

**SCORING SUPPORT
FOR
BENBOW DEMENTIA HOUSEHOLD DESIGN
CHECKLISTS (BDHDC) 2018**

DESIGN FEATURES:

(can be used separately or combined)

SMALL HOUSE AND WAYFINDING,

ACCESSIBILITY,

INTERIOR DESIGN,

LIGHTING AND NOISE,

OUTDOOR.

REFERENCES

Benbow, William, "Advantages of 'Small House' designs in dementia care", Canadian Nursing Home, Vol.23, March, 2012

Benbow, William, "*Evidence-based checklist for wayfinding design in dementia care facilities*", Canadian Nursing Home, March/April 2013, Vol.24, No.1,

Benbow, William, "*Are Nursing Homes Falling Short In Full Wheelchair Accessibility?*" Canadian Nursing Home, Vol.24, No.4, December 2013 ,

Benbow, William, " Interior Design for dementia care residences", Canadian Nursing Home, Vol. 25, No. 3, October 2014,

Benbow, William, "Lighting and Noise Design in Dementia Care Facilities", Canadian Nursing Home, Vol.24, October, 2013

Benbow, William, Maximizing the use of outdoor gardens in dementia care facilities, Canadian Nursing Home, Vol.25, No.1, March/April, 2014

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BENBOW SMALL HOUSE AND WAYFINDING CHECKLIST SCORING SUPPORT

SMALL HOUSE BUILDING STRUCTURE:

(Maximum 64 points)

1. **Small Scale** (number of residents per self-contained Household – including lounge and dining)
(Reference: Marquardt 2009, Netten 1989, Calkins, Cutler, Nelson, Verbeek, Jenkins)

Score 0 points if House census is greater than 24 residents.

- a. Score 2 points if House census is between 19 and 24 residents and House is divided into wings or sub-groups.
- b. Score 5 points if House census is between 14 and 18 residents.
- c. Score 8 points if House census is between 6 and 13 residents.

2. **Corridor length:** (short distance between resident room and amenities)

(Reference: Netten 1989, Pinet 1999, Brawley 1992, Regnier)

Score 0 points if corridor is longer than 35 metres (115 feet).

- a. Score 2 points if corridor length is 35 metres or less (115 feet) and has at least two intermediate elements such as a seating area.
- b. Score 5 points if corridor length is 30 metres or less (100 feet) and has at least one intermediate element such as a seating area.
- c. Score 8 points if corridor length is 25 metres or less (82 feet)

3. **Direct Visual Access:** (Can see core amenities from resident bedroom, and can see bedroom from major amenities)

(Reference: Marquardt 2009 and 2011, Passini 1998 and 2000)

Score 0 points if less than 50% of residents can see the core amenity areas including dining and lounge from their bedroom door and vice versa.

- a. Score 2 points if at least 50% of residents can see the core amenity areas from their bedroom door and vice versa: i.e. their bedroom door from the amenity and have visual and direct access of the outdoor area from the core amenity area.
- b. Score 5 points if at least 75% of residents can see the core amenity areas from their bedroom door and vice versa and have visual and direct access to the secure outside area from the core amenity area.
- c. Score 8 points if 100% of residents can see the core amenity areas from their bedroom door and vice versa and have visual and direct access to the secure outside area from the core amenity area.

4. Layout: (floor plan shape of House: circulation has minimal changes in direction)
(Reference: Elmstahl, Marquardt 2009)

Score 0 points if the House unit floor plan layout is a courtyard or square design with multiple changes of direction.

- a. Score 2 points if the House unit floor plan layout is an H shaped design with amenities in the cross piece.
- b. Score 5 points if the House unit floor plan layout has only one change in direction such as an L, V, Y or T shape with core amenities at the junction.
- c. Score 8 points if the House unit floor plan layout is a straight corridor or open plan design with no change in direction. Note: in Houses with larger census and longer corridors the amenities should be an intermediate element.

5. Reference Points (built in anchor points/landmarks at circulation decision points)
(Reference: Elmstahl, Marquardt 2011, Zeisel, Netten, Passini)

Score 0 points if there are no built in reference points to aid wayfinding decision making at intersections of corridors and entrances to rooms, wings and amenities.

- a. Score 2 points if there is at one built in reference point to aid wayfinding decision making.
- b. Score 5 points if there are two built in reference points to aid wayfinding decision making.
- c. Score 8 points if there are three or more built in reference points to aid wayfinding decision making.

6. Minimal Repetitive Elements: (major architectural elements: rooms and entrances)
(Reference: Passini, Marquardt 2009, Netten, Fleming, Joseph, University of Stirling)

Score 0 points if there are many repetitive elements such as similar doors along corridors, identical wings and amenity spaces.

- a. Score 2 points if amenity areas are distinct in shape and access points.
- b. Score 5 points if amenity areas are distinct in shape and access and entrances to corridors/wings are distinct.
- c. Score 8 points if resident bedroom doors are distinct in style and colour; corridor entrances and wings are distinctive; and amenity rooms have distinct and defining shapes and access points.

7. Rooms with legible meaning: (function and meaning of room are self-evident)

(Reference: Marquardt, Netten, Passini)

Score 0 points if rooms are indistinguishable for the most part, with generic furniture and décor: i.e. all resident rooms are identical, amenity areas have shared and overlapping functions.

- a. Score 2 points if lounge, dining and activity amenities are recognizable spaces with some distinctive furnishings.
- b. Score 5 points if amenities are distinct rooms, with clear separate functions such as dining; lounge; and activity distinguishable by flooring, fixtures, furnishings and décor.
- c. Score 8 points if rooms and their entrances are clearly distinguishable by function and meaning, with pictograms and words reinforcing flooring, fixtures, furnishings and décor: eg. Picture of a knife and fork and the word as well for location of dining room.

9. Spatial proximity of amenities: (lounge, dining, activity area)

(Reference: Elmstahl, Marquardt, Netten)

Score 0 points if amenities are spread throughout the House in several areas.

- a. Score 2 points if there is a core grouping of main amenities with additional satellite lounges or activity areas in other parts of the House.
- b. Score 5 points if amenities are collocated at one end of the House.
- c. Score 8 points if amenities are collocated in a core area at the junction of wings or as an intermediate element in a straight corridor.

**INTERIOR ELEMENTS:
(Maximum 36 points)**

Signage and Environmental Interventions:

1. Residents' Name and Photo: (to identify resident rooms for residents)

(Reference: Namazi 1951, Nolan 2001 and 2002, Passini)

- a. Score 1 point if Resident's name is used to identify bedroom
- b. Score 2 points if Resident's name and photo is used to identify bedroom
- c. Score 3 points if Resident's name and photo as young adult is used to identify bedroom and is placed on the resident's room door.

2. Pictograms: (e.g. graphic of knife and fork for dining room, toilet for WC)

(Reference: Namazi, Cantley, Passini)

- a. Score 1 point if a pictogram is used to identify one room or area.
- b. Score 2 points if two rooms or areas are identified by pictograms.
- c. Score 3 point if three or more rooms or areas are identified by pictograms.

- 3. Lettering; enlarged, contrasting:** (make signs as large as appropriately possible for posting area)
(Reference: Brawley 1992, Namazi)
- Score 1 point if lettering on most signs is a minimum of $\frac{3}{4}$ inch high and contrasts with sign background.
 - Score 2 points if lettering on most signs is a minimum of 1 and $\frac{1}{2}$ inches high and contrasts with sign background.
 - Score 3 points if lettering is more than 1 and $\frac{1}{2}$ inches high, contrasts with sign background, and if the sign itself contrasts with mounting background.
- 4. Low placement of signs and cues:** (to accommodate downward gaze)
(Reference: Passini, Namazi, Calkins)
- Score 1 point if signs and cues are generally at eye level.
 - Score 2 points if signs and cues are below 4 feet.
 - Score 3 points if signs and cues are below 2 feet and/or on the floor.
- 5. Landmarks (added to structure):** At decision points such as intersections, entrances, wings, rooms.
(Reference: Brawley 1992, 1997)
- Score 1 point if landmarks at all major intersections and distinct in terms of form.
 - Score 2 points if landmarks at all intersections and entrances to major rooms or areas and distinct in terms of form and function.
 - Score 3 points if there is 1 landmark per room, including resident room entrances; and if landmarks are distinct in terms of form, function and meaning.
- 6. Colour contrast:** (minimum 30% luminance contrast: signs, cues, walls, floors, step edges, level changes, furniture, fixtures – sinks, toilets, switches, plates)
(Reference: Fleming, Brawley, see LRV in University of Stirling "Virtual Suite")
- Score 1 point if wayfinding cues and signs are in high contrast colour.
 - Score 2 points if wayfinding cues and signs are in high contrast colour; and floor and wall are in high contrast colours; and doors for resident use are in high colour contrast with their frames.
 - Score 3 points if wayfinding cues and signs are in high contrast colour combinations, and floor and wall are in high contrast colours and doors for resident use are in high colour contrast with their frames; and furniture and fixtures are in contrasting colour to walls and floor.

7. Personal Memorabilia: (particularly from young adulthood and earlier)

(Reference: Namazi, Brawley)

- a. Score 1 point if memory boxes used adjacent to resident room door.
- b. Score 2 points if memory boxes contain object from resident's youth.
- c. Score 3 points if residents' rooms contain personal memorabilia: e.g. bed spread, photos, favourite objects and furniture, particularly from youth era.

8. Lighting – glare and lux: (see lighting checklist: light requirement for older people can be five times greater)

(Reference: Netten, Brawley, Fleming)

- a. Score 1 point if the interaction between lighting, flooring and other surfaces eliminates glare: use of non-reflective floors, walls, tables, artwork and indirect lighting, shaded lamps and ambient lighting is 320 to 550 lux.
- b. Score 2 points if glare is eliminated, and artificial lighting is bright enough in all areas and consistent enough to eliminate shadows: i.e. 550 to 1000 lux .
- c. Score 3 points if glare is eliminated; ambient lighting is sufficient; and task lighting is 550 to 1100 lux; and signs, cues and landmarks are well lit.

