

Deaths from Resident-to-Resident Aggression in Australian Nursing Homes

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OBJECTIVES: To describe the frequency and nature of deaths from resident-to-resident aggression (RRA) in nursing homes in Australia.

DESIGN: National population-based retrospective cohort study.

SETTING: Accredited nursing homes in Australia.

PARTICIPANTS: Residents whose deaths resulted from RRA and were reported to the coroner between July 1, 2000, and December 31, 2013.

MEASUREMENTS: Cases were identified using the National Coronial Information System, and data on individual, interpersonal, organizational, and societal factors were collected through review of the paper-based coroners' files.

RESULTS: This research identified 28 deaths from RRA over a 14-year study period (0.004 per 100,000 bed days). Most exhibitors of aggression were male ($n = 24$, 85.7%), and risk of death from RRA was twice as high for male as for female nursing home residents (relative risk (RR) = 2.13, 95% confidence interval (CI) = 0.93–4.80, $P = .05$). Almost 90% of residents involved in RRA had a diagnosis of dementia, and three-quarters had a history of behavioral problems, including wandering and aggression. Dyad analysis showed that exhibitors of aggression were often younger and more recently admitted to the nursing home than targets. RRA incidents commonly occurred in communal areas and during the afternoon and involved a "push and fall." Seven (25%) RRA deaths had a coronial inquest; criminal charges were rarely filed.

CONCLUSION: This is the first national study in Australia, and the largest internationally, to examine RRA deaths using medicolegal data. This generates hypotheses for future research on the effect of environmental and organizational factors on the frequency and preventability of RRA. *J Am Geriatr Soc* 2017.

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Resident-to-resident aggression (RRA) in nursing homes is an emergent public health concern.¹ It is defined as "negative, aggressive and intrusive verbal, physical, sexual, and material interactions between long-term care residents that in a community setting would likely be unwelcome and potentially cause physical or psychological distress or harm to the recipient".¹

Aggression is a common behavioral and psychological symptom of dementia (BPSD), although its exact prevalence remains unknown, with significant variation in estimates.² The number of people diagnosed with dementia will almost triple from 46 million in 2015 to more than 100 million by 2050,³ posing a significant public health problem.⁴ This trend is magnified in the nursing home population, with 50% of residents in Australia⁵ and the United States⁶ diagnosed with dementia. It is estimated at least 20% of nursing home residents exhibit aggressive behavior.⁷ Resident aggression toward caregivers and staff is a workplace health and safety hazard.⁸ It is even more dangerous when directed toward other residents (RRA), because of their heightened vulnerability to injury and death.^{9,10}

The prevalence of RRA has been estimated as affecting 20.2% (95% confidence interval (CI) = 18.1–22.5) of nursing home residents in the United States.¹¹ A recent systematic review on physical RRA leading to injury identified 18 relevant studies,¹² 13 of which were conducted in the United States and none in Australia. The review found that RRA often occurs between exhibitors (residents who exhibit aggressive behavior) with high levels of cognitive awareness and physical functionality and a history of aggression^{13,14} and female targets (residents to whom the aggressive behavior is directed) with cognitive impairment and a history of wandering.^{13–16} RRA also commonly takes place in the afternoon in communal areas^{13,17} and is often unprovoked^{15,17} or triggered by communication problems and perceived invasion of space.^{13,18,19}

Studies rarely considered organizational factors (e.g., facility size, care level), interventions, or outcomes of RRA; only one death from RRA was reported across 18 studies.²⁰ In response to the paucity of knowledge, a recent editorial citing 40 deaths from RRA using international media reports called for more empirical research on the topic.²¹

In Australia, there is no centralized collection of data on RRA incidents with detailed information on individuals involved (staff or residents), outcomes and responses, or the circumstances surrounding the incident.²² Australia does however have a national death reporting system that collects medicolegal data on all deaths required to be reported to the coroner, including from RRA. This provides a unique opportunity to address the gap in international literature by contributing empirical data on the most-severe outcome of RRA.

