

Resident Aggression

Evidence is growing that resident-to-resident aggression (RRA) is widespread in dementia units and that environmental factors can be manipulated to mitigate this aggression. Failure to address the issues involved in RRA raises the question of liability for health authorities and care facilities - particularly where a resident is forced to room with a resident known to be aggressive.

By Bill Benbow, MSW

Environmental interventions to mitigate resident-to-resident aggression

In January, 2016, the B.C. Seniors Advocate released a report entitled "Monitoring Seniors' Services" which confirmed that in B.C. there were between 425 and 550 reported incidents of Resident-to-Resident Aggression (RRA) that resulted in harm in government licensed nursing homes in 2014/15 (Mackenzie, 2016).

The Vancouver Sun followed up on this with a report that 16 seniors have died after a physical confrontation in a B.C. nursing home - four every year since 2012. *The Sun* reported that, based on B.C. Ministry of Health data, there were more than 1000 physical aggression incidents each year in B.C.'s long-term care (LTC) system.

Similarly, last year, eight Ontario seniors were killed in nursing homes (Pemberton, January 17, 2016)

W5 (the Canadian TV news program) reported, in 2013, that based on coroner's reports there have been at least 60 nursing home killings across Canada in the last 12 years - with 25 of these in Ontario.

Regional Ontario Coroner, Dr. Roger Skinner, estimated that the overall number of homicides in Ontario nursing homes is in the range of 4 to 10 a year (W5 Research Team, 2013).

The *London Free Press* reported that, based on a report by the Geriatric and Long-Term Care Review Committee of the Office of the Chief Coroner for Ontario, a scourge of violent dementia is going unchecked in Ontario nursing homes: there have been 13 homicides in two years in Ontario long term care homes. Furthermore, the Health

Ministry trains nursing home staff to care for residents who may be aggressive, but that training has failed (Sher, 2015).

Although there are limited studies of RRA, there is a growing consensus that RRA in long-term care facilities is high but underreported.

A Quebec study analysed data from 2332 residents of Quebec City area nursing homes and found that 21% displayed physical aggressive behaviour. The study noted that persons with dementia have declining ability to adjust to environmental demands as the cognitive losses progress (Voyer, 2005).

The Canadian Institute for Health Information (CIHI) reported on an analysis of data from five Nova Scotia nursing homes between 2003 to 2007. The analysis found that nearly 40% of 699 residents exhibited one or more aggressive behaviours including verbal or physical abuse, social inappropriateness and resistance to care in the seven day period prior to their last assessment (CIHI, 2008).

In 2014, the Ontario Long Term Care Association indicated that nearly half of Ontario's 77,600 long-term care residents exhibit some level of aggressive behaviour, with 11% at the severely aggressive level, while another 35% display moderate aggressive behaviours (OLTCA, 2014).

A Canadian study in 2015 attempted to determine the extent of RRA across Canada, but found that data was incomplete and uneven. The study, however, did conclude that there is some indication that

RRA makes up approximately one-third of reported abuse cases in Canadian nursing homes (McDonald, 2015).

The CIHI also reported that antipsychotics are commonly prescribed to treat aggression and agitation in LTC: 39% of seniors in LTC facilities across Canada had at least 1 claim for an antipsychotic in 2014; in B.C. the rate is 48% (CIHI, 2016; p.8)

Residents with severe cognitive impairment, and those exhibiting highly aggressive behaviour, were more likely to have used an antipsychotic (51.3%). Most of these drugs can have harmful side effects such as sedation, a sudden drop in blood pressure, falls, fractures, strokes and death (CIHI, 2016).

Perhaps the most thorough study of RRA to date is the 2007/08 Ph.D. dissertation of *Eilon Caspi*. He employed direct observation in the common areas of two Special Care Units in Massachusetts. For over ten months he spent an average of 9.5 hours a day, five days a week, observing 12 selected residents who were known to be behaviourally expressive.