9. Minimal information clutter:

(Reference: Passini)

- a. Score 1 point if signage is simple (six grade reading level)
- b. Score 2 points if signage is simple, and posted information is minimal.
- c. Score 3 points if signage is simple, posted information is minimal, and kept to meaningful decision points: key intersections and entrances.

10. Reduced floor patterns and lines: (to reduce impediments to desired routes)

(Reference: Brawley, Perritt)

- a. Score 1 point if floor patterns are of low contrast, with small pattern detail.
- b. Score 2 points if floor patterns and lines are eliminated for the most part.
- c. Score 3 points if adjoining floor materials match well in appearance with little contrast.

11. Visibly accessible toilet: (toilets out of sight are out of mind – to remediate door is left open or removed and replaced with privacy curtain; and light left on)

(Reference: Namazi)

- a. Score 1 point if door routinely left open or removed on resident room ensuite and light left on or a night light so that toilet is visible from outside the ensuite.
- a. Score 2 points if door routinely left open on resident room ensuite and amenity toilet rooms and a light left on so that toilet or sink is visible from outside the room. WC could have modesty vestibule, curtain, or “close door” sign on inside.
- b. Score 3 points if all toilet room doors routinely left open with a light on and high colour contrast used between toilet and floor, or toilet seat and toilet so that ensuite toilet can be seen from resident room and amenity toilet from amenity.

12. Multiple Cueing: e.g. pictogram and word; landmark and colour contrast

(Reference: Marquardt 2011, Nolan 2001 and 2002, Zeisel)

- a. Score 1 points if multiple cueing is used on resident room entrances.
- b. Score 2 points if multiple cueing is used on resident room entrances; and amenities.
- c. Score 3 points if multiple cueing is used on resident room entrances; and amenity areas and their entrances; and circulation features.

BENBOW ACCESSIBILITY CHECKLIST SCORING SUPPORT

(Maximum 100 points)

(Rating scale: Assign score of 0, 1, 3, or 5 for each Design Feature)

(References: Various Design Guidelines; US Veterans Affairs Small House Model 2017)

DESIGN FEATURES:

1. Front Entrance: Walkway to main entrance:

Score 0 points if walkway to main entrance is uneven.

- a. Score 1 point if the walkway is a continuous plane surface with flush joints a maximum 6mm in height differential.
- b. Score 3 points if in addition to (a), the walkway surface is of a permanent material, that is firm and slip resistant and a minimum of 1524 mm (5') wide.
- c. Score 5 points if in addition to (b) the walkway is level; or if inclined it is at a maximum gradient of 1 in 20 with appropriate safety curbs.

2. Front Entrance: Facility Entrance power operated:

Score 0 points if the Facility Entrance doors are not power operated.

- a. Score 1 point if the Facility Entrance doors are power operated by a push paddle or key pad.
- b. Score 3 points if the Facility Entrance doors are power operated by automatic sensors.
- c. Score 5 points if in addition to (a) or (b) the Facility Entrance doors are sliders with a 4 – 6 second closure delay.

3. Front Entrance: door clearances:

Score 0 points if the Front Entrance Door opening is less than 914 mm (36") wide.

- a. Score 1 point if the Front Entrance door is a minimum 914 mm (36") wide.
- b. Score 3 points if in addition to (a) there is a rectangular clear area in front of each side of the door of a minimum length of 1100 mm (43"), plus the width of the door on the inward swing side; AND the minimum width of the clear area is equal to the width of the door plus a latch side clearance of 600 mm (2 feet) on the inward swing side of the door and 300 mm (1 foot) on the outward swing side of the door.
- c. Score 5 points if the rectangular clear area before the door is a minimum length and width of 1524 mm (5 feet) plus on the inward side the swing of the door.

4. Outside access from House Units:

Score 0 points if there is no at grade access to an outside area.

- a. Score 1 point if all levels of the Facility have access to an outdoor area at grade or to a patio, deck or sunroom.
- b. Score 3 points if all Houses of the Facility have direct access from within each House to an outdoor area at grade or a patio, deck or a sunroom.
- c. Score 5 points if in addition to (b) all Houses have access to an outside area, deck or sunroom via doors that are automated with a paddle or sensor.

5. Contiguous floor levels:

Score 0 points if floor levels are not contiguous: i.e. flooring is not a level surface plane.

- a. Score 1 point if thresholds between flooring are bevelled at 45 degrees or less; and are a maximum 13mm (1/2 inch) in height.
- b. Score 3 points if flooring joints are a maximum 6 mm in height differential (1/4 inch).
- c. Score 5 points if flooring joints are a maximum 2 mm in height differential (1/25 inch).

6. Wheel chair turning diameter in resident rooms, ensuites, and amenities:

Score 0 points if there is less than 1524 mm (5 feet) turning diameter for wheel chair maneuverability.

- a. Score 1 point if there is a minimum of 1524 mm turning diameter for wheel chairs in all resident areas.
- b. Score 3 points if wheel chair turning diameter is a minimum of 1676 mm (5'6").
- c. Score 5 points if wheel chair turning diameter is a minimum of 1830 mm (6 feet).

7. Corridor width:

Score 0 points if corridor width is less than 1830 mm (6 feet)

- a. Score 1 point if corridor width is a minimum of 1830 mm (6 feet).
- b. Score 3 points if corridor width is a minimum of 1830 mm (6 feet) and the corridor has laybys or alcoves for parking carts and lifts.
- c. Score 5 points if corridor width is a minimum of 2400 mm (8 feet).

8. Corridor length:

Score 0 points if the corridor length from the bedroom door to the beginning of the main amenities is more than 35 m (115 feet) for the most distant resident room.

- a. Score 1 point if corridor length from bedroom door to the start of the main amenities is a maximum of 35 m (115 feet) for the most distant resident room.
- b. Score 3 points if corridor length from bedroom door to the start of the main amenities is a maximum of 30 m (100 feet) for the most distant resident room.
- c. Score 5 points if corridor length from bedroom door to the start of the main amenities is a maximum of 25 m (82 feet) for the most distant resident room.

9. Resident Room usable space (excluding ensuite, built-ins and vestibule):

Score 0 points if the Resident Room usable space is less than 15.5 sq. m. (167 sq. feet).

- a. Score 1 point if the Resident Room usable space is a minimum 15.5 sq. m. (167 sq. feet).
- b. Score 3 points if the Resident Room usable space is a minimum of 17 sq. m. (183 sq. feet).
- c. Score 5 points if the Resident Room usable space is a minimum of 18 sq. m. (193 sq. feet).

10. Resident Room minimum dimensions for required clearances – score either Panhandle or Paired Ensuite design or use an average if both designs are in use:

(i) Panhandle design (vestibule):

Score 0 points if the Resident Room width is less than 4000 mm (13'1") wide by 6550 mm (21'6") long.

- a. Score 1 point if the Resident Room is a minimum of 4000 mm (13'1") wide by 6550 mm (21'6") long. (CRD, Victoria design)
- b. Score 3 points if the Resident Room is a minimum of 4420 mm (14'6") wide by 6858 mm (22'6") long. (CLC, 2011, p.4-13 design)
- c. Score 5 points if the Resident Room is a minimum of 4420 mm (14'6") wide by 7315 mm (24') long. (CLC, 2011, p. 4-19 design)

(ii) Paired Ensuite design:

Score 0 points if the Resident Room width is less than 3455 mm (11'4") wide by 4548 mm (14'11") long.

- a. Score 1 point if the Resident Room width is less than 3455 mm (11'4") wide by 4548 mm (14'11") long. (NB, 2010, p.27 design)
- b. Score 3 points if the Resident Room is a minimum of 3799 mm (12'6") wide by 4844 mm (15'11") long. (Ayre Manor, Sooke BC - design by Jensen Group Architects)
- c. Score 5 points if the Resident Room is a minimum of 4064 mm (13'4") wide by 5335 mm (17'6") long. (NB, 2010, p.29 design)

11. Resident Room Ensuite Area

Score 0 points if the Resident Ensuite includes a shower and is less than 5 sq. m. (54 sq. f) or is a minimum 4.5 sq. m. (50 sq. f) without a shower.

- a. Score 1 point if the Resident Ensuite includes a shower and is a minimum 5 sq. m. (54 sq. f); or is a minimum 4.5 sq. m. (50 sq. f) without a shower.
- b. Score 3 points if the Resident Room Ensuite includes a shower and is a minimum 6 sq. m. (65 sq. f); or is a minimum 5.5 sq. m. (60 sq. f) without a shower.
- c. Score 5 points if the Resident Room Ensuite includes a shower and is a minimum 7 sq. m. (75 sq. f) or is a minimum 6.5 sq. m. (70 sq. f) without a shower.

12. Door Openings: Resident Room and Ensuite:

Score 0 points if either the Resident Room entrance door or Ensuite door is less than 914 mm (36 inches).

- a. Score 1 point if the Resident Room entrance door and Ensuite door are both a minimum 914 mm (36 inches).
- b. Score 3 points if in addition to (a), there is a latch side clearance of 600mm (24") on the inside of the door and a minimum latch side clearance of 300mm (12") on the outside of the door.
- c. Score 5 points if in addition to (b) there is a minimum clear and level rectangular space 1500 mm (5') in length in front of both sides of the door.

13. Ensuite Toilet:

Score 0 points if the ensuite toilet seat is not between 400 mm (16") and 460 mm (18") in height from the floor.

- a. Score 1 point if the ensuite toilet seat is between 400 mm (16") and 460 mm (18") in height from the floor.
- b. Score 3 points if the ensuite toilet is accessible from the front and one side: i.e. there is a clear and level rectangular space 600 mm by 1500 mm (2' x 5').
- c. Score 5 points if the toilet is accessible from the front and two sides.

14. Ensuite Fixtures:

Score 0 points if clearance under the sink is less than 735 mm (29') and there is no ensuite shower, tilting mirror, locked drawer or nurses cupboard.

