Spending time outdoors has been found to have therapeutic potential, and to be highly valued by older adults, yet outdoor areas at residential care facilities are commonly reported as being underutilized. To learn what features of the physical environment were perceived by residents as either attracting or deterring outdoor usage, this study conducted focus groups and written surveys at fourteen assisted living facilities, with 108 residents ranging from 61 to 97 years of age. Participants reported that their outdoor usage was influenced by accessibility, aesthetic concerns, and specific environmental features such as the provision of shade, seating elements, plants, and views. The rural vs. urban background of participants was compared with self-reported time spent outdoors, and no significant association was found.

Barriers to outdoor access: mainly lack of comfort and lack of accessibility:
- lack of adequate and closely spaced seating,
- lack of protection from sun and rain (overhead shelter)
- unsafe walking surfaces
- distance too far
- lack of comfortable seating and other amenities (swings)
- lack of interesting features, landscape views
- lack of adequate maintenance: cracked sidewalks
- hard to open doors
- difficult to use wheelchairs on paths

- **Trellis Factsheet:**
  http://trellisscotland.org.uk/files/briefings/Trellis%20Factsheet%20Dementia%20and%20Gardening%202010.pdf

Introduction
This Trellis factsheet is a starting point for anyone gardening with people with dementia or interested in developing such a garden. It contains general information on **dementia** and the importance of garden activities for health & well being (page 1); **garden design** (pages 2-3); **planting** and **garden activities** (page 4) and provides **resources** and references for further in depth reading on pages 5-6.

- Troxel, David, **The Last Great Frontier in Long-Term Care: Let's Get Our Elders Outside,** Alzheimer's Care Quarterly, October/December, 2005.

Many long-term care communities advertise outdoor space as an important component of quality care, yet outdoor space is often underutilized by persons with dementia. The article describes the benefits of nature and the outdoor experience for persons with dementia and offers suggestions for how to encourage and train staff how to utilize outdoor space. Put in context of culture change, the article also argues that outdoor activity programming also benefits staff members, enhancing their job satisfaction and lives.
Several suggestions:
1. Assess the space
2. Talk to staff about expectations
3. Create an outside activity program: brainstorm and follow up.
4. Encourage staff to accompany residents outdoors.

- Truman, Mandy, **The Ayre Manor Garden Project**, 2009:
  http://wabenbow.com/?page_id=562

A care staff's perspective on benefits of a courtyard garden at a Complex Care facility in BC: particularly good details on sensory experience.
Summary:
From my perspective as a Care Aide at Ayre Manor Lodge, I would like to give you some insight into the importance of having a functioning garden in the Ayre Manor Courtyards …The courtyard gardens at Ayre Manor have the potential to contribute significantly to the quality of life of the residents, their friends and families. Since the bulbs in the courtyards have begun to bloom, the residents have been venturing out more often. This has filled a lot of their days with "gardening" … watering, weeding and collecting rocks in the garden! This activity has given a noticeable amount of pleasure, even amongst patients unable to communicate verbally.

- Wood, Wendy et al, **Activity situations on an Alzheimer's disease special care unit and resident environmental interactions, time use, and affect**, American Jounal of Alzheimer's Disease and Other Dementias, Vol.20, No.2, March/April 2005.

Abstract

Routine activity situations on an Alzheimer's disease (AD) special care unit were examined with respect to residents' social and physical environmental interactions, time use, and apparent affect. Using a computer-assisted observational tool, observers recorded prevailing activity situations and corresponding behaviors and affects of seven residents every 10 minutes, from 8:00 AM to 8:00 PM, across four days. Although meals/snacks and some activity groups were positively associated with use of physical objects and engagement in activities, residents were predominantly environmentally disengaged, inactive, or without positive affects during the most prevalent activity situations of background media, downtime, and television. Findings suggest that routine activity situations may act as potent environmental influences on the quality of life (QOL) of people with AD and mediate the effectiveness of other environmental interventions undertaken on their behalf.