He witnessed and documented 85 RRA incidents. A high proportion of these incidents related to invasion of one's personal space, predominantly over seating arrangements (30%), and territory, including attempts to invade one's private living area.

Residents demonstrated very limited capacity to tolerate disruptive behaviour by other residents such as noise: questioning, shouting, burping, sneezing, coughing etc., particularly in crowded rooms.



Before

After

Creative Art Co.

A redesign to mitigate wayfinding confusion

Three-quarters of the incidents took place when residents were not participating in an activity, and one-third took place during mealtimes. Caspi concluded that, in many instances, the triggers were clearly situational and therefore potentially modifiable (Caspi, 2010).

There are many critical aspects in which to study RRA, from characteristics of the aggressor and the target, to determining triggers and situational factors and best practice approaches to addressing them.

One common theme is the contribution of environmental factors and this is the focus of this article.

Stimulating and healing environments

In the Netherlands, Karin Dijkstra (2006) looked at what physical environment stimuli turn facilities into healing environments and found it useful to divide the environment into three dimensions:

1. Architectural Features
2. Interior Design Features, and
3. Ambient Features

(1) Architectural Features

- Household/unit size
- Rooms/room sizes/crowdedness
- Spatial layout

Household/unit size

Calkins reports that over the past two decades the size of most nursing units has decreased from 60 beds to households of from 9 to 24 residents. Larger units are associated with poorer resident outcomes, including higher agitation and aggressiveness (Calkins, 2011).

A 1998 U.S. study of 53 Special Care Units (SCU) examined the question of the importance of the physical environment upon agitated behaviours. They found that a large number of features of the physical environment were associated with increased agitation, including large unit size, low light intensity, and poor scores of home likeness. "The finding that larger unit size is associated with higher agitation supports the popular design concept that small units, or the division of large units into smaller functional subunits, will minimize resident agitation" (Sloan, 1998).

Across Canada most Health Authorities are now on side with this concept. Ontario remains an outlier with 32 as the maximum size of units with the result that most facilities in Ontario build to this maximum and continue to experience the highest levels of resident to resident aggression. Further aggravating this issue is Ontario's practice of mandating a high proportion of shared rooms with the basic/standard bedroom housing two residents and many semi-private residents sharing a washroom.

B.C.'s Seniors' Advocate, Isobel Mackenzie, has pointed out that in B.C., only 75% of beds are in dedicated single occupancy rooms: 6456 residents are in shared accommodation. The B.C. Ministry of Health target is to have 95% of seniors in LTC

Rooms/room sizes/crowdedness

in single rooms as per licensing regulations. Mackenzie (2016) stated that "everybody should have their own bed and own bathroom" (Mackenzie, 2016).

A 2007 Connecticut study of Police callouts to nursing homes in response to RRA found that 70% of incidents occurred in common living areas, and 30% took place in a resident room. Assaults were most likely to occur as a result of a conflict situation, often between roommates.

In common areas, 'competition for resources', such as chairs, dining table, TV and staff attention was common. The authors underline a troubling issue: "Failure to protect one resident from the assaultive behaviour of another could be construed as staff neglect if the behaviour is repeated and not addressed" (Lachs, et al., 2007).

Rosen reviewed RRA in 2008 and notes that agitation and difficult behaviours are often the reasons that families place cognitively impaired older adults in long term care facilities. Consequently, when such individuals are congregated together it creates an environment for assaultive behaviour. The incidence of such behaviour in nursing homes is not less than patients in state psychiatric hospitals.

In another study, Rosen used focus groups of residents and staff and found that the most frequent locations for RRA were in the dining room and residents' rooms. The challenges of communal living were largely exacerbated by 74% of residents living in shared rooms.

Even in the common rooms, territorial-

ity was a commonly mentioned trigger with conflicts arising over competition for a preferred chair in a lounge or dining room and disputes over preferences for TV volume, heat, opening and closing windows, shades, and lighting. Cognitively impaired residents had lost coping skills such as sharing resources and compromising (Rosen, et al., March, 2008; August 2008).