This is the first national study to describe the frequency and nature of deaths from RRA in nursing homes in Australia using existing medicolegal information—a valuable data source for public health research.²³ This research aims to describe the epidemiology of deaths from RRA in Australian nursing homes (2000–13) and analyze the relationships between RRA exhibitors and targets.

METHODS

Study Design

This national retrospective cohort study of deaths from RRA in nursing home residents in Australia was conducted and reported in accordance with guidelines for Reporting of studies Conducted using Observational Routinely-collected Data.²⁴

Subjects and Setting

Subjects were residents of accredited nursing homes in Australia who died from injuries sustained in RRA incidents and whose deaths were reported to the coroner (2000–13). During the study period, Australia's population increased from 19 million to 23 million, with older adults aged 65 and older making up 12.3% of the population in 2000 and 14.4% in 2013.^{25,26} In 2000, there were approximately 140,000 older adults living in approximately 2,900 accredited nursing homes.²⁷ In 2013, there were approximately 180,000 older adults living in approximately 2,700 accredited nursing homes.²⁸

Case Identification

Cases were identified through a search of the National Coronial Information System (NCIS), an Internet-based data storage and retrieval system of information generated for coroners' investigations (www.ncis.org.au). The researchers searched for all deaths in which the incident location was classified as a nursing home; home for elderly adults or retirement village; hospice, palliative, or respite care; or residential care facility, and the coroners' investigation was completed as of December 31, 2013. NCIS staff provided a unit record data extract of the search results.

Inclusion Criteria

Cases were included if the incident occurred in an accredited nursing home, the deceased was a permanent or temporary resident at the time of the incident, and the death was determined to be the result of RRA. To determine the first two criteria, a database of nursing homes accredited by the Australian Aged Care Quality Agency was compiled from annual lists that the Australian Government Department of Health publishes online (and archives) (www.agedcare.health.gov.au). This was used to link the street address of the incident location for the death to the street address of an accredited nursing home to confirm the first two criteria. The final criterion was fulfilled if the "intent" field in NCIS was coded as assault and the "perpetrator" was identified as another resident of the same facility or it was determined that the death occurred proximate to an RRA incident after manual review of documents attached to NCIS.

Data Collection

The NCIS contains a record of each death including sociodemographic information about the deceased, cause of death, and details of the coroner's investigation.²⁹ Data collected directly from the NCIS were supplemented with more-detailed information on the circumstances of the death obtained from the paper-based coronial record. Information contained in the coronial record included police report, witness statements (from family members, nursing home staff, or treating health care professionals), medical or nursing notes (where available), autopsy report, toxicology report, and coroners' finding. Variables for collection were derived from findings of a systematic literature review¹² and informed by the Socio-Ecological Model (SEM) for violence prevention.³⁰ The SEM is a theory-based framework that advocates for collection and analysis of information at the individual, interpersonal, incident, organizational, and societal level to identify opportunities for health promotion and injury prevention at each level.^{30,31} A single researcher (BM) manually reviewed the coronial record at each state and territory Coroner's Office to collect data on individual and interpersonal variables for targets and exhibitors (including demographic, physical, mental, and behavioral factors), incident variables (including date, time, and location), organizational variables of the nursing home, and societal variables (details of the medico-legal investigation). Data items were entered into an Excel spread sheet (Microsoft Corp., Redmond, WA) prepopulated with information from the NCIS then exported into SPSS version 22 (IBM Corp., Armonk, NY) for analysis.

Data Analysis

Incidence rates per 100,000 bed days (residential care places over the study period) and rate ratios (RRs) were calculated using resident population data.³² Univariate and bivariate descriptive statistical analyses were performed on variables related to targets and exhibitors (individually and as dyads), circumstances of the death, and coroners' investigation. All normally distributed data were measured

using means and standard deviation (SDs), and nonnormally distributed data were measured using medians and interquartile ranges (IQRs). Mean differences in age and duration of residence were calculated using paired-samples *t*-tests. The McNemar test was used to determine whether there was a significant difference in distribution of sex between targets and exhibitors. Results were considered significant at $P \leq .05$.