- a. Score 1 point if the ensuite sink has an under sink clearance of 735 mm (29').
- b. Score 3 points if there is an ensuite shower.
- c. Score 5 points if there is a tilting mirror, locked drawer for resident use, and nurses' cupboard for special supplies.

15. Assisted Bathing Suite:

Score 0 if there is not at least one Assisted Bathing Suite per Neighbourhood or if it is less than 20 sq. m.

- a. Score 1 point if there is at least one Assisted Bathing Suite per Neighbourhood and it includes a toilet and sink, has tub access on three sides, and is a minimum 20 sq. m.
- b. Score 3 points if there is at least one Assisted Bathing Suite per Neighbourhood and it includes a toilet and sink, has tub access on three sides, and is a minimum 22 sq. m.
- c. Score 5 points if there is at least one Assisted Bathing Suite per Neighbourhood and it includes a toilet and sink, has tub access on three sides, and is a minimum 24 sq. m.

16. Resident areas door handles and closure:

Score 0 points if door handles are of a knob type that requires clutching and turning.

- a. Score 1 point if the door handles are a push plate or a U shaped door pull.
- b. Score 3 points if the door handles are a lever.
- c. Score 5 points if in addition to (a) or (b) the doors have no closures or any closure device is set at a maximum 38 N force.

17. Resident Room ceiling lift system:

Score 0 points if resident rooms do not have a ceiling lift system.

- a. Score 1 point if there is a one track ceiling lift system over the bed.
- b. Score 3 points if the ceiling track system covers most of the resident's room such as a gantry system.
- c. Score 5 points if in addition to (a) or (b) the ceiling track system continues into the ensuite.

18. In-House Amenity area (dining plus lounge plus activity areas)

Score 0 points if combined amenities total less than 6 sq. m. (65 sq. feet) per resident.

- a. Score 1 point if combined amenities total a minimum of 6 sq. m. (65 sq. feet) per resident.
- b. Score 3 points if combined amenities total a minimum of 7 sq. m. (75 sq. feet) per resident.
- c. Score 5 points if combined amenities total a minimum of 8 sq. m. (86 sq. feet) per resident.

19. Resident areas controls: height from finished floor:

Score 0 points if controls are higher than 1200 mm (47") from the finished floor.

- a. Score 1 point if controls are a maximum 1200 mm (47") from the finished floor.
- b. Score 3 points if controls are a maximum 1100 mm (43") from the finished floor.
- c. Score 5 points if in addition to (b) some controls operate on a motion sensor.

20. Resident areas windows: viewing height:

Score 0 points if window height prevents viewing from a sitting position.

- a. Score 1 point if window height enables visibility from a sitting position.
- b. Score 3 points if window height enables visibility from sitting and bed positions.
- c. Score 5 points if windows are located a minimum 457 mm (18") away from corners.

BENBOW INTERIOR DESIGN CHECKLIST SCORING SUPPORT

(Maximum 100 points)

(Rating scale: Assign score of 0, 1, 3, or 5 for each Design Feature)

LIGHT FIXTURES

Lighting Levels: Use a light meter equivalent to DVM 1300 from Velleman, capable of measuring 0 – 50,000 lux with an accuracy of 5%.
Take several readings from several rooms and times; then average.
If measuring in Foot Candles (FC) - Note: 1 foot candle = 10.76 lux.

1. Ambient Lighting (Lounge, Bedroom, Bathroom: (taken at sitting eye level)

(References: Brawley, Noell-Waggoner, Lepeleire, Sinoo, Riemersma-van der Lek Calkins)

Score 0 points if Ambient Lighting is < 320 lux.

- a. Score 1 points if Ambient Lighting is ≥ 320 lux.
- b. Score 3 points if Ambient Lighting is ≥ 550 lux.
- c. Score 5 points if Ambient Lighting is ≥ 1000 lux in an amenity: i.e. bright light therapy.

2. Task Lighting: (Dining, Activity, Lounge and Bedroom Reading areas) Measure on surface of task)

Score 0 points if task lighting is < 550 lux.

- a. Score 1 points if task lighting is ≥ 550 lux.
- b. Score 3 points if task lighting is ≥ 750 lux.
- c. Score 5 points if task lighting is ≥ 1100 lux.

3. Glare: (see item 18: Finishes for definition of Light Reflective Value – LRV)

(References: Brawley and Noell-Waggoner)

Score 0 points if glare is present.

- a. Score 1 points if light fixtures use shielded bulbs or indirect lighting.
- b. Score 3 points if in addition to (a), flooring has a low to medium LRV (30 to 40).
- c. Score 5 points if in addition to (a) and (b), outdoor surfaces such as concrete are stained to a medium colour value (LRV 30 to 40).

4. Colour Rating of Fixture: (Colour Rendering Index (CRI) is measure of closeness to daylight of source of light. Kelvin is a unit of measurement used to describe the hue of a specific light source: the higher the Kelvin value of the light source, the closer the light’s colour output will be to actual sunlight. Bulbs with an output of 3500K or lower will have an amber hue, bulbs in the mid-range of 3500K-4100K will have a white hue, bulbs in the higher 4100K+ range will tend toward a blue hue and closer to sunlight. You can check with fixture or light bulb manufacturer for CRI and Kelvin ratings.)
(References: Noell-Waggoner)

Score 0 points if CRI < 70 in common areas.

- a. Score 1 points if CRI ≥ 70 in common areas.
- b. Score 3 points if CRI ≥ 70 in common areas and bedrooms.
- c. Score 5 points if CRI ≥ 70 in common areas and bedrooms and Colour Temperature is > 3000 Kelvin (white daylight) in common areas.

Examples of Color Temperature and CRI

Light Source	Color Temperature	Color Rendering Index
Candle	1700k	100 CRI
High Pressure Sodium	2100k	25 CRI
Incandescent	2700k	100 CRI
Tungsten Halogen	3200k	95 CRI
Cool White	4200k	62 CRI
Clear Metal Halide	5500k	60 CRI
Natural Sunlight	5000-6000k	100 CRI
Daylight Bulb	6400k	80 CRI

Kelvin Color Temperature	2700K	3000K	3500K	4100K	5000K	6500K
Associated Effects and Moods	Ambiant Intimate Personal	Calm Warm	Friendly Inviting	Precise Clean Efficient	Daylight Vibrant	Daylight Alert
Appropriate Applications	Living/Family Rooms Commercial/ Hospitality	Living/Family Rooms Commercial/ Hospitality	Kitchen/Bath Light Commercial	Garage Commercial	Commercial Industrial Institutional	Commercial Industrial Institutional

5. Controls:

Score 0 points if switches are located higher than 1200 mm (47 inches)

- a. Score 1 point if switches are located lower than 1200mm (47 inches).
- b. Score 3 points if in addition to (a), double-switching is used in bedrooms.
- c. Score 5 points if in addition to (a) and (b) dimmable switches are used in corridors.

6. Flexibility:

Score 0 points if there is limited flexibility in type of lighting fixtures.

- a. Score 1 point if there is a variety of fixtures including floor and table lamps.
- b. Score 3 points if in addition to (a) there are overhead and task lighting fixtures in resident rooms and common areas.
- c. Score 5 points if in addition to (a) and (b) some fixtures are activated by motion sensors, especially for ensuite.

COLOUR PALETTE and COLOUR CONTRAST (Over all general impression)

Contrast can be determined using a Grayscale available from Art supply store, A standard Grayscale has 10 segments ranging from white to black, in 10% increments. Good contrast should have at least two segments between: i.e. 30% value difference – if one item has 20% value the other should have at least 50%.

See Youtube demonstration: <http://www.youtube.com/watch?v=CqMf16Mbke8>

Programs like Adobe Photoshop can convert colour photos to Grayscale image.

<http://www.workwithcolor.com/color-luminance-2233.htm>



7. Colour Contrast to enhance visibility, particularly major surfaces such as walls, doors, ceilings and flooring:

(References: Cooper, Bright and Egger, Bakker)

Score 0 points if colour contrast is poorly utilized.

- a. Score 1 point if strong warm colours at the yellow-red end of the spectrum are used.
- b. Score 3 points if in addition to (a) colour contrast is well utilized: e.g. light against black, dark against white, light yellow against dark blue.
- c. Score 5 points if in addition to (a) and (b) peach, coral, apricot tones are used to add warmth, with a minimum of pastel blues and lavenders.

8. Degree of Contrast and camouflage murals for Redirection:

(References: creativeartco.com, truedoors.com)

Score 0 points if there is minimal use of contrast or lack of contrast for redirection.

- a. Score 1 point if a lack of contrast is used to hide doors to exits, housekeeping rooms etc.
- b. Score 3 points if in addition to (a) contrast such as a contrasting stripe on floor or ribbons on doors is used to deter access.
- c. Score 5 points if murals are used on doors to camouflage exits and dangerous areas.

ENSUITE FIXTURES

9. Ensuite Fixtures - Safety, Accessibility, Visibility:

Score 0 points if little effort has been made to make ensuite fixtures easily visible and accessible.

- a. Score 1 point if the ensuite toilet is visible from the bed and an accessible height (between 400 mm (16") and 460 mm (18") in height from the floor).
- b. Score 3 points if in addition to (a) there are appropriate grab bars for the toilet and shower and well marked faucets.
- c. Score 5 points if in addition to (a) and (b) contrast is used to make the toilet seat, sink, and grab bars stand out against their backgrounds.

FITTINGS

10. Fittings - Simple and plain, contrast:

(References: Brush)

Score 0 points if there is little effort to avoid large contrasting patterns on fittings.

- a. Score 1 point if there is no life like or large pattern on curtains, bedding and cushions.
- b. Score 3 points if in addition to (a) there are personalized fittings such as bedspreads, pillows, and other personal items on display.
- c. Score 5 points if in addition to (a) and (b) there is a good use of contrast between table/placemats and plates, and utensils, and between handles and background.

11. Fittings - Signage, Visibility:

Score 0 points if little effort is made to make signage visible with large fonts and contrast.