Spacial considerations/layout

An Arkansas study utilized perceptions of certified nurses' assistants and found that there are factors within the nursing home environment that may be identified and altered to prevent violence between residents. Again, intrusion into personal space, issues with roommates and taking/touching another resident's possessions scored highest. There were many instances of intrusion near or inside resident rooms in areas that the residents claimed as their "territory".

A common factor was residents searching for a washroom. Incumbents found this particularly aggravating. One man who had been the victim of multiple episodes of RRA was known as "Goldilocks" because he frequently wandered into other residents' rooms and tried out their beds.

Care aids stated that they spent much of their day intervening between residents who lay claim to the same seat in the dining or activities room. Residents who shared rooms often fought over the other's noise, TV, heat, curtains, possessions and whether to leave the door open or closed (Snellgrove, 2013).

(2) Interior Design Features

- Wandering/wayfinding confusion
- Activity areas • Colour & contrast
- Personal space

Wandering/wayfinding confusion

Wandering appears to be a major problem for people with dementia as they search for a way out near exits (*see photo, page 5*), or can't find their own room, or need a wash room, or lose their way looking for an amenity area such as dining or lounge, or try to escape noxious stimulation or crowding, or just pace to relieve boredom.

This wandering becomes a potential conflict situation when a resident inadvertently intrudes into another's personal space or room. Deficits in the Interior

Design contribute to, and exacerbate, this wayfinding confusion.

Activity areas

A 1995 study in the state of Maryland looked at physical and social environmental attributes and found that behaviours, such as pacing, screaming and other strange noises, constant requests for attention, repetitious mannerisms, inappropriate handling of things, and strange movements tended to decrease when participants were involved in structured activities, and that agitated behaviours increased when the person was not involved in any activity. "Social and structured activities are important even for the most demented segment of the nursing home population" (Cohen -Mansfield, 1995).

Colour and contrast

With diminished vision, seniors with dementia have difficulties with low colour contrast, especially with pastels such as blue and lavender. Other vision related problems are with colour discrimination, especially dark green and red.

Depth perception and low lighting can lead to misinterpreting shadows, as can patterns and stripes on flooring. Too many colours together can be distracting.

All of these visual deficiencies can lead to frustration, confusion and agitation (Benbow, CNH, Oct., 2014).

(3) Ambient Features

- Noise • Lighting
- Temperature (heat and cold)

Noise

In 2007, in a Sudbury Extencicare residence, Keith Croteau, 59, was beaten to death by his roommate in a dispute over the volume of the television set in their room. (Mulligan, 2015).

Rosen found that the most frequent trigger in common rooms, such as dining and lounges, was a resident calling out, moaning, screaming or yelling which understandably disturbed other residents and caused a chain reaction, particularly in a critical mass or density. This could generate half an hour of residents yelling at each other to shut up or be punched out (Rosen, August, 2008).

Decreasing noise levels at night helps

improve sleep and lessens agitation in residents (Alessi and Schnelle, 2000).

Lighting

As Sloan found many people with dementia do not fare well with low light: natural age-related deterioration is aggravated by altered sensitivity to environmental conditions due to a reduction of the ability to understand sensory experiences. Many studies have found that ambient light was 50% to 60% lower and task light only 20% to 40% of recommended levels in most nursing homes (Brawley & Noell-Waggoner, 2008).

Light requirements for seniors can be as high as five times greater than for younger people. For those with dementia, shadows and glare increase the difficulty of interpreting the environment and may lead to fear and agitation (Benbow, CNH, Oct. 2013).

Temperature - heat and cold

According to a 2009 study people with dementia have an altered sensitivity to environmental conditions principally indoor climate and may become increasingly reactive and agitated. The authors found that since people with dementia respond on a sensory level rather than on an intellectual level extra attention should be paid to the indoor environment in relation to comfort and problem behaviour (Van Hoof, 2010).