Ethics

The Victorian Institute of Forensic Medicine Research Advisory Committee (RAC014–14) and the Department of Justice Human Research Ethics Committee (CF/14/17569) approved this study, which was registered with the Monash University Human Research Ethics Committee (CF15/157–2015000077).

RESULTS

Overview

During the 14-year study period, 28 deaths from RRA were identified, at a rate of 0.004 per 100,000 bed days (Table 1). A median of two deaths (IQR 1–2) occurred per year, involving 56 residents (28 exhibitors, 28 targets) (Table 2).

Individual and Interpersonal Factors (Exhibitor-Target Dyad)

Sex

Risk of death from RRA was twice as high for male as female nursing home residents (RR = 2.13, 95% CI = 0.93–4.80, $P = .05$). Of the 56 residents involved in RRA incidents, most male ($n = 37$, 66%); most of the 28 exhibitors of aggression were male ($n = 24$, 85.7%), whereas most of the 28 targets were female ($n = 15$, 53.6%). There was a significant difference in the distribution of sex between targets and exhibitors (McNemar chi-square = 12.0, $P = .001$). Examining exhibitor-target dyads (Figure 1) shows that there were a similar number of male ($n = 13$) and female ($n = 12$ to 15) targets, yet

100% of incidents involving a male target also involved a male exhibitor.

Age

There was no significant difference in risk of death from RRA based on resident age (Table 1). The age of residents involved in fatal RRA incidents ranged from 54 to 98 (mean 81.5 ± 9.2). Targets (mean age 84.3 ± 7.9) were older than exhibitors (mean age 78.2 ± 9.5), with a mean difference of 6.1 years ($t(23) = 3.31$, 95% CI = 2.30–9.95, $P = .003$).

Mental health

Almost 90% of residents involved in RRA incidents had a diagnosis of dementia, with the same proportion for exhibitors ($n = 25$, 89.3%) and targets ($n = 25$, 89.3%). Eight exhibitors had a diagnosis of schizophrenia (28.6%), and seven targets had a diagnosis of depression (25.0%).

History of Behavioral Problems

A history of behavioral problems was common in targets ($n = 22$, 78.6%) and exhibitors ($n = 21$, 75.0%). More exhibitors had a history of aggression ($n = 19$, 67.9%), and wandering behaviors ($n = 17$, 60.7%), than targets ($n = 15$, 53.6% and $n = 14$, 50.0%, respectively). Other behavioral problems such as verbal outbursts and disinhibited sexual behavior were also common in targets ($n = 14$, 50.0%) and exhibitors ($n = 12$, 42.9%). In 64.3% of RRA incidents, exhibitors and targets had a history of behavioral problems (Figure 1). Nine exhibitor-target dyads (32.1%) had been involved in at least one prior incident together in the last 12 months.

Duration of Residence

Duration of residence of those involved in fatal RRA incidents was positively skewed, with a median duration of 9.5 months (IQR 2–24). The difference in median duration of residence between targets (14.3 months, IQR 2.2–32.9) and exhibitors (9.3 months, IQR 3.0–19.2) was not significant ($t(20) = 0.99$, 95% CI = -5.17–14.52, $P = .33$). Although equal proportions of targets ($n = 15$, 53.6%) and exhibitors ($n = 15$, 53.6%) had resided in the nursing

Table 1. Resident-to-Resident Aggression (RRA) Deaths Nursing Homes in Australia, According to Sex and Age

Factor	Nursing Homes				
	RRA Deaths, n (%)	Occupied Bed Days (2000–13)	Rate of Death from RRA	Rate Ratio (95% Confidence Interval)	P-Value
Sex					
Female	15 (53.6)	556,779,178	0.003	1.00	
Male	13 (46.4)	226,320,601	0.006	2.13 (0.93–4.80)	.05
Age					
<65	1 (3.6)	30,612,564	0.003	0.89 (0.02–6.39)	>.99
65–74	2 (7.1)	67,696,739	0.003	0.80 (0.08–3.87)	.83
75–84	9 (32.1)	243,783,973	0.004	1.00	
85–94	14 (50.0)	371,946,079	0.004	1.02 (0.41–2.67)	.98
≥95	2 (7.1)	69,060,424	0.003	0.79 (0.08–3.79)	.81
Total	28 (100.0)	783,099,779	0.004		

