

# Biting the Bullet: Firearm Ownership in Persons with Dementia. A Registry-Based Observational Study

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## Abstract.

**Background:** In Sweden, 2,296,000 firearms were legally owned by private persons in 2017 and there were 150,000 persons living with a dementia diagnosis. A proportion of these persons owning a firearm may pose safety concerns.

**Objective:** The aim was to describe firearm ownership in persons with dementia in Sweden and examine which characteristics are explaining physicians' decision to report a person to the police as unsuitable to possess a firearm.

**Methods:** This was a registry-based observational study. 65,717 persons with dementia registered in the Swedish Dementia Registry were included in the study. Logistic regression was used to evaluate which of the persons' characteristics were most important in predicting the likelihood of being reported as unsuitable to possess a firearm. Relative importance of predictors was quantified using standardized coefficients (SC) and dominance analysis (DA).

**Results:** Out of 53,384 persons with dementia, 1,823 owned a firearm and 419 were reported to the police as unsuitable owners. Firearm owners were predominantly younger, males, living alone, and without assistance of homecare. The most important predictors of being reported to the police were: living with another person (SC=0.23), frontotemporal dementia (SC=0.18), antipsychotics prescription (SC=0.18), being diagnosed in a memory/cognitive clinic (SC=-0.27), female gender (SC=0.18), mild (SC=-0.25) and moderate (SC=-0.21) dementia, and hypnotics prescription (SC=0.17).

**Conclusion:** Firearm owners with dementia were mostly younger males who were still living more independent lives. The decision to remove a weapon was not solely based on a diagnosis of dementia but a combination of factors was considered.

Keywords: Alzheimer's disease, behavioral and psychological symptoms of dementia, dementia, firearm, frontotemporal, neuropsychiatric symptoms, risk assessment, vascular, violence

## INTRODUCTION

In Sweden, with a population of 10 million people, there are 601,917 persons with valid weapon license (Swedish Police Authority, private communication), 2,296,000 firearms legally owned [1], and up to 150,000 persons living with a dementia diagnosis [2, 3]. The proportion of firearm owners with

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dementia in Sweden has not been studied earlier. An example from the United States (US) shows that up to 60% of households where a person with dementia reside have legally held firearms [4]. However, not much is known about persons with dementia who own a firearm nor how to assess risks associated with firearm ownership.

Although older persons rarely commit serious crimes, aggression is more common among persons with dementia compared to healthy population of the same age [5–7]. Gradual impairment of executive functions [8, 9] and visuospatial processing [10] can lead to improper firearm handling and to unintentional injuries and deaths. A few homicide cases involving persons with dementia have been described, often as a consequence of the persons' delusional beliefs associated with the victim, e.g., the imposter syndrome [11–15]. Furthermore, persons with dementia may have an increased risk of suicide [16], particularly within the first three months after the dementia diagnosis [17]. Firearm availability increases suicide risk independently of other suicide risk factors [18, 19]; in contrast, a reduced availability of firearms decreases the suicide rate [20]. Consequently, restricting access to firearms for all persons with dementia at the time of diagnosis may appear reasonable. This procedure has been implemented in two states in the US (Texas [21] and Hawaii [22]). Firearm ownership in Sweden is mostly related to hunting which entails significant social and personal meaning [23]. Similar to losing a driving license, rapid decision about removing a firearm may lead to decreased activity and social isolation and add to overall stigma associated with dementia diagnosis [24]. Additionally, the fear of having firearm removed could potentially discourage help seeking behavior and delay diagnosis. With these consequences in mind, the decision to remove a firearm must be carefully assessed for each individual person.

In most of the states in the US, there are few restrictions regulating access to firearms [25]. In Sweden, a license is necessary to own a firearm [26]. According to the Swedish law [26, 27], physicians are obliged to report to the police if a person is considered unsuitable to possess a firearm. The authorities then decide if the license to have a firearm should be revoked. However, there is no official guideline on violence risk assessment (VRA) for persons with dementia. Organic brain disease (frontal or temporal lobe dysfunction), substance abuse, physical or psychiatric comorbidity, evidence of conflict or previous aggression, and changes in the environment were described

as potential factors associated with increased aggressiveness which might be important in VRA of persons with dementia [15]. However, choosing who should or should not have access to a firearm is not straightforward. In persons with mental illness, physicians' VRA had low accuracy, particularly for females [28].