- a. Score 1 point if signage uses large text (minimum 60 pt.- 2 cm.) and minimum 70% contrast between text and background.
- b. Score 3 points if in addition to (a) signage is located at or below door handle level.
- c. Score 5 points if in addition to (a) and (b) pictures and text are used in some signage such as for common toilet rooms and resident bed rooms.

FURNITURE

12. Seating:

(References: Capezuti, Hughes)

Score 0 points if chairs and sofas are poorly suited to seniors in terms of height, stability and contrast to background.

- a. Score 1 point if seating is 51 to 56 cm - 20 to 22 inches high, sturdy, with arm rests.
- b. Score 3 points if in addition to (a), seating is designed with water resistant fabric, pop up cushions and a flow through design.
- c. Score 5 points if in addition to (a) and (b) there is a variety of choice in terms of seating height, and the furniture colour contrasts with its background (walls, floor).

13. Tables:

Score 0 points if the tables are not sturdy, safe, and accessible.

- a. Score 1 point if the dining room tables are sturdy: i.e. substantial pedestal or well braced legs.
- b. Score 3 points if in addition to (a) the tables are square, with rounded corners, and curved edges.
- c. Score 5 points if in addition to (a) and (b) tables have adequate wheel chair clearance. (underside 735 mm - 29 inches from floor)

14. Wardrobes and Dressers:

Score 0 points if wardrobes and dressers are inappropriate for dementia residents.

- a. Score 1 point if wardrobes have two side by side compartments, one section open or glazed for one day use; and the other larger for ongoing storage.
- b. Score 3 points if in addition to (a) wardrobes and dressers have handles contrasting with their backgrounds, and no sharp corners or edges.
- c. Score 5 points if wardrobes, dressers, night tables etc. have hard wearing high pressure laminate on major surfaces and are fabricated with a durable substrate such as wood, plywood, or medium density fiberboard (not particle board).

15. Appliances (safety):

Score 0 if there is no effort to ensure safety of appliances.

- a. Score 1 point if the only appliances accessible to residents are refrigerators.
- b. Score 3 points if there are no microwave ovens available to residents or any that are available have safety sensors and simple to use controls.
- c. Score 5 points if in addition to (b) there are no ranges accessible to residents or any that are available have staff controlled shut offs.

FLOORING

16. Flooring - Safety, Accessibility, Durability:

Score 0 points if inappropriate flooring is used.

- a. Score 1 point if thresholds are a maximum 13 mm (1/2 inch) and bevelled.
- b. Score 3 points if flooring is stable, firm, slip resistant, and cushioned, yet does not impede movement.
- c. Score 5 points if in addition to (a) or (b) flooring is easily maintained, water, mildew and stain resistant.

17. Flooring - Contrast:

(References: Dickinson, Perritt)

Score 0 points if contrast issues are not taken into consideration in the choice of flooring.

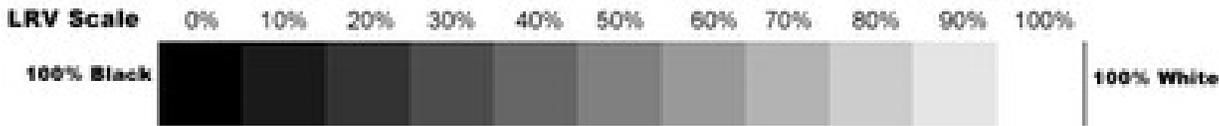
- a. Score 1 point if large contrasting patterns have been avoided.
- b. Score 3 points if in addition to (a) flooring contrasts with walls and baseboards to easily distinguish edges between flooring and walls.
- c. Score 5 points if in addition to (a) or (b) tonal contrast from one flooring material to another is less than 30% unless contrast is being used to redirect residents away from an area.

FINISHES

18. Finishes - Simplicity, Durability: (Light Reflective Value, Contrast, and durability)

Light Reflectance Value is a numerical rating assigned by paint manufacturers to each color they make. Usually this number is shown on sample paint chips and actual paint containers. This number is a scientifically determined assessment of the amount of light and heat that color will reflect on a scale of 0 to 100. Pure black has an LRV of 0, absorbs all light and heat, and can get very hot. On the other hand, pure white has a reflectance value of nearly 100, and can keep a space light and cool. All colors fit in between these two extremes. A color with an LRV of 50 will reflect 50% of the light that falls on it, and one with an LRV of 23 will reflect 23% of the light, and so on. Think of LRV's as a numerical version of a gray value scale for colors, roughly like this:

White: (LRV 100) High Light (LRV 95) Light (LRV 80)	Low Light (LRV 65) Medium: (LRV 50) High Dark (LRV 35)	Dark (LRV 20) Low Dark (LRV 5) Black (LRV 0)
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Score 0 points if finishes have inappropriate Light Reflective Values or confusing patterns.

- a. Score 1 point if finishes avoid large contrasting or life like patterns or specks.
- b. Score 3 points if in addition to (a) the Light Reflective Value of ceilings is greater than 80; and the LRV of walls is greater than 60, and the LRV of floors is between 30 and 40.
- c. Score 5 points if in addition to (a) and (b) there is use of wall and corner protection such as chair rails and acrovyn like coverings on susceptible surfaces.

19. Finishes - Contrast:

(References: Dupuy)

Score 0 points if contrast is not well utilized to aid in visibility of objects against their background.

- a. Score 1 point there is generally 30% contrast between objects and their background: e.g. handrails, grab bars, handles, furniture.
- b. Score 3 points if in addition to (a) adjacencies utilize contrast so that junctions and edges are more visible, particularly for pastel finishes.
- c. Score 5 points if in addition to (a) and (b) colour contrast is utilized to distinguish doors from walls or door frames as a wayfinding aid: e.g. to resident rooms, washrooms.

FEATURES

20.Special Points of Interest:

Score 0 points if there is a dearth of special points of interest.

- a. Score 1 point if features are used to enhance décor, atmosphere and theme.
- b. Score 3 points if features are used as landmarks to aid in wayfinding.
- c. Score 5 points if in addition to (b) special living features such as plants and animals are used: e.g. aquarium, aviary, the Eden model.

BENBOW LIGHTING AND NOISE CHECKLIST SCORING

LIGHTING: Lighting Levels: Use a light meter equivalent to DVM 1300 from Velleman, capable of measuring 0 – 50,000 lux with an accuracy of 5%. Take several readings from several rooms and times; then average. If measuring in Foot Candles (FC) - Note: 1 foot candle = 10.76 lux.

(Rating Scale: 3 - 4 – 5)

1. Ambient Lighting (Lounge, Bedroom, Bathroom: (taken at sitting eye level)

(References: Brawley, Noell-Waggoner, Lepeleire, Sinoo, Riemersma-van der Lek Calkins)

Score 0 points if Ambient Lighting is < 320 lux.

- a. Score 3 points if Ambient Lighting is \geq 320 lux.
- b. Score 4 points if Ambient Lighting is \geq 550 lux.
- c. Score 5 points if Ambient Lighting is \geq 1000 lux in an amenity: i.e. bright light therapy.

2. Task Lighting: (Dining, Activity, Lounge, Bedroom Reading areas) Measure surface of task)

Score 0 points if task lighting is < 550 lux.

- a. Score 3 points if task lighting is \geq 550 lux.
- b. Score 4 points if task lighting is \geq 750 lux.
- c. Score 5 points if task lighting is \geq 1100 lux.

Lighting Issues:

(Rating range 2 - 3 – 4)

3. Colour: (Colour Rendering Index (CRI) is measure of closeness to daylight of source of light)

You can check with fixture or light bulb manufacturer for CRI and Kelvin ratings.

(References: Noell-Waggoner)

Score 0 points if CRI < 70 in common areas.

- a. Score 2 points if CRI \geq 70 in common areas.
- b. Score 3 points if CRI \geq 70 in common areas and bedrooms.
- c. Score 4 points if CRI \geq 70 in common areas and bedrooms and Colour Temperature is > 4000 Kelvin (white daylight) in common areas.

Examples of Color Temperature and CRI

Light Source	Color Temperature	Color Rendering Index
Candle	1700k	100 CRI
High Pressure Sodium	2100k	25 CRI
Incandescent	2700k	100 CRI
Tungsten Halogen	3200k	95 CRI
Cool White	4200k	62 CRI
Clear Metal Halide	5500k	60 CRI
Natural Sunlight	5000-6000k	100 CRI
Daylight Bulb	6400k	80 CRI

4. Contrast

(References: Cooper, Bright and Egger, Bakker)

Score 0 points if there is no effort to use contrast between floors and walls.

- a. Score 2 points if there is at least 30% difference in contrast between floors and walls and around doors in common areas and corridors.
- b. Score 3 points if there is at least 30% difference in contrast between floors and walls and around doors in common areas and corridors and bedrooms and bathrooms.
- c. Score 4 points if in addition to (b) there is also good contrast generally between objects and ground such as door handles, grab bars, toilet seats, furniture, seating, plates, cups and utensils.

Contrast can be determined using a Grayscale available from Art supply store,

A standard Grayscale has 10 segments ranging from white to black, in 10% increments. Good contrast should have at least two segments between: i.e. 30% value difference – if one item has 20% value the other should have at least 50%.

See Youtube demonstration: <http://www.youtube.com/watch?v=CqMf16Mbke8>

Programs like Adobe Photoshop can convert colour photos to Grayscale image.

<http://www.workwithcolor.com/color-luminance-2233.htm>



5. Natural Light

(References: Noell-Waggoner, Torrington, Brawley)

Score 0 points if there is poor access to natural light.

- a. Score 2 points if there is good use of windows to bring daylight into the facility.
- b. Score 3 points if there are added features such as extra windows, clerestories or skylights to bring increased daylight into facility.
- c. Score 4 points if in addition to (b), residents are encouraged to daily use a sunroom, conservatory or to make use of direct and easy access to an outdoor area at least 15 minutes daily.

6. Natural Views:

(References: Torrington)

Score 0 points if there are limited natural views.

- a. Score 2 points if there are pleasant natural views accessible from several windows in the facility.
- b. Score 3 points if there are excellent natural views with adjacent seating near windows with appropriate sill heights 630 mm (25 inches) in the common areas.
- c. Score 4 points if in addition to (b), there are excellent natural views for many of the resident bedrooms with appropriate sill heights (630mm) to permit easy viewing from sitting or in bed.