Table 2. Individual Characteristics of Targets and Exhibitors of Resident-to-Resident Aggression

Characteristic	Target	Exhibitor
	n (%)	
Sex		
Female	15 (53.6)	4 (14.3)
Male	13 (46.4)	24 (85.7)
Age		
<65	1 (3.6)	1 (3.6)
65–74	2 (7.1)	5 (17.9)
75–84	9 (32.1)	12 (42.9)
85–94	14 (50.0)	6 (21.4)
≥95	2 (7.1)	
Unlikely to be known		4 (14.3)
Mental health disorder^a		
Organic disorder (including dementia)	25 (89.3)	25 (89.3)
Mood disorder (including depression)	7 (25.0)	6 (21.4)
Other	6 (21.4)	15 (53.6)
None	2 (7.1)	1 (3.6)
History of behavioral problems^b		
Aggression	15 (53.6)	19 (67.9)
Wandering	14 (50.0)	17 (60.7)
Other	14 (50.0)	12 (42.9)
None	3 (10.7)	2 (7.1)
Prior incidents involving target or exhibitor		
Between target and exhibitor	9 (32.1)	9 (32.1)
Between target or exhibitor and other residents	10 (35.7)	13 (46.4)
Between target or exhibitor and staff	6 (21.4)	11 (39.3)
None	8 (28.6)	7 (25.0)
Unlikely to be known	4 (14.3)	4 (14.3)
Physical health problems^c		
Circulatory system	19 (67.9)	11 (39.3)
Musculoskeletal system	16 (57.1)	4 (14.3)
Genitourinary system	13 (46.4)	7 (25.0)
Respiratory system	10 (35.7)	
Digestive system	9 (32.1)	2 (7.1)
Other	16 (57.1)	9 (32.1)
Physical impairments		
Visual	7 (25.0)	5 (17.9)
Hearing	5 (17.9)	3 (10.7)
Speech	4 (14.3)	1 (3.6)
Mobility	12 (42.9)	4 (14.3)

^aSchizophrenia and delusional disorders, substance use-related disorders, neurotic and stress-related disorders, personality disorders.

^bSexual disinhibition; racial outbursts; resistance to care; intrusive or territorial behaviors. History of behavioral problems could not be determined for exhibitors in five cases (17.9%) and for targets in three cases (10.7%).

^cEndocrine, nutritional, and metabolic diseases; neoplasms; diseases of the nervous system; diseases of the skin and subcutaneous tissue; certain infectious and parasitic diseases. Physical health diagnoses could not be determined for exhibitors in 11 cases (39.2%) and for the target in one case (3.6%).

home for less than 12 months, analysis of the exhibitor-target dyad revealed that in almost one third of incidents ($n = 9$, 32.1%), the exhibitor had resided there for less than 12 months and the target for longer than 12 months.

Incident Factors

Half of all RRA incidents leading to death involved a “push and fall” type assault ($n = 14$, 50.0%) (Table 3). Common primary injuries that targets sustained included head injury

($n = 11$, 39.3%) and hip fracture ($n = 6$, 21.4%). Twenty-three targets (82.1%) were transferred to the hospital within 24 hours of the incident, where half died within 1 week without returning to the nursing home ($n = 14$). Half of all RRA incidents involved an unintentional target³³ ($n = 14$), and six (21.4%) involved a target who exhibited antagonistic behavior. A staff member often witnessed incidents ($n = 18$, 64.3%), and one was captured on security footage. RRA commonly occurred in communal areas such as corridors ($n = 10$, 35.7%) or shared living and dining areas ($n = 7$, 25.0%) and during the afternoon nursing shift from 2:00 p.m. to 10:00 p.m. ($n = 14$, 50.0%).