Mitigation strategies

A 1996 study of assaultive behaviour in geriatric patients reported that environmental factors include limited body space and excessive stimuli such as noise, light, temperature and activity level. Violation of territorial space was noted as a contributing factor. Violence prone older persons have a 'body buffer zone' four times larger than those not prone to violence. (A body buffer zone refers to the distance a person likes to keep between himself/herself and other people). The baseline for interventions is to provide a quiet and non-crowded environment (Chou, 1996).

A B.C. study sponsored by the Workers' Compensation Board of B.C. in 2004 noted several environmental changes to a Vancouver facility which resulted in a considerable reduction in incidents of aggression:

- the dining room was renovated and gates removed to allow easier all-day access, thereby eliminating queues and congestion

as residents no longer had to line up and jostle for position;

- the TV was moved farther away from the dining room for noise control;
- bathrooms were made more accessible;
- a Smoking Room was cleared of redundant furniture to reduce crowding (Boyd, 2004).

Personal space

As early as 1990, U.S. researchers Negley and Manley raised the question of personal space and crowdedness. They referenced norms of tolerated interactional distances: 0 to 18 inches as intimate; 18 to 48 inches as personal; 48 to 144 inches as social, and more than this as public. Violation of these norms can result in turf or territory defence.

In studying units at a veterans' medical centre, they noted that the highest RRA was on an upper floor of a 47-bed dementia unit. The assaults clustered around mealtimes when residents were going to or coming from the ground floor dining room and had to use crowded elevators and congested hallways.

The authors noted that dementia residents did not exhibit normal elevator behaviour, i.e., looking forward and avoiding eye contact. Unless turned by staff, they would stand face-to-face with other residents. When crowded they would push, shove and slap at each other.

The facility layout was changed so that two Day Rooms on the Dementia Unit were used for dining. Residents were no longer herded to the ground floor three times/day for meals, and assaults decreased 47.5%.

The researchers further noted that separating the higher functioning from the lower functioning residents into two distinct dining areas served to decrease aggressor/victim interaction which contributed to a dramatic decrease in assaults.

The authors underline the importance of care staff being sensitized to the issue of territoriality and intervening before a resident intrudes on another's space (Negley and Manley, 1990).

Private rooms

Karl Pillemer, recommends the need for environmental interventions to reduce RRA. He argues that RRA is an outcome of a poor fit between the abilities of the person with dementia and the physical

Resident-to-Resident Aggression

Contributing factors: causes and triggers

Factors in physical environment

Noise	Inadequate lighting/glare
Crowdedness	Too cold or hot
Lack of privacy/Private away areas	Indoor confinement
Inadequate landmarks/signage	TV/radio
Hallways (too narrow; 'deadends')	Elevators

Situational causes and triggers

Frustration	Repetitive speech
Boredom	Competition for resources
Invasion of personal space	Unwanted entry into bedroom
Seating arrangement	Conflicts by/with roommates
Intolerance of another's behaviour	Racial/ethnic comments/slurs

Eilon Caspi, Ph.D. - 'Preventing Resident-to-Resident Aggression in Dementia,' Toronto, 2014.

and social environment.

Pillemer identified major forms of RRA to be invasion of privacy or personal integrity: incursion on personal space, invasion of room privacy, and clearing a way through congestion.

Roommate problems were high, as were arguments over disruptive behaviour in common areas. "For a resident with general agitation or hostility, a roommate can become a convenient target of aggression." Disputes were often over a radio or TV too loud, opening/closing a window, turning lights on or off, rummaging in one's drawers, and middle of the night disturbances.

Pillemer and colleagues also recommend environmental modifications to reduce crowding, mitigate congestion of wheelchairs, and utilize non-restraining barriers to unwanted entry of rooms. Specifically, they raise the question of private versus shared rooms (Pillemer, et al., 2012).