7. Transitions:

(References: Noell-Waggoner)

Score 0 points if there is no effort to mitigate entrance light differences from outside to inside.

- a. Score 2 points if facility entrances have some shade covering such as a portico or awning.
- b. Score 3 points if entrances have shade covering plus increased inside electric light to aid in the transition from outside to inside during daytime.
- c. Score 4 points if in addition to (b), there is no area in the facility where the brightest light is any greater than three times brighter than the lowest light.

8. Day and Night Adjustments:

(References: Noell-Waggoner)

Score 0 points if corridor lighting is not dimmed at night.

- a. Score 2 points if corridors are dimmed at night.
- b. Score 3 points if corridors and common areas are dimmed at night.
- c. Score 4 points if in addition to (b), night lights and/or motion sensors are used to assist at night.

9. Even Distribution of Lighting:

(References: Noell-Waggoner)

Score 0 points if pooling of light is evident.

- a. Score 2 points if indirect lighting is used to evenly disperse lighting to walls and floors.
- b. Score 3 points if ceilings have an LRV ≥ 80 ; and walls > 60 .
- c. Score 4 points if in addition to (a) and (b), sheer curtains are used to diffuse bright daylight.

10. Glare:

(References: Brawley and Noell-Waggoner)

Score 0 points if glare is present.

- a. Score 2 points if light fixtures use shielded bulbs or indirect lighting.
- b. Score 3 points if in addition to (a), flooring has a low to medium LRV (30 to 40).
- c. Score 4 points if in addition to (b), outdoor surfaces such as concrete are stained to a medium colour value (LRV 30 to 40).

11. Individual Preferences:

Score 0 points if no provision is made for flexible individual preferences in lighting.

- a. Score 2 points if ambient light is adjustable with dimmers.
- b. Score 3 points if ambient and task light are adjustable with dimmers.
- c. Score 4 points if lighting controls for residents are within accessible reach - 1200mm (47").

12. Maintenance Standards and Schedule:

Score 0 points if there is no regular routine maintenance of fixtures and bulbs

- a. Score 2 points if there is a schedule to regularly audit lighting and clean fixtures.
- b. Score 3 points if staff monitor and adjust lighting throughout the day to suit daylight changes.
- c. Score 4 points if residents' glasses are actively monitored and cleaned.

NOISE:

Noise Levels: Use a Type 2 Sound Meter equivalent to a Sound Level Pen (840018) from Sper Scientific (measuring 32 – 130 dB with an accuracy of 1.5 dB) Data to be collected while rooms unoccupied. Take several readings from several rooms and times: do not average, but rather, take the median: i.e. list the values from lowest to highest and take the middle one.

(Rating Scale: 3 – 4 – 5)

1. Ambient Noise Level Assessments – Bedrooms:

(References: Bharathan, Berglund))

Score 0 points if Daytime Resident bedroom noise level > 40 dB

- c. Score 3 points if Daytime Resident bedroom noise level \leq 40 dB
- d. Score 4 points if Night time Resident bedroom noise level \leq 35 dB
- e. Score 5 points if Night time Resident bedroom noise level \leq 32 dB

2. Ambient Noise Level Assessments – Common Areas:

Score 0 points if Daytime Common areas are > 45 dB

- a. Score 3 points if Daytime Common areas are \leq 45 dB
- b. Score 4 points if Daytime Common areas are \leq 40 dB
- c. Score 5 points if Daytime Common areas are \leq 35 dB

Noise Issues: **(Rating Scale: 2 – 3 – 4)**

3. Layout:

Score 0 points if resident bedrooms flank noisy areas or access to House Units is through resident bedroom areas.

- a. Score 2 points if there is a privacy zone for resident bedrooms separate from noisier areas such as utility, laundry, activity, dining, server, nurses' stations, entrances and public areas.
- b. Score 3 points if in addition to (a), service traffic is minimized through the resident room areas: e.g. with a service corridor or service entrance for utilities, supplies, meals etc.
- c. Score 4 points if in addition to (a) and (b), there is a quiet seating area in addition to noisier lounge areas such as TV rooms.

4. Noise Mitigating Design Features: (Architect, Engineer, and/or Builder can confirm design specifications)

(References: Osborne)

Score 0 points if no noise mitigating features are evident.

- a. Score 2 points if windows are double glazed and ceilings or walls are clad with sound absorbing material.
- b. Score 3 points if in addition to (a), resident bedroom walls are soundproofed with a Sound Transmission Class rating of 45 with walls extending to the structural deck.
- c. Score 4 points if in addition to (a) and (b), HVAC equipment and ducting is designed and installed with a Noise Criterion (NC) of 25 in bedrooms and 35 in amenity areas.

5. Noise Reducing Adaptations:

(References: Bakker, Connell)

Score 0 points if no noise reducing adaptations are evident.

- a. Score 2 points if an effort is made to use noisy equipment away from resident areas: e.g. pill crushers, dish washers, coffee grinders.
- b. Score 3 points if lined drapes, wall hangings and/or carpeting are used to soften sound.
- c. Score 4 points if in addition to (a) and (b), noise reducing measures are practiced such as rubber tips on chairs, bedside TV speakers, padded equipment, place mats, and closed doors.

6. Schedule Intrusive Noise:

(References: Boehm, Bakker)

Score 0 points if no effort is made to schedule intrusive noise.

- a. Score 2 points if floor and carpet cleaning is scheduled for times when areas are unoccupied by residents.
- b. Score 3 points if in addition to (a), servery and dining noise is minimized by prepping before residents arrive in area and cleaning up, dishwashing etc. after residents depart area; and keeping door to Servery closed.
- c. Score 4 points if in addition to (a) and (b), Quiet Times are regularly scheduled.

7. Night Time Noise:

(References: Alessi)

Score 0 point if no measures are taken to reduce night-time nursing noise.

- a. Score 2 points if corridor lights are dimmed at night, and resident rooms have night lights to aid them in locating bathrooms and exits.
- b. Score 3 points if night time nursing care routines are conducted with minimal lighting and noise.
- c. Score 4 points if in addition to (a) and (b), supervision is facilitated with measures such as windows and blinds in resident bedroom doors, and/or motion sensor monitoring.

8. Alarms and Pagers:

(References: Bakker)

Score 0 point if no effort is made to reduce overhead pagers and alarm noise.

- a. Score 2 points if overhead paging is limited to emergencies.
- b. Score 3 points if portable pagers and cellphones are muted by using vibrate.
- c. Score 4 points if an alarm use protocol has been arranged with local authorities to guide sound levels, drills and testing routines.

9. Staff Training:

(References: Overman-Dube)

Score 0 points if noise reduction is not regularly included in staff training.

- a. Score 2 points if noise reduction is part of ongoing staff training.
- b. Score 3 points if in addition to (a), staff are encouraged to use softer voices, quieter footwear, and put cellphones on vibrate.
- c. Score 4 points if in addition to (a) and (b), staff regularly turn off equipment when not in use including amenity TVs and close doors to reduce the spread of noise.

10. Signage:

(References: Overman-Dube)

Score 0 points if no noise related signs are evident.

- a. Score 2 points if signs are used to remind visitors and staff to speak softly.
- b. Score 3 points if signs request cell phones be put on vibrate.
- c. Score 4 points if signs notify everyone of designated Quiet Times.

11. Surveys:

Score 0 points if no effort is made to solicit input from residents, families and staff re the impact of noise.

- a. Score 2 points if surveys are used to regularly gather feedback from residents, families and staff re noise problems and suggestions for remediation.
- b. Score 3 points if in addition to (a), staff informally engage residents and families to identify bothersome noises and discuss remedies.
- c. Score 4 points if successful interventions have resulted from such surveys.

12. Maintenance Schedule:

(References: Dewing)

Score 0 points if there is no regular routine maintenance of noise making equipment.

- a. Score 2 points if regular maintenance of noise generating equipment is scheduled.
- b. Score 3 points if staff monitor noisy equipment throughout the day and immediately address maintenance issues such as squeaky wheels, leaky faucets.
- c. Score 4 points if residents hearing aids are actively monitored for use and batteries replaced promptly.

BENBOW OUTDOOR CHECKLIST SCORING SUPPORT

Maximum 100 points: Assign a score of 0, 1, 3, or 5 for each Element or Feature

SUPPORT ELEMENTS:

1. Management Support (written and actual):

(References: Grant, Chapman)

Score 0 points if there is no documented evidence of management support.

- a. Score 1 point if the Mission, Vision, Values, Philosophy, or Policy support and encourage outdoor area use by residents: e.g. by promoting residents' independence and maintaining their optimal abilities.
- b. Score 3 points if in addition to (a), the facility has written Procedures, Programming and Staff Training that support and encourage outdoor area use by residents.
- c. Score 5 points if in addition to (a) and (b) the management team's attitude and example support and encourage outdoor area use by residents.

2. Staff Involvement (attitudes and practices):

(References: Connell, Wood, Fleming)

Score 0 points if there is little or no evidence of active staff involvement in supporting and encouraging outdoor area use by residents.

- a. Score 1 point if staff facilitate independent use of outdoor area: e.g. by ensuring that the door to the outdoor area is easy to use, regularly open or unlocked for resident use.
- b. Score 3 points if in addition to (a) staff regularly provide outdoor activities.
- c. Score 5 points if in addition to (a) and (b) staff participate in training to develop their knowledge and skills in optimizing residents' use of outdoors.

3. Meaningful Activities (to enhance motivation):

(References: Brawley, Chapman, Troxel, Lovering, Guaita)

Score 0 points if there is little evidence of activity being used to motivate outdoor use.

- a. Score 1 point if residents are encouraged to pursue simple activities outdoors such as helping with cleaning, feeding birds, watering and weeding.
- b. Score 3 points if in addition to (a) there are regularly scheduled and special occasion activities held outdoors.
- c. Score 5 points if in addition to (a) and (b) there are regular staff reviews of outdoor use and activities with a view to keeping the outdoor area an interesting active place.