Organizational Factors

Proportionally, RRA incidents most commonly took place in large facilities with 60 or more beds ($n = 18$, 64.3%) offering high and low care services ($n = 16$, 57.1%) and located in metropolitan areas ($n = 21$, 75.0%), although there were no significant differences in rates according to nursing home type (Appendix S1), so the results are inconclusive.

Societal Factors (Medicolegal Death Investigation)

Medicolegal death investigation of RRA deaths (Appendix S2) included a full autopsy (including internal examination) in 21 cases (75%) and toxicological analysis in 16 (57.1%). An inquest (formal public hearing) into the death was held in seven cases (25.0%), and coroners' recommendations were made in three cases (10.7%). Criminal charges were filed in only two cases (7.1%), and in both instances, the accused died before court proceedings began. Reasons criminal charges were not filed in 23 cases (82.1%) and were often not specified ($n = 14$, 60.9%) or included that the exhibitor was deemed unfit for police interview ($n = 4$, 17.4%) or not in the public interest to prosecute ($n = 3$, 13.0%).

DISCUSSION

Summary of Findings

This national study identified 28 deaths from RRA reported to the coroner over a 14-year period. This is the largest cohort of RRA deaths examined using medicolegal data published in the research literature. RRA is estimated to affect at least 20%^{11,34} of nursing home residents, but little is known about its outcomes. This research provides foundational information on the most-severe outcome of RRA: death. Lessons learned from this data can be applied to preventing fatal and nonfatal incidents.

A greater proportion of male residents was involved in RRA incidents in this study (66.1%) than in an earlier U.S. study that found that only 30% of residents involved in RRA were male.¹⁷ This is probably because of the difference in outcomes measured (deaths and police reports), because the proportion of male residents in the studies was similar (38% Australia, 41% United States). Risk of death from RRA was found to be twice as high for male as female nursing home residents.

As anticipated, there was a high prevalence of dementia among residents involved in a fatal RRA incident