Morgan and Stewart, in a Saskatchewan study, compared multiple occupancy to private rooms on dementia care units. Forty-six residents moved from an older structure with shared rooms to a less crowded new building with all private rooms. The authors studied the effect of increased privacy and decreased density. They were interested in social density (the number of persons in a given amount of space) and spatial density (the amount of space per person). They defined crowding as a subjective response to high density, and privacy as a way to control unwanted interaction.

They found that after residents moved to private rooms they spent more time in their rooms during the day and slept much bet-

ter at night. With more space per person and fewer persons in the unit, public spaces were much less congested.

The Old Unit had been crowded and noisy with high levels of stimulation. In the New Unit, residents were much less agitated as they had options for escape from disturbing noise and disruptive behaviour. Both staff and family stated that the private rooms resulted in a major reduction in irritability and conflict between residents. "I think there's less fighting really (on the new unit), because, as was said, there's not so much stimulus there; there's not so much jostling and bumping and trying to find space, and they have their own rooms" (Morgan, et al., 1998).

John Zeisel has extensively researched Environmental Correlates to behaviour in Alzheimer residents. His 2003 study of 15 special care units found that residents in facilities with more privacy and more opportunities for personalization generally scored lower on anxiety and aggression scales. Other positive factors were residential/homelike features and an ambient environment that residents can understand (Zeisel, et al., 2003).

Crowding and privacy

Roger Ulrich and colleagues, in a 2012 Swedish study, looked at crowding in psychiatric wards. Crowding is related to inadequacies in the configuration of the physical environment that constrain a person's ability to find privacy and avoid stressors such as noise and arguments.

The best mitigation of crowding is single resident rooms with private bathrooms.

smaller resident group size (12 to 18), movable seating in spacious lounges and activity rooms, low noise, nature window views, garden access, nature art (no abstract art), daylight exposure, good staff sight lines, homelike qualities and easy wayfinding.

Providing single resident bedrooms is the most important design intervention for reducing stress and aggression.

Dayrooms and other shared areas should be spacious enough to enable residents to regulate their personal space when others are in the room (Ulrich, et al., 2012). However, a Director of Care has pointed out that smaller units can be difficult to staff adequately. Household size, both in terms of number of residents and area, needs to be adjusted to staffing realities.

In addition to privacy, the amount of space provided to a resident is critical to minimize crowding; the *Benbow Best Practice Design Guideline (BPDG)* commends all private rooms and recommends a minimum of 16 square metres of use-

able space for each private resident room - exclusive of the ensuite and vestibule and closet. This is difficult to achieve with less than an overall allocation of 23 to 25 square metres. In addition, the *Benbow BP Design Guideline* recommends six to seven square metres per resident of amenity space (dining, lounge and activity) within each Household (Benbow, BPDG, 2014).

Meaningful activities

Professor Elion Caspi found that most episodes of RRA occurred during downtime compared to when residents were engaged in meaningful activity - mainly between 2:00 p.m. - 8:00 p.m., that time interval when many residents with dementia become restless, irritable or anxious.

In Caspi's study, 72% of RRA episodes took place when residents were not involved in activities. He quotes Dr. Paul Raia, developer of *Habilitation Therapy*: "Activities are the main weapon against behaviour difficulties and violent behavior;"

and, "A wise lawyer will first approach the activity director and ask, 'How did you engage the resident in a way that would have prevented the violence/injury against my client?'" (Caspi, 2014; Raia, 2011).

Rosen lists several activities that have been suggested in the literature as possible interventions such as aromatherapy, music therapy, psychomotor/game therapy, pet therapy, and art therapy (Rosen, 2016).

Landscape Art and Interactive Art can be calming and engaging as well. See: (www.creativeartco.com).

One manager of a model dementia unit in B.C. told this author that it is quite difficult to find activity workers who are trained, knowledgeable and experienced in working with dementia residents.