4. Maintenance (Hard and Soft):

(Reference: Rodiek, Brawley)

Score 0 points if the outdoor area is poorly maintained.

- a. Score 1 point if hard surfaced pathways are well maintained, litter and crack free.
- b. Score 3 points if in addition to (a) soft landscaping and special features are well cared for.
- c. Score 5 points if in addition to (a) and (b) there is an active volunteer program to assist staff in maintaining and caring for the outdoor areas.

DESIGN ELEMENTS:

5. Location (Direct Physical Access):

(Reference: Cohen-Mansfield, Cutler)

Score 0 points if there is not direct access from every residential floor to an outdoor area or solarium/conservatory or balcony.

- a. Score 1 point if there is direct access from every residential floor to an outdoor area or solarium/conservatory or balcony.
- b. Score 3 points if there is direct access from every Care Unit or Household to an outdoor area or solarium/conservatory or balcony.
- c. Score 5 points if every Care Unit or Household has direct access to an Outdoor Area or solarium/conservatory or balcony from their common areas such as dining, lounge or activity areas .

6. Entryway (Easy to use main legible access point):

(Reference: Grant, Namazi 1992)

Score 0 points if there is not a main well marked legible access point.

- a. Score 1 point if there is a main highly visible landmark legible Entryway.
- b. Score 3 points if in addition to (a) the Entryway door is unlocked during the day in reasonable weather with an easy to open door or with an automatic opener or is propped open.
- c. Score 5 points if in addition to (a) and (b) visual transition has been mitigated at the Entryway with additional lighting indoors and shading outdoors.

7. Safety (to minimize falls and other hazards):

(Reference: Lovering, Detweiler, Zeisel, Namazi)

Score 0 points if there are unmet safety concerns re outdoor area.

- a. Score 1 point if walkways are smooth, level, non-slip, non-glare, and litter free with no dangerous overhangs or objects projecting onto the path.
- b. b. Score 3 points if in addition to (a) there is enhanced lighting of the walkways, perimeter and features.
- c. Score 5 points if in addition to (a) and (b) all plants are non-toxic with no thorns, or other hazards.

8. Visibility (for staff and residents):

(Reference: Bengtsson)

Score 0 points if visibility of the outdoor area from indoors is compromised.

- a. Score 1 point if there is good visibility of the outdoor area from indoors through a glass Entry door and large adjacent windows.
- b. Score 3 points if the whole Garden is easily visible from the indoor Common areas and the Entryway.
- c. Score 5 points if once outdoors the resident can see the way back to the Entryway and the Indoor Common area is visible from the Garden.

9. Security (unobtrusive enclosure):

(Reference: Zeisel, Grant, Beckwith, Brawley)

Score 0 points if the outdoor area is not enclosed securely.

- a. Score 1 point if the outdoor area is securely enclosed.
- b. Score 3 points if the enclosure is a minimum of 2200 mm (7.2 feet) and difficult to climb.
- c. Score 5 points if in the enclosure fencing and service exits are camouflaged.

10. Accessibility (easy to open door):

(Reference: Detweiler, Murphy, Rodiek)

Score 0 points if the Entryway door is difficult to open. (note: if a looped two door system is used, then both doors should meet these criteria)

- a. Score 1 point if the Entryway door is on a level landing; is a minimum 914 mm (36") wide with a lever handle; and the latch side clearance is a minimum 610 mm (24 ").
- b. Score 3 points if in addition to (a) the Entryway door requires a maximum 8.5 pound opening pressure; and has a 13 mm (1/2") maximum bevelled threshold.
- c. Score 5 points if in addition to (a) and (b) the Entryway door has an automatic opener or is propped open during clement weather.

11. Accessibility (easy to use Walkway):

(Reference: Cohen-Mansfield, Cooper-Marcus, Murphy, Lovering)

Score 0 points if the walkway is not barrier free.

- a. Score 1 point if the walkway is a minimum 1830 mm (6') wide.
- b. Score 3 points if in addition to (a) the walkway has gentle curves with no sharp turns or angles.
- c. Score 5 points if in addition to (a) and (b) the walkway has clearly marked edges or curbs; and handrails.

12. Accessibility (easy to use Furniture and Fixtures):

(Reference: Grove, Lovering)

Score 0 points if furniture and fixtures are not wheelchair accessible.

- a. Score 1 point if outdoor tables have a minimum under top clearance of 685 mm (27") for wheelchair user knees to slide under; and adequate manoeuvring space.
- b. Score 3 points if in addition to (a) there are raised garden beds with heights of 450 – 600 mm (18 – 24").
- c. Score 5 points if in addition to (a) and (b) an accessible drinking fountain is supplied (minimum 27" knee space and easy to operate).

13. Comfort (shelter from inclement weather):

(Reference: Grant)

Score 0 points if no shelter is provided from inclement weather – wind and rain.

- a. Score 1 point if there is a large sheltered Entryway Patio with seating.
- b. Score 3 points if in addition to (a), there is a destination shelter with seating.
- c. Score 5 points if there is a conservatory, sunroom or enclosed perimeter walkway for year round use.

14. Comfort (shade and screening):

(Reference: Heath, Rodiek, Cutler)

Score 0 points if there is no shade provided.

- a. Score 1 point if the Entryway Patio is covered for protection from the sun.
- b. Score 3 points if additional shade is provided in shady nooks with seating and/or trellis over the walkway.
- c. Score 5 points if in addition to shade, screening is provided for protection from insects.

15. Layout (a simple pathway):

(Reference: Cooper-Marcus, Rodiek, Lovering)

Score 0 points if the layout is complex: not a simple pathway.

- a. Score 1 point if the layout is based on a simple visible looped pathway that leads back to the entry patio, or if not looped, there is a reasonable turnaround to direct the resident back towards the entry patio.
- b. Score 3 points if there are well landmarked destinations going and coming back.
- c. Score 5 points if there are adequate rest stops with seating along the way.

16. Amenities (convenience):

(Reference: Lovering)

Score 0 if there are no convenience amenities.

- a. Score 1 point if there is easy access to a washroom: i.e. less than 15 metres (50 feet) from Entryway (either indoors or outdoors though preferably with direct outdoor access to the washroom).
- b. Score 3 points if in addition to (a) there is a snack and beverage cart or barbeque supplied outdoors.
- c. Score 5 points if in addition to (a) and (b) there is a garden shed with easy to use tools.

17. Seating (location and design):

(Reference: Lovering, Rodiek, Brawley)

Score 0 points if seating is non-existent or quite limited.

- a. Score 1 point if there is a variety of seating locations outdoors that provide options of sun or shade, private or social opportunities.
- b. Score 3 points if in addition to (a) seating is on a firm level base with adequate back support and armrests to allow for easy transfers.
- c. Score 5 points if in addition to (a) and (b) seat height is in the range of 405 – 460 mm (16 – 19”) which facilitates rising and transfers.

18. Natural Features:

(Reference: Rodiek, Bengtsson)

Score 0 points if there is a paucity of natural features.

- a. Score 1 point if there is a good variety of safe, non-toxic plants.
- b. Score 3 points if the natural elements appeal to a variety of senses: sight, smell, touch, taste, sound: eg. are colourful and interesting.
- c. Score 5 points if in addition to (a) or (b) the plants and wildlife are familiar to residents and help them recall their own gardens.

19. Supportive Features:

(Reference: Brawley, Grove)

Score 0 points if there are little if any special garden ornamental features.

- a. Score 1 point if there are a variety of garden ornaments such as weather vane, wind chimes, flag pole, old car, bike etc.
- b. Score 3 points if in addition to (a) there are wild life features such as bird bath, bird feeder, bird houses, squirrel feeders, etc.
- c. Score 5 points if in addition to (a) and (b) there is a safe water feature such as a bubbling fountain or trickling stream; and/or arbour, archway, pergola to add architectural interest.

20. Views (to add motivation):

(Reference: Cohen-Mansfield, Rodiek, Cutler, Zeisel)

Score 0 points if the main view from the outdoor area is a fence or wall.

- a. Score 1 point if there are interesting views within the garden such as activity and wildlife.
- b. Score 3 points if from the outdoor area there are interesting views of activity outside the garden.
- c. Score 5 points if the views to areas outside the garden are mitigated so as not to stimulate exit behaviour: i.e. fences, gates and service doors are camouflaged so that the enclosure appears natural and unobtrusive so as not to entice exiting.

REFERENCES

LAYOUT AND WAYFINDING

- Brawley, Elizabeth, "Alzheimer's disease: designing the physical environment", The American Journal of Alzheimer's Care and Related Disorders & Research, January/February 1992.
- Brawley, Elizabeth, "Environmental design for Alzheimer's disease, a quality of life issue", Aging & Mental Health, 2001.
- Calkins, Margaret, "Evidence-based design for dementia", Long-Term Living Magazine, 2011.
- Elmstahl, Solve, et al, "How should a group living unit for demented elderly be designed to decrease psychiatric symptoms?", Alzheimer Disease and Associated Disorders, 1997.
- Marquardt, Gesine, and Schmiege, Peter, "Dementia-friendly architecture: Environments that facilitate wayfinding in nursing homes." American Journal of Alzheimer's Disease & Other Dementias, 2009
- Marquardt, Gesine, "Wayfinding for people with dementia", Health Environments Research & Design", 2011.
- Namazi, K., and Johnson, Beth, Physical environmental cues to reduce the problems of incontinence in Alzheimer's disease units, The American Journal of Alzheimer's Care and Related Disorders and Research, 1991.
- Namazi, K. et al, "Long-term memory cuing to reduce visuo-spatial disorientation in Alzheimer's disease patients in a special care unit", The American Journal of Alzheimers Care, 1991.
- Netten, Ann, "The effect of design of residential homes in creating dependency among confused elderly residents" International Journal of Geriatric Psychiatry, vol. 4, 1989.
- Nolan, Beth et al, "Using external memory aids to increase room finding by older adults with dementia", American Journal of Alzheimer's Disease and other Dementias, 2001.
- Nolan, Beth et al, "Evaluation of the Effect of Orientation Cues on Wayfinding in Persons with Dementia", Alzheimer's Care Quarterly, 2002
- Pinet, Celine, "Distance and the Use of Social Space by Nursing Home Residents", Journal of Interior Design, 1999.
- Passini, Romedi et al, "Wayfinding and Dementia: Some research findings and a new look at design", Journal of Architectural and Planning Research, 1998.
- Passini, Romedi et al, "Wayfinding in a Nursing Home for advanced dementia of the Alzheimer's Type", Environment and Behavior, 2000.
- Perritt, Mitzi et al, "Empirical Findings Suggest Recommendations for Carpet Pattern and Texture", Alzheimer's Care Quarterly, 2005.
- University of Stirling, Virtual Care Home:
http://dementia.stir.ac.uk/sites/default/files/bed_door_10.swf;
<http://dementia.stir.ac.uk/design/virtual-environments/virtual-care-home>
- Zeisel, John, "Environment, Neuroscience, and Alzheimer's Disease", Alzheimer's Care Quarterly, 2005.