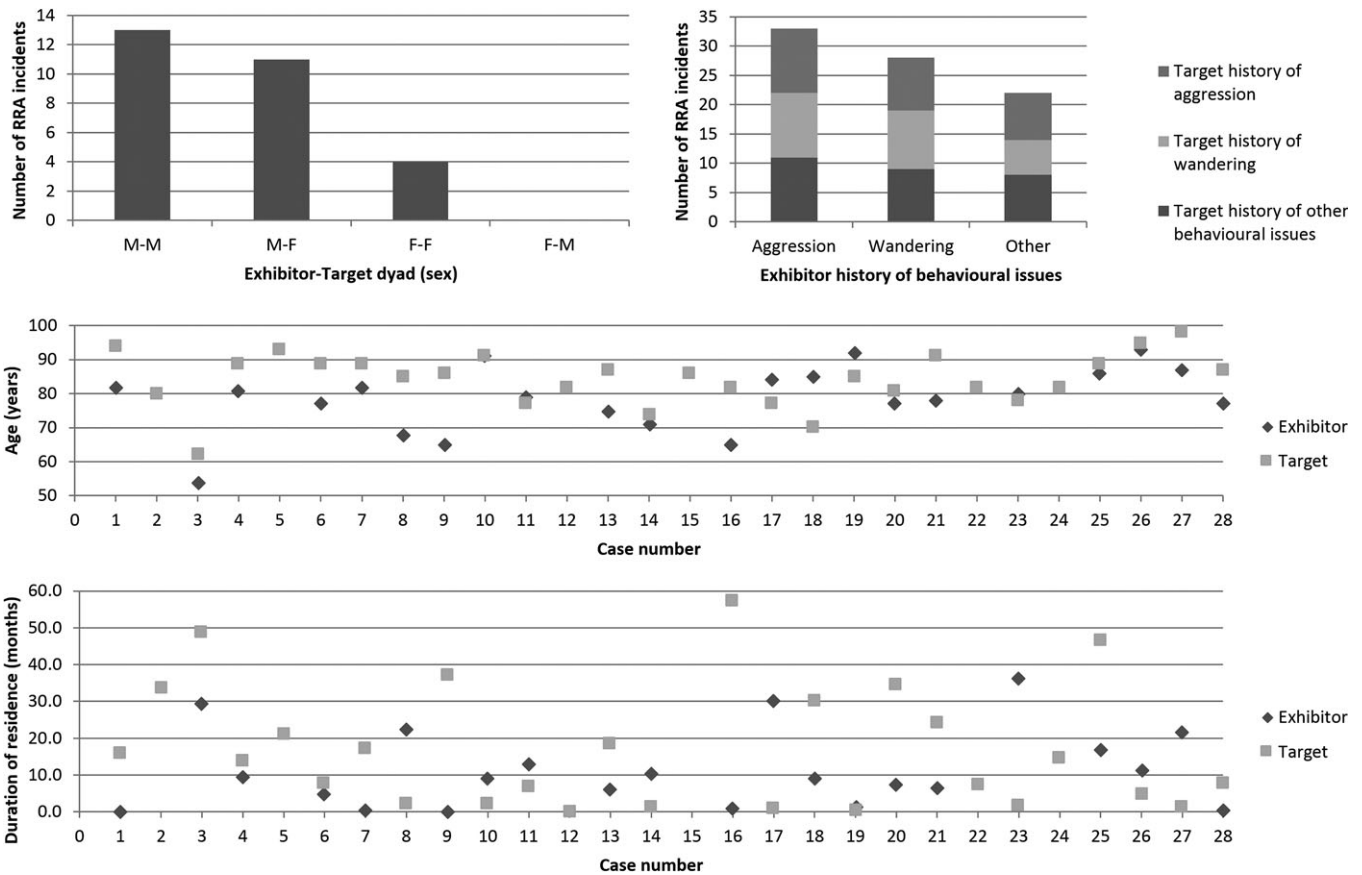


Figure 1. Interpersonal factors for resident-to-resident aggression (exhibitor-target dyads). *Information was not available in some cases for exhibitor age (n = 7); exhibitor duration of residence (n = 6); and target duration of residence (n = 1).

(~90%) and much greater than those involved in nonfatal incidents (50–75%).^{17,35} Somewhat surprisingly, more than one-quarter of exhibitors had a diagnosis of schizophrenia. This is troubling given the rising prevalence of mental health problems, including dementia and schizophrenia, in the nursing home population.³⁶ Without intervention, an increasing number of nursing home residents will be at risk of death from RRA. This finding suggests a need to review the appropriateness of assessment, management, and accommodation arrangements for individuals with dementia and schizophrenia.

This is the first study to examine the exhibitor-target dyad. In accordance with SEM theory, these results suggest that RRA arises from a combination of individual and interpersonal factors of targets and exhibitors. For example, although analysis of individuals found that exhibitors are more commonly male and targets most commonly female, dyad analysis revealed that RRA is most likely to occur between two male residents. This is supported by previous findings that male residents were twice as likely as female residents to be injured by another resident.¹⁵ Furthermore, although the conventional understanding is that RRA occurs between an exhibitor with a history of aggression^{13,14} and a target with a history of wandering,¹⁵ dyad analysis indicates that exhibitors and targets are both likely to have a combination of behavioral problems. This suggests that residents at risk of being involved in RRA could become exhibitors or targets, depending on the

circumstances triggering an incident. The finding that exhibitors are often younger than targets is new but is consistent with the knowledge that younger persons who enter nursing homes may be more physically mobile and have preexisting psychiatric conditions.³⁷ Collectively, these findings highlight the importance of analyzing persons involved in RRA as a dyad.

An examination of incident-related factors revealed high-risk locations and time periods for RRA incidents. RRA most commonly occurred in communal areas (60.7% in current study vs as high as 70% in a previous study¹⁷). This is unsurprising given that this is where residents are most likely to interact with one another. RRA incidents also frequently occur in residents’ bedrooms (~40% in current and previous studies^{11,15}), often when residents mistake another resident’s room for their own. Fatal and nonfatal RRA incidents are most likely to occur during the afternoon or evening,^{11,17} which is consistent with when BPSDs usually manifest. Finally, “push and fall” type assaults were found to be most common, in keeping with experiences of nonfatal RRA (94% of nurse aides reported witnessing this type of assault³⁸). Other forms of aggression less likely to result in a fatality such as hitting,¹¹ grabbing, and pinching³⁸ were uncommon or not present in this study. This information provides a basis for development of new strategies to better manage aggressive behaviors of nursing home residents, although this study can only generate hypotheses about prevention approaches;