Another manager pointed out that current funding levels do not permit the qualification level of activity staff that is needed to provide adequate activity - especially in smaller units. She agrees that, ideally, activity should be provided 6 to 7 days per week, but this is not possible given available resources.

One solution is to provide Meaningful Activity nodes throughout the Household, with appropriate seating to encourage self-initiated engagement and counteract boredom (Benbow, CNH; Dec., 2014).

Another suggestion is to provide shelves, dressers and trunks in corridors filled with hats, scarves and small household items that residents can rummage through, interact with and carry from place to place. Staff buy-in is essential since it is up to them to return items to their storage place.

Wandering, wayfinding and mitigating intrusions

Caspi recommends a '*Vigil Dementia System*' which provides an alert when a resident enters another's bedroom; such technology can be built into the floor or doorway of resident rooms.

Recent developments in WiFi-based Real-Time Location Systems (RTLs), based on resident and staff badges, have made it possible to monitor and track residents and receive alerts when they approach or enter "restricted zones". In addition, a 'duress' call function is critical to allow staff to alert other staff that they need assistance.

Older facilities may not have adequate WiFi to support these newer technologies;



A warm inviting ambiance is achieved for residents with a painted-on-the-wall fireplace, and four landscape paintings that will never fall down. Below: Magnetic activity boards to provide activities to divert residents, thereby preventing resident-to resident aggression.

DOUBLE SIDED, FREE STANDING MAGNET ACTIVITY



but even old technology can be useful.

One manager reported that her facility curtailed a resident's sexual assaultive behaviour by fastening a door bell to the resident's bedroom door so that staff would be alerted whenever he went on the prowl. This quickly stopped the behaviour.

Shinoda-Tagawa in a 2004 study of data from Massachusetts noted that wandering was strongly associated with injuries – most likely due to residents putting themselves in harms way by wandering into another resident's personal space or room. Effective interventions here include soft barriers such as Velcro nets or 'wandering strips' like bright yellow bands of heavy rubberized fabric fastened to the door frame with strong magnets sewn into each side. Symbols such as stop signs in door-ways can help as well (Shinoda-Tagawa, 2004).

Wandering 'pathways'

Snellgrove suggests providing wanderers with safe wandering paths away from resident rooms and allowing adequate space in which residents may move around and escape from noise – and provision of adequate clothing for cold-sensitive residents and fans for hot-natured residents (Snellgrove, 2013).

Namazi and Johnson reported that ensuring free access to a secure outdoor areas decreased residents' agitated behaviours (Namazi and Johnson, 1992).

Modifying older facilities

Cutler and Kane espouse the premise that private spaces and barriers are two attributes of the physical environment in nursing homes that have the potential to significantly reduce intrusion into the personal space of residents.

Based on data drawn from 131 nursing units in 40 nursing homes, they recommend ways to modify older, shared rooms to achieve maximal personalized privacy. They stress the importance of minimally identifying the sleeping space and private social space of each resident by dividing shared rooms into two distinct resident areas. If a floor-to-ceiling dividing wall is not possible, room dividers could be armoires or moveable closets, with wall coverings identifying each area as discrete. One resident may lose a window vista, but gain a corridor view.

Barriers to decrease incursions into personal space are also discussed, such as folding or mesh baby gates or mesh fabric secured by Velcro strips to door frames.

An intriguing feature is the use of Dutch Doors with inside latches which allow residents to watch activity in the corridor while preventing intrusion. They caution that such minimal barriers will not exclude all unwanted intruders (Cutler and Kane, 2002).

Note also that for fire rating, Dutch Doors will require that the upper door have an astragal, bevel, or rabbit on the pull side so that pushing the upper portion closed forces the lower portion closed as well.

The Province of B.C. is experimenting with rooms that are equipped with locks, like a bathroom privacy lock that allows residents to leave, but prevents unwanted people from entering without a key when the resident is inside.