Small House and Layout References:

- Cantley, C. and Wilson, R., Put Yourself in my place, 2002. See: <<http://www.jrf.org.uk/sites/files/jrf/1861348118.pdf>>.
- Calkins, M., Ten Senior Living Design Innovations, *LTC*; 60(3); March, 2011.
- Cutler, L., and Kane, R., "Transforming Nursing Homes, Implications," 2009. See:<www.allhealth.orgbriefingmaterials/GreenHouseDesign-919.pdf>.
- Fleming, R., Environmental design and modification for people with dementia. From a workshop on environmental design for people with dementia; University of Wollongong, NSW, Australia; 2009.
- Fleming, R. and Purandare, N., Long-term care for people with dementia: environmental design guidelines, *International Psychogeriatrics*; 22; special issue #7; p.553-557; May 18, 2010.
- Jenkins, R., et al., Financial implications of 'The Green House Model,' *Seniors Housing & Care Journal*; 19(1); 2011. See: <http://thegreenhouseproject.org/wp-content/uploads/2011/09/NIC_2011_SHCJ_GreenHouseArticle.pdf>.
- NBC - National Building Code of Canada 2010; "New residential care classification created in building and fire codes," National Research Council of Canada, Ottawa. See:<www.nrc-cnrc.gc.ca/eng/ibp/irc/ci/v15no2/2.html>.
- Nelson, G., "Household Models for Nursing Home Environments," a paper written for the Pioneer Network, 2009. See: ><http://www.pioneernetwork.net/Data/Documents/NelsonHousehold-ResidentialPaper.pdf>>.
- The Multilevel Design Guidelines British Columbia, 1994. Available at: <http://wabenbow.com/?page_id=122>.
- Ontario Ministry of Health, "Long Term Care Home Design Manual, 2009." See: <www.health.gov.on.ca/english/providers/program/ltc_redev/renewalstrategy/pdf/home_design_manual.pdf>.
- Pinet, C., Distance and the use of social space by nursing home residents, *Journal of Interior Design*; 25(1); May, 1999.
- Design Guidelines for Queensland Residential Care Facilities. Queensland (Australia) Health, 1999. See: <www.health.qld.gov.au/cwamb/agedguide/13037.pdf>.
- Regnier, V., Design for Assisted Living: Guidelines for Housing the Physically and Mentally Frail; John Wiley, New York; 2002.
- Regnier, V. and Denton, A., Ten new and emerging trends in residential group living environments, *NeuroRehabilitation*; vol. 25; p.169-188; 2009.
- Verbeek, H., Redesigning Dementia Care: An evaluation of small-scale, homelike care environments; 2011; thesis, Maastricht University, The Netherlands.
- Fraser Health: Residential Complex Care Building Requirements; Fraser Health Authority, B.C.; 2007.

ACCESSIBILITY

- ADA Standards for Accessible Design, Department of Justice (US), 2010. <http://www.ada.gov/regs2010/2010ADASTandards/2010ADASTandards.pdf>
- Barrier Free Design Guide, Department of Veterans Affairs (US), 2011, <http://www.cfm.va.gov/til/dGuide/dgBarrFree.pdf>
- Building Access Handbook, BC, 2007. (based on the Canada National Building Code) http://www.housing.gov.bc.ca/pub/building_access_handbook_2007.pdf
- Community Living Centers (CLC), Design Guide, Department of Veterans Affairs (US), 2011 <http://www.cfm.va.gov/til/dGuide/dgCLC.pdf> (replaced by "Small House Model" 2017.
- Complex Residential Care Developments, Vancouver Coastal Health (VCH) Design Guidelines, British Columbia, 2007. <http://wabenbow.com/wp-content/uploads/2011/06/VCH-Complex-Care-Design-guidelines-June-6-07.pdf>
- Design Guidelines for Continuing Care Facilities in Alberta, Alberta Health, 2012. <http://www.health.alberta.ca/documents/CC-Design-Guidelines-Facilities-2012.pdf>
- Design Standards for Nursing Homes, New Brunswick, 2010. <http://www2.gnb.ca/content/dam/gnb/Departments/sd-ds/pdf/NursingHomes/NursingHomeDesignStandards-e.pdf>
- Long Term Care Facility Requirements (Space and Design), Appendix B, Nova Scotia Department of Health, 2007/2008. http://www.gov.ns.ca/health/ccs_strategy/LTC_Facility_Requirements.pdf
- Long Term Care Home Design Manual, Ministry of Health and Long-Term Care, Ontario, 2009. http://www.health.gov.on.ca/english/providers/program/ltc_redev/renewalstrategy/pdf/home_design_manual.pdf
- McGuinness, Katherine, Ten steps to ensuring hospital accessibility compliance, Health Facilities Management Magazine, March, 2013. http://www.hfmmagazine.com/hfmmagazine/jsp/articledisplay.jsp?dcrpath=HFMMAGAZINE/Article/data/03MAR2013/0313HFM_FEA_CompOps&domain=HFMMAGAZINE
- Multilevel Care Design Guidelines, Victoria, BC, 1992, 1994. http://wabenbow.com/?page_id=173 , http://wabenbow.com/?page_id=122
- Pagliuca, Lorita et al, Accessibility and physical deficiency: identifying architectural barriers in internal areas of hospitals in Sobral, Ceara, [Revista da Escola de Enfermagem da USP](#), vol.41-4, pp.581 – 588, Brazil, 2007.
- Pinet, Celine, Distance and the Use of Social Space by Nursing Home Residents, Journal of Interior Design, 25 (1), p.1-15, 1999.
- Pressalit Care, Design Guide Bathroom, UK, 2007. <http://www.e-pages.dk/pressalitcare/29/12>
- Small House Model Design Guide, Department of Veterans Affairs (US), 2017, <https://www.cfm.va.gov/til/dGuide/dgSmallHouseModel.pdf>

INTERIOR DESIGN

- Benbow, W. , Evidence-based checklist for wayfinding design in dementia care facilities, Canadian Nursing Home, Vol.24, No.1. March/April 2013.
- Benbow, W., Lighting and Noise Design in Dementia Care Facilities, Canadian Nursing Home, Vol.24, No. 3, Oct/Nov 2013,
- Bright, Keith, and Egger, Veronika, Using visual contrast for effective, inclusive environments, Information Design Journal, 16, 2008.
- Brodrick, James, LED lighting progresses driven by lessons learned, LEDsMagazine, March 2014:
<http://www.ledsmagazine.com/articles/print/volume-11/issue-3/features/programs/led-lighting-progresses-driven-by-lessons-learned.html>
- Brush, J. et al, Using the Environment to Improve Intake for People with Dementia, Alzheimer's Care Quarterly, Fall, 2002.
- Brush, J. et al, Influences on perceived function of a nursing home resident, Journal of Communication Disorders, 36, 2003.
- Calkins, Margaret, Lighting for Older Eyes, LTL Magazine, November 2003:
<http://www.ltlmagazine.com/article/lighting-older-eyes>
- Calkins, Margaret, Evidence-based long term care design, NeuroRehabilitation, 25, 2009.
- Capezuti, E. et al, Bed and Toilet Height as Potential Environmental Risk Factors, Clinical Nursing Research, 17, Feb 2008.
- Cooper, B. et al, The Use of the Lanthony New Color Test in Determining the Effects of Aging on Color Vision, Journal of Gerontology, 46, 1991.
- Cronin-Golomb, Vision in Alzheimer's Disease, The Gerontologist, June, 1995.
- Dalke, H. et al, Colour and lighting in hospital design, Optics and Laser Technology, 38, 2006.
- Dupuy, R. et al, Lighting, Low Vision & Building Codes, National Institute of Building Sciences, Low Vision Design Symposium, January 2013:
<http://www.brikbases.org/sites/default/files/Lighting%20Low%20Vision%20and%20Building%20Codes-Paper.pdf>
- Dickinson, J. et al, The effect of selected residential carpet and pad on the balance of healthy older adults, Environment and Behavior, 33, March 2001.
- Ellis, E. et al, EBD Using Daylight-Mimicking LEDs for improving Health Outcomes in Older Adults at St. Francis, BAU Architecture, 2014: <http://www.bauarchitecture.com/research.daylightstfrancis.shtml>
- Enhancing the lives of people with dementia: Dementia design standards, Cumbria Care:
<http://www.cumbria.gov.uk/eLibrary/Content/Internet/327/890/40382101629.pdf>
- Figueiro, Mariana and Rea, Mark, New research in light and health field is expanding the possibilities LED lighting in healthcare environments, Congresso Internacional de Iluminacion, 2005:
<http://www.lrc.rpi.edu/programs/lightHealth/pdf/LEON.pdf>
- Hughes, Elizabeth, Creating Functional Environments for Elder Care Facilities, Geriatric Nursing, July/August, 1995.
- Hyde, Joan, The Physical Environment and the Care of Alzheimer's Patients, The American Journal of Alzheimer's Care and Related Disorders & Research, May/June 1989
- Interior Design, Dementia-Friendly Environments, Victoria Government Health Information, Australia:
<http://www.health.vic.gov.au/dementia/changes/interior-design.htm>
- Lepeleire, J, et al, Insufficient Lighting in Nursing Homes, JAMDA, June 2007.
- Janssen, W., et al, Determinants of the Sit-to-Stand Movement: A Review, Physical Therapy, 2002:
<http://ptjournal.apta.org/content/82/9/866.full>