### *Aims of the study*

Given the lack of knowledge on firearm ownership among persons with dementia and the lack of guidelines for the VRA assessment, we used the Swedish Dementia Registry (SveDem) to 1) describe firearm ownership in persons with dementia in Sweden and 2) examine which of the recorded characteristics of the person were considered by physicians when reporting the person as unsuitable to possess a firearm.

## **MATERIALS AND METHODS**

### *Study population*

All persons diagnosed with dementia who were registered to SveDem from 2007 to 2016 ( $n = 65,717$ ) were included in the study. SveDem is a national quality registry covering an estimated 43% of all dementia cases in Sweden in 2018 [29, 30]. Persons are diagnosed and followed-up yearly in specialist units, primary care centers, or in nursing homes. All data (dementia subtype, gender, age, Mini-Mental State Examination (MMSE) score, medication, living arrangement, home and day care) are collected at the time of dementia diagnosis. Information on the firearm ownership is reported either by the persons or family members. Eight dementia diagnoses are reported in the SveDem: Alzheimer's disease (AD), vascular dementia, mixed dementia, dementia with Lewy bodies (DLB), frontotemporal dementia (FTD), Parkinson's disease dementia (PDD), unspecified dementia, and other dementia types (including various dementia disorders, e.g., corticobasal degeneration and alcohol related dementias). Type of dementia was diagnosed according to the 10th revision of the International Classification of Diseases (ICD-10) [31]. Additionally, the McKeith criteria [32] for DLB, the Lund-Manchester criteria [33] for FTD, and the Movement Disorder Society Task Force criteria [34] for PDD were used. Due to previous evidence suggesting that PDD and DLB belong to the same disease spectrum we merged these two groups into a single group one, Lewy body disease.

All procedures involving human subjects/patients were approved by the regional ethical review board in Stockholm, Sweden with ethical number: 2015/2232-31/5. All patients receive information about the use of their information and have the right to refuse participation or withdraw their data from the registry at any time.

### Statistical analysis

Baseline characteristics of persons with dementia who did or did not own a firearm were described with frequencies and percentages for categorical variables and means and standard deviations for continuous variables. Characteristics associated with 'being reported to the police as unsuitable to own firearm' were evaluated only among firearm owners. However, 12,333 (19%) persons had missing information on firearm ownership. Furthermore, 19,112 persons (29.1%) had missing information in at least one of the recorded variables, with percent of missing data ranging from 1% for living arrangements to 13% for being reported to the police (Supplementary Table 1). To manage the problem of missing data, in the main analysis we performed multivariate imputation with chained equation (MICE) [35], using R package MICE, version 3.0 [36].

In each imputed dataset, persons with firearms were selected for the analysis. Dementia subtype, gender, age, MMSE score (very severe: 0–10, moderate severe 11–18, moderate 19–23, mild 24–30), hypnotics, antipsychotics, anxiety suppressors, antidepressants, N-Methyl-D-aspartate receptor antagonist, acetylcholinesterase inhibitors, vascular medication, living arrangement (living alone, with another person or in a nursing home), and diagnosing unit (primary care, memory clinic) were assessed as potential predictors of the outcome, being reported to the police as unsuitable to own firearm. Multivariable logistic regression was used to estimate odds ratios (OR) and 95% confidence intervals (CIs) of the association between preselected variables and the outcome. Discrimination ability of the model was evaluated by bootstrapped area under the receiver operating characteristic curve (AUC) [37]. Finally, variable importance was estimated with fully standardized coefficients (SC) and dominance analysis. SC were calculated as  $b_s = (b)(s_X)(R)/s_{\hat{Y}}$ , where  $b$  is the sample estimate of the unstandardized logistic regression coefficient,  $s_X$  is the sample standard deviation of the predictor  $X$  and  $s_{\hat{Y}}$  is the standard deviation of the predicted values of the outcome  $Y$  [38]. Dominance

analysis determines the relative importance of a predictor across multiple models representing all possible combinations of the predictors from the full model [39]. For each predictor, we present the weighted average of its contribution to an overall model fit by averaging results across all models in which the predictor is included (general dominance statistics).