Wayfinding difficulties exacerbate wandering and lead many residents to enter other residents' bedrooms while looking for their own room or a washroom. There are many architectural ways to address this deficit in dementia residents such as Small Households, short corridors, direct visual access to destinations, simple layout with limited changes in direction, built in landmarks, rooms with self-evident function such as a fireplace in lounges and servery counter in dining rooms, and co-locating amenities in the core of the Household.

There are a number of Interior Design features capable of addressing Wayfinding Deficits such as resident's name and photo on the bedroom door, personal memorabilia in memory boxes and in resident's room, individually designed and coloured bedroom doors, graphics to identify and lead to visibly accessible wash rooms, large lettering on signs with good contrast, decorative landmarks for every room, distinctive décor for each functional room, interactive murals, camouflaged exits and service doors and, reduced floor patterns and lines (Benbow, CNH, March, 2013).

Noise mitigation

Salonen and colleagues, in a 2013 review of 'indoor environment literature' noted that noise is one of the features of the ambient environment that residents complain about most frequently.

Reducing noise levels by using noise-

reducing finishes such as sound-absorbing ceiling tiles, single-bed resident rooms, and short corridors reduce annoyance, stress, confusion, headaches, exhaustion and disorientation (Salonen, et al., 2013).

A recent UK study looked at staff and relatives' perspectives on aggressive behaviour in residential care gave the example of one unit that was redesigned to incorporate a Quiet Room. This had a positive effect: the level of aggression came down with the opportunity to sit quietly away from the hubbub of noise and crowdedness (Duxbury, et al., 2013).

Cohen-Mansfield and Werner found that, when soft music was present in the environment, agitated behaviours decreased.

It was also found that residents' challenging behaviours were affected by sensitivity to temperature variations such as feeling too hot or too cold. Also requests for attention and aggressive behaviours increased when there were high levels of noise. They concluded that aggressive behaviours may be a response to noxious stimuli such as invasion of personal space or privacy, or an uncomfortable environment. The challenge is to correctly interpret the agitated behaviour and, like a detective, determine the causation and best treatment approach. (Cohen-Mansfield and Werner, 1995).

Seating

Seating should be flexible, arranged in sociable nodes, and movable to allow residents to move away from noises and other disturbances (Ulrich, et al., 2012).

A 1992 study of an Alzheimer home in the state of Maine found that reductions in noise and activity level during a "quiet week" reduced the number of observed frantic/violent behaviour incidents from 38 to 19. During the 'quiet week' there was no television, radio, stereo, piano, and staff used only quiet voices, avoided moving quickly in resident areas and reduced use of telephones.

The public entrance to the unit was relocated from the central foyer to a side door out of sight of the residents.

A video camera was used to gather data of sample time periods for analysis. They concluded that "alterations in staff behavior and facility design can influence agitation levels of Alzheimer patients."

The study also noted that, for some resi-

dents, there was a definite pattern of morning and afternoon agitated periods. They subsequently used this information to identify residents who should be redirected away from noisy activities (Meyer, et al., 1992).

Indoor climate

Some mitigating measures for the indoor climate include solar shades to limit over-heating in summer and operable windows for ventilation. Bathrooms especially need to be kept comfortably warm since residents with dementia may be unable to express their discomfort other than with agitated behaviour. Ceiling heat lamps on timers is one solution, as is adequate ventilation.

Radiant floor heating (also called under-floor heating) can be very effective and safe. Non-slip, cushioned, low glare vinyl on a bathroom floor is recommended. Bedrooms need to be thermally comfortable as nocturnal unrest can be the result of being too cold or too warm (Van Hoof, et al., 2010).

Increased lighting

Dr. Paul Raia believes that the single most important adaptation to an environment is enhanced lighting, i.e., increasing from 320 lux to 750 lux and controlling the glare. This will reduce late afternoon and early evening agitation.