Basic point is that regardless of the design features provided in a dementia unit, without strong staff intervention, residents will likely underutilize amenities.

- York, Sherril, **Residential design and outdoor area accessibility**, NeuroRehabilitaiton 25, 2009. (SHKN)

Abstract.

The outdoor environment can provide many positive and therapeutic benefits for persons with complex neurological conditions. In order to benefit from outdoor exposure and experiences, individuals need to be able to access that environment. This article provides a discussion of physical and programmatic access to outdoor living elements in homes and residential facilities for persons with neuro-disabilities. Design considerations for outdoor elements such as common gathering areas, walking paths and paths to/between elements, gardens (viewing and working), and resting areas are presented using legal standards or universal design principles as guides.

- Universal Design is an approach to design that integrates products and building features that are usable by everyone regardless of their ability level.
- Outdoor spaces tend to be underutilized due to design issues, barriers to use, and the role of programs and activities in those spaces.

Main factors in providing quality outdoor living spaces:

- variety of spaces that support individual, group, and family uses, and that are easy to access without major effort;
- comfort in elements of the environment such as shade, temperature, and seating;
- visual appeal that includes a prevalence of natural green material, reduction in concrete and other hard surfaces, views of nature and appealing textures;
- support of physical activity and positive outdoor distractions such as walking paths, gardening, bird watching, or fishponds.
- safety of elements and transition zones that eliminate physical hazards and disconnections between indoors and outdoors.
- reduction of ambiguity through clearly identifiable features and furniture placed in the outdoor space. The layout of the space should be easily understood.

Important elements:

- Transitions from inside to outside: easy to use doors, lighted and covered entry.
- Walkways that are firm, stable and slip resistant with edge protection and wide enough for passing of two persons
- Adequate seating along paths, at observation points, and to socialize: benches with backrests and armrest (seat heights 17 – 19"); with protection from sun and rain.
- Accessible tables (knee space 27 " high, 30" wide, 19" deep)
- Elevated gardens
- Simple and intuitive wayfinding
- Adequate lighting
- Outdoor Intercom Call boxes.
-

- Zeisel, J., **Treatment Effects of Healing Gardens for Alzheimer's: A Difficult Thing to Prove**, Edinburgh Garden Paper, 2005, retrieved from: http://www.healinglandscapes.org/pdf-library/Zeisel%20Treatment%20Effects.pdf

Abstract:
These working parts of the brain provide us with the key to the 'treatment effects' of the built environment, including contact with the outdoors through gardens and their designs. A garden designed to help a person find their way without using the cognitive mapping capacities that they have lost is a successful healing garden. A garden that elicits positive moods that PLWA can fully experience and by which they can orient themselves, is a successful healing garden. An outdoor environment that is self-organizing, that enables the PLWA to use the garden without having to organize themselves, is a successful healing garden. Contact with the elements through ongoing access to a healing garden can reduce such symptoms as sleep/wake disturbances and sundowning.

Design Principles: There are three major overlapping design principles or schema for the design of healing gardens for PLWA. These are: natural mapping (Norman); latent image elements (Lynch); and housing zones (Zeisel).

Latent image elements, defined by Kevin Lynch in his landmark study and book Image of the City of how taxi cab drivers organize information about cities in which they work, include:
• **Paths:** The channels along which people move; the predominant element in their image of their environment as they move through it. Edinburgh Garden Paper Page 3
• **Edges**: Boundaries between two areas; either penetrable barriers or seams that join parts of a garden together. Edges like the fence around a garden define and hold together general areas.
• **Districts**: Sections of a garden that someone can enter into; recognizable as having a unique identifying character.
• **Nodes**: Spots in a garden that are foci to and from which people travel. Nodes can be junctions, the crossing of paths or places of intense activity.
• **Landmarks**: Reference points singled out from a host of possibilities in a setting: towers, domes, signs, trees, doorways; "increasingly relied upon as a journey becomes more and more familiar" (Lynch: 48).