Given that the selection of persons into the main analysis was based on multiply imputed variable, we also performed a sensitivity analysis restricted only to complete cases.

All analyses were undertaken in R version 3.6.0 (Foundation for Statistical Computing, Vienna, Austria) [40].

## RESULTS

### Description of the study population

Of 65,717 persons with dementia in SveDem, 53,384 had information on the firearm ownership, and 1,823 (3.4%) persons with dementia owned a firearm. Out of those, 346 persons were reported to the police by the physicians as unsuitable to own a firearm. Additionally, seventy-three persons with dementia were reported despite the lack of information on their firearms status. Baseline characteristics of persons with dementia with and without a firearm are presented in Table 1. Compared to persons with dementia who did not own firearm, firearm owners were somewhat younger (age < 79 years: 53.4% versus 38.8%), predominantly male (90.4% versus 38.7%), living alone (71.5% versus 46.7%), and without assistance of homecare (17.8% versus 33.4%). The distribution of other characteristics was similar between the two groups (Table 1). Almost 19% of persons had missing information on the firearm status. For most of the recorded variables, persons with missing values resembled patients with no firearm. However, compared to persons with firearm status, they were more often diagnosed in primary care, had unspecified dementia (Table 1), and had a considerably higher proportion of missing information in all recorded variables with the exception of the total number of drugs used (Supplementary Table 1).

### Factors predicting risk of being reported to the police as unsuitable to own a firearm

The model predicting the risk of being reported to police as unsuitable to own firearm is reported in

Table 1  
 Characteristics of patients with and without a firearm

	Firearm ownership status					
	No (n = 51,561)		Yes (n = 1,823)		Missing (n = 12,333)	
	n	%	n	%	n	%
Diagnosis						
Alzheimer's disease	16,197	31.4	580	31.8	3,375	27.4
Frontotemporal dementia	795	1.5	54	3.0	138	1.1
Lewy body dementia	1,855	3.6	103	5.7	358	2.9
Mixed dementia	10,305	20.0	318	17.4	1,427	11.6
Vascular dementia	9,939	19.3	369	20.2	2,069	16.8
Other	1,181	2.3	37	2.0	475	3.8
Unspecified	11,289	21.9	362	19.9	4,491	36.4
Age						
< 74	9,889	19.2	505	27.8	2,254	18.3
74–78.9	10,098	19.6	466	25.6	2,438	19.8
79–84	12,950	25.2	479	26.3	3,137	25.5
> 84	18,551	36.0	370	20.3	4,465	36.3
Missing	73	-	3	-	39	-
Gender						
Female	31,628	61.3	176	9.7	6,985	56.6
Male	19,933	38.7	1,647	90.4	5,348	43.3
Mini-Mental State Examination						
Very severe (0–10)	1,678	3.5	47	2.7	439	4.1
Moderate severe (11–18)	11,992	24.8	363	20.7	2,824	26.7
Moderate (19–23)	18,366	38.0	656	37.4	3,883	36.7
Mild (24–30)	16,239	33.6	689	39.3	3,446	32.5
Missing	3,286	-	68	-	1,741	-
Living arrangements						
Living alone	23,962	46.7	1 280	70.5	5,567	47.1
Living with another person	21,924	42.7	464	25.6	4,524	38.3
Nursing home	5,439	10.6	72	4.0	1,723	14.6
Missing	236	-	7	-	519	-
Diagnostic institution						
Memory Clinic	30,202	58.6	1 065	58.4	5,013	40.7
Primary care	21,359	41.4	758	41.6	7,320	59.4
Daycare						
No	48,315	95.8	1 738	97.3	10,433	96.0
Yes	2,137	4.2	48	2.7	439	4.0
Missing	1,109	-	37	-	1,461	-
Homecare						
No	33,844	66.6	1 473	82.2	7,680	69.5
Yes	16,942	33.4	318	17.8	3,369	30.5
Missing	775	-	32	-	1,284	-
N-Methyl-D-aspartate receptor antagonists						
No	44,539	88.7	1 595	89.3	10,055	92.2
Yes	5,673	11.3	192	10.7	854	7.8
Missing	1,349	-	36	-	1,424	-
Acetylcholinesterase inhibitors						
No	28,786	56.9	941	52.3	6,372	57.3
Yes	21,777	43.1	860	47.8	4,756	42.7
Missing	998	-	22	-	1,205	-
Vascular drugs						
No	15,382	30.7	505	28.3	3,639	33.2
Yes	34,766	69.3	1 277	71.7	7,340	66.9
Missing	1,413	-	41	-	1,354	-
Antidepressants						
No	65,683	71.3	1 346	75.8	7,600	69.8
Yes	14,385	28.7	431	24.3	3,284	30.2
Missing	1,493	-	46	-	1,449	-

(Continued)

Table 1  
(Continued)

	Firearm ownership status					
	No (n = 51,561)		Yes (n = 1,823)		Missing (n = 12,333)	
	n	%	n	%	n	%
Antipsychotics						
No	46,989	94.0	1,704	96.0	9,812	91.2
Yes	2,986	5.0	72	4.1	949	8.8
Missing	1,586	-	47	-	1,572	-
Hypnotics						
No	41,388	82.9	1,587	89.6	8,632	80.1
Yes	8,530	17.1	184	10.4	2,144	19.9
Missing	1,643	-	52	-	1,557	-
Anxiety suppressors						
No	44,564	89.2	1,655	93.3	9,182	85.1
Yes	5,407	10.8	119	6.7	1,612	14.9
Missing	1,590	-	49	-	1,539	-
Reported						
Yes	-	-	346	22.2	73	1.9
No	51,561	100.0	1,212	77.8	3,876	98.2
Missing	-	-	265	-	8,384	-

Table 2. According to dominance analysis, the most important characteristics used by physicians were: 1) living arrangement, 2) dementia subtype, 3) APD prescription, 4) diagnosing unit, 5) gender, and 6) MMSE score. Somewhat similar, the most important factors in terms of the SC were: diagnosing unit (being diagnosed in primary care versus memory clinic, SC = -0.27), followed by mild dementia (MMSE 24–30 versus 0–10, SC = -0.25), living arrangements (living with someone else in the household versus living alone, SC = 0.23), moderate dementia (MMSE 19–23 versus 0–10, SC = -0.21), antipsychotics prescription (SC = 0.18), dementia subtype (FTD versus AD, SC = 0.18), female gender (0.18), and hypnotics (SC = 0.17).

Of these, living with someone else in household (OR = 1.67, 95% CI: 1.17–2.38), hypnotics (OR = 1.77, 95% CI: 1.21–2.59) or antipsychotics (OR = 2.42, 95% CI: 1.35–4.35) prescription, being diagnosed with FTD (OR = 3.1, 95% CI: 1.56–6.18), and being a female (OR = 1.79, 95% CI: 1.2–2.67) were associated with higher odds of being reported to the police as unsuitable to possess firearm. On the other hand, being diagnosed in a primary care clinic (OR = 0.59, 95% CI: 0.44–0.78) and with mild (OR = 0.60, 95% CI: 0.32–1.13) or moderate (OR = 0.65, 95% CI: 0.35–1.22) dementia were associated with lower odds of being reported (Table 2). The pooled bootstrapped AUC of the model was 0.66. Overall, sensitivity analysis yielded similar results, with the exception of small differences in the order

of characteristics identified in the dominance analysis (Supplementary