- Kuo, Y-L., The influence of chair seat height on the performance of community-dwelling older adults' 30-second chair stand test, Aging Clinical Experience Research, 2013.
- Malone, E. et al, Furniture Design Features and Healthcare Outcomes, The Center for Health Design, 2011: http://www.healthdesign.org/sites/default/files/FurnitureOutcomes_2011.pdf
- Pache, M. et al, Colour vision deficiencies in Alzheimer's disease, Age and Ageing, 32, 2003.
- Percival, J., Lighting the homes of people with sight loss: an overview of recent research, Thomas Pocklington Trust, September 2007: <http://www.pocklington-trust.org.uk/Resources/Thomas%20Pocklington/Documents/Word/Research%20Publications/OP13.doc>
- Perritt, Mitzi et al, "Empirical Findings Suggest Recommendations for Carpet Pattern and Texture", Alzheimer's Care Quarterly, 2005.
- Rizzo, M., et al, Vision and cognition in Alzheimer's disease, Neuropsychologia, 38, 2000.
- Sinoo, M. et al, Light conditions for older adults in the nursing home: Assessment of environmental illuminances and colour temperature, Building and Environment, 46, 2011.
- Tomoko, K. et al, The Use of Microwave Ovens by Elderly Persons With Disabilities, The American Journal of Occupational Therapy, 51, October, 1997.
- Upali, N. et al, Achieving EBD Goals through flooring selection & design, The Center for Health Design, 2012: http://www.healthdesign.org/sites/default/files/tandusflooringreport_final.pdf
- Van Hoof, J. et al, The indoor environment and the integrated design of homes for older people with dementia, Building and Environment, 45, 2010.
- Wijk, H. et al, Colour Discrimination, Colour Naming, and Colour Preferences Among Individuals With Alzheimer's Disease, International Journal of Geriatric Psychiatry, 14, 1999.

Links:

- www.memorymaid.ca ; www.bkrcarteffects.com
- <http://www.enablingenvironments.com.au/Resources/Downloads.aspx>
- <http://www.enablingenvironments.com.au/AdaptaHome/MaterialsandSurfaces.aspx>
- http://www.silverinnings.com/docs/Health%20n%20Fitness/Alzheimer%20n%20Dementia/Good_Sense_Good_Design%20for%20Dementia.pdf
- <http://www.ldparchitects.com/concept/downloads/Chof.pdf>
- <http://www.cih.org/resources/PDF/Scotland%20general/Improving%20the%20design%20of%20housing%20to%20assist%20people%20with%20dementia%20-%20FINAL.pdf>
- <http://info.furnitureconcepts.com/blog-0/?Tag=Furniture+for+incontinence>

LIGHTING AND NOISE

- Alessi, Cathy, and Schnelle, John, Approach to sleep disorders in the nursing home setting, *Sleep Medicine Reviews*; 4(1); p. 45-56; 2000.
- Bakker, Rosemary, Sensory Loss, Dementia, and Environments, *Generations: Journal of the American Society on Aging*; 27(1); p.46-51; Spring, 2003.
- Berglund, B. et al, Guidelines for Community Noise, World Health Organization, Geneva, 1999.
- Brawley, E.C., Environmental design for Alzheimer's disease: a quality of life issue, *Aging & Mental Health*; 5(Supplement 1); p.79-83; 2001.
- Brawley, E.C. and Noell-Waggoner, Eunice, "Lighting: Partner in Quality Care Environments"; 2008: <http://www.pioneernetwork.net/Data/Documents/BrawleyNoell-WagonerLightingPaper.pdf>
- Bharathan, T., et al, What do patterns of noise in a teaching hospital and nursing home suggest? *Noise and Health*; 9(35); p.31-34; April, 2007.
- Boehm, Heidi and Morast, Stacey, Quiet Time, *American Journal of Nursing*; 109(11, Supplement); p.29-32; November, 2009: http://www.nursingcenter.com/lnc/journalarticle?Article_ID=940560
- Connell, B. et al, Effect of Environmental Interventions on Noise in Nursing Homes, *The Gerontologist*; 44(1); p.77; October, 2004.
- Dewing, Jan, Caring for people with dementia: noise and light, *Nursing Older People*; 21(5); p.101-109; June, 2009.
- Fagan, Frank, Hearing Loss, *Canadian Nursing Home*; 22(4); p.4-11; December, 2011.
- Hodges, Lisa, et al, Dementia Design Guidelines, Home and Community Care Capital Works Program, The University of Sydney, June 2006. <www.homemods.info>
- Joosse, Laura, Do Sound Levels and Space Contribute to Agitation in Nursing Home Residents with Dementia, *Research in Gerontological Nursing*; 5(3); p.174-184; 2012.
- Joseph, A. and Ulrich, R., "Sound Control for Improved Outcomes in Health Care Settings"; Issue Paper #4; The Centre for Health Design; January, 2007.
- Lepeleire, Jan De et al, Insufficient Lighting in Nursing Homes, *Journal of American Medical Directors Association*; p.314-317; June, 2007.
- "Lighting", Dementia-Friendly Design Considerations; Alzheimer Knowledge Exchange; January, 2010: <http://www.akeresourcecentre.org/Design>
- Noell-Waggoner, Eunice, Lighting Solutions for Contemporary Problems of Older Adults, *Journal of Psychosocial Nursing*; 42(7); p.14-20; July, 2004.
- "Noise", Dementia-Friendly Design Considerations; Alzheimer Knowledge Exchange; July, 2011: <http://www.akeresourcecentre.org/Design>
- Osborn, Richard et al, Effects of Background Noise on the Perception of Speech by Sighted Older Adults and Older Adults with Severe Low Vision, *Journal of Visual Impairment and Blindness*; 94(10) October, 2000.
- Overman Dube, Joyce et al, Environmental Noise Sources and Interventions to Minimize Them, A Tale of 2 Hospitals, *Journal of Nursing Care Quality*; 23(3); p.216-224; July-September, 2008.
- Riemersma-van der Lek, R.F., Effect of Bright Light and Melatonin on Cognitive and Noncognitive Function in Elderly Residents of Group Care Facilities; *The Journal of the American Medical Association*; 299(22); June, 2008; summarized in *Canadian Nursing Home*; 19(3); p.25; October, 2008)
- Torrington, J.M., Tregenza, P.R., Lighting for people with dementia, *Lighting Research and Technology*; 39(1); p.81-97; 2007.
- Van Hoof, J. et al, The indoor environment and the integrated design of homes for older people with dementia, *Building and Environment*; 45; p.1244-1261; 2010.

- “Why is Lighting Important to Older Adults, Literature Review”, Dementia Friendly Design Considerations; Alzheimer Knowledge Exchange; 2010:
http://www.akeresourcecentre.org/files/Design/DD%20CoP_Lighting_Literature_Review.pdf

Links

- Auditory Assistance: Strategies to reduce hospital noise problems, *HFM magazine*, 2010:
http://www.hfmmagazine.com/hfmmagazine/jsp/articledisplay.jsp?dcrpath=HFMMAGAZINE/Article/d ata/01JAN2010/1001HFM_FEA_Design
- Conducting a Noise Study on Your Dementia Unit: <http://www.nursetogether.com/Career/Career-Article/itemid/2640.aspx#.UWB35JOsh8E>

OUTDOOR

- BC Building Code - Building Access Handbook 2007 (BC)
http://www.housing.gov.bc.ca/pub/building_access_handbook_2007.pdf
- Bengtsson, Anna and Carlsson, Gunilla, Outdoor Environments at Three Nursing Homes, *Journal of Housing for the Elderly*, 2006, 19(3/4)
- Beckwith, Margaret 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.
- 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).
- City of Toronto Accessibility Design Guidelines,, 2004;
http://www1.toronto.ca/static_files/equity_diversity_and_human_rights_office/pdf/accessibility_design_guidelines.pdf
- 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.
- 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
- 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.
- 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.
- 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
- 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.
- Detweiler, Mark et al, What Is the Evidence to Support the Use of Therapeutic Gardens for the Elderly? *Psychiatry Investigation*, 2012.
- Guaita, Antonio 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.
- 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.
- Grove, Kim, *Gardens for People with Dementia: A Guide to make them safe and suitable*, 2012.
- 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
- 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.
- 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).
- Marcus, Clare Cooper, Garden of the Family Life Center, *Journal of Housing for the Elderly*, Vol.21, No.3/4, 2007.

- 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.
- 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.
- 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 & Research*, Jan/Feb, 1992.
- 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
- 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>
- Troxel, David, The Last Great Frontier in Long-term Care: Let's get our Elders Outside, *Alzheimer's Care Quarterly*, 2005, 6(4).
- Wood, Wendy et al, Activity situations on an Alzheimer's disease special care unit and resident environmental interactions, time use, and affect, *American Journal of Alzheimer's Disease and Other Dementias*, Vol.20, No.2, March/April 2005.
- Zeisel, John, Creating a Therapeutic Garden That Works for People Living with Alzheimer's, *Journal of Housing for the Elderly*, Vol.21 (1/2), 2007.

[Links to other Garden Checklists:](#)

- Marcus, Clare Cooper, Alzheimer's Garden Audit Tool (AGAT), *Journal of Housing for the Elderly*, 2007, 21 (1-2): 179-191: http://www.tandfonline.com/doi/abs/10.1300/J081v21n01_09#UokfLMSshcY
- Dementia Therapeutic Garden Audit Tool, Alzheimer's Australia, 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>
- 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>
- Rodiek, Susan, 2013 Seniors' Outdoor Survey Staff Version: http://www.accesstonature.org/SOS_Staff.pdf