Table 3. Resident-to-Resident Aggression Incident Factors

Variable	n (%)
Assault type	
Push and fall	14 (50.0)
Punch or strike and fall	6 (21.4)
Punch or strike with no fall	2 (7.1)
Wrestle or scuffle and fall	2 (7.1)
Strike or push with object	2 (7.1)
Other	2 (7.1)
Primary injury sustained	
Head injury	11 (39.3)
Hip fracture	6 (21.4)
Rib fracture	4 (14.3)
Neck or spinal fracture	3 (10.7)
Facial injuries and defensive wounds	3 (10.7)
Arm fracture	1 (3.6)
Witnessed	
No	8 (28.6)
Yes	19 (67.9)
Unlikely to be known	1 (3.6)
Target type	
Unintentional	14 (50.0)
Provoking	6 (21.4)
Bystander	4 (14.3)
Unlikely to be known	4 (14.3)
Location within facility	
Corridor, hallway	10 (35.7)
Communal living area	7 (25.0)
Target's bedroom	5 (17.9)
Exhibitor's bedroom	5 (17.9)
Shared bedroom	1 (3.6)
Season	
Spring (Sep–Nov)	11 (39.3)
Summer (Dec–Feb)	6 (21.4)
Autumn (Mar–May)	7 (25.0)
Winter (Jun Aug)	4 (14.3)
Nursing shift (time of incident)	
Morning (7:00 a.m.-1:59 p.m.)	10 (35.7)
Afternoon (2:00 p.m.-9:59 p.m.)	14 (50.0)
Night (10:00 p.m.-6:59 a.m.)	4 (14.3)

further research is needed to develop and test intervention strategies.

Investigation of deaths from RRA involved an inquest (public court hearing) in seven (25%) cases, five times as great as the 5% of all deaths reported to the coroner in Australia.³⁹ Conversely, in the criminal justice system, charges were rarely filed against exhibitors (7.1%). Comparative information on criminal charges resulting from elder abuse cases in Australia is unavailable.⁴⁰ To provide some context, family violence-related assaults result in charges filed against perpetrators in approximately 40% of cases.⁴¹ RRA is an increasing area of concern for geriatricians and nursing home staff and poses a unique problem for the legal sector and society in how to appropriately respond.

Strengths and Limitations

This world-first study examined deaths from RRA using existing medicolegal death investigation information. Although there are known limitations of the NCIS,²³

collection of unit record data from paper-based coronial records enabled a richness of information not otherwise available. Despite this, detailed information on the nature of care provided and its effect on residents involved in RRA was not available through this secondary dataset but is important to collect and examine in future studies. A further limitation is the small number of cases, which limits data analysis. It is likely that RRA incidents in Australia are underreported for a number of reasons, including that incidents may occur without any credible witnesses present and that the current legislative framework requires providers to report incidents to an external authority only in certain circumstances.⁴² Nevertheless, findings from this research are likely to be generalizable to a broader international audience given Australia is a developed country with coronial⁴³ and aged care systems⁴⁴ similar to those in the United Kingdom and United States.

CONCLUSION

This research provides a foundation for future inquiry into RRA in Australia and contributes to the growing international body of knowledge aimed at better understanding this behavior. The research generates hypotheses that the frequency of RRA differs between nursing homes with different resident cohort mixes, physical environments, organizational systems, and degrees of resident-centered care. Further research is needed to improve the quality and depth of information on RRA to develop appropriate management and prevention strategies.

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SUPPORTING INFORMATION

Additional Supporting Information may be found in the online version of this article:

Appendix S1. Organisational factors relevant to resident-to-resident aggression

Appendix S2. Societal factors relevant to resident-to-resident aggression (medico-legal death investigation process)

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