Raia maintains that caregivers must be sensitive to the ongoing need to modify things in the environment - bright lights and glare, mirrors, plants, noisy equipment, etc. By manipulating the environment caregivers can learn to manage reactive behaviors (Raia, P., *Habilitation Therapy*, Ch. 2).

Hanford and Figueiro studied the effect of light on circadian rhythm and concluded that bright light does appear to be a treatment possibility for aggressive behaviour in persons with dementia; they recommend consideration of a 24-hour lighting scheme that is sensitive to natural lighting rhythms (Hanford and Figueiro, 2013).

Staff training & skills

Of course, staff training is one of the key components to making staff more sensitive to the possibilities of environmental intervention. Northcrest Care Centre in Delta, B.C. has reduced the use of anti-psychotic medications from 40% to 16% by ensuring the environment is appropriate and that

staff are aware of preventive measures. Director of Care, Gloria Hunter, indicates that they have found it especially helpful to identify residents with aggressive tendencies by placing a purple butterfly on their chart and door of their room so that anyone approaching knows to be wary.

Charts for aggressive residents detail triggers for that particular resident such as becoming agitated in a noisy room or being upset if their personal space is broached. (Pemberton, January 18, 2016).

The Director of Care for Kiwanis Pavilion in Victoria, B.C., Fiona Sudbury, has pointed out that Worksafe B.C. and Accreditation Canada both require that facilities have systems for alerting staff and volunteers of residents with potential for aggression. She uses red-yellow-green door signs to indicate that caution is needed. However, she also indicates that direct care staffing levels are a major contributor to incident prevention, particularly in smaller units. In Europe, with its history of smaller Households, she has seen 5:1 direct care staffing levels (i.e., Sweden), a scenario that is just not possible in Canada given its current funding levels. (Personal Communication, Fiona Sudbury; March, 2016).

Evidence is growing that resident-to-resident aggression is widespread in dementia units and that environmental factors can be manipulated to mitigate this aggression. Failure to address this issue raises the question of liability for health authorities and facilities - particularly where a resident is forced to share a room with a resident known to be aggressive.

Lynn McDonald, in her review of resident-to-resident abuse across Canada, concluded that there is a dearth of guidelines and recommendations available for LTC homes - for example, guidelines pertaining to crowding and space configuration.

In 2015, McDonald co-ordinated a consensus-building workshop of researchers that recommended research priorities for RRA. High on the list was the "identification of environmental factors triggering RRA" and "developing/assessing RRA environmental interventions."

One of this workshop's most tantalizing suggestion was to obtain input from Interior Designers and Architects who have experience and expertise in the field, particularly on optimal ways of configuring space

for this population (McDonald, et al., 2015).

Concluding remarks

It is the author's hope that the list of environmental triggers discussed are sufficiently comprehensive, and that the mitigation strategies outlined are of value. However, as a colleague from Australia pointed out, "... although improving the physical environment is important, it can't be done in isolation. Staff understanding and skills in assessing and managing unmet needs of people with dementia (including communication, empathy and engagement skills), timely and effective pain management and information sharing and working collaboratively with all stakeholders (including family, specialist/consultative services) needs to be incorporated. A perfect physical environment will not make up for these shortfalls." (Personal Communication, Dannielle McIntosh, Hammond Care Australia; April, 2016).

This paper has provided evidence-based research to support specific environmental mitigation such as smaller households; private rooms for residents to remove roommate squabbles; adequate space in common areas such as dining, lounge and activity rooms to reduce crowding; adequate lighting; flexible and sufficient seating arrangements to reduce competition; appropriate wayfinding cues and landmarks to assist residents in finding their own rooms and washrooms; lowered noise and noxious stimulation; sensitivity to indoor climate and activity nodes such as interactive art and rummaging opportunities. All of these factors can facilitate a calming environment and demonstrate a willingness to alleviate and prevent resident-to-resident aggression.

The author welcomes suggestions for environmental interventions that can prevent resident-to-resident aggression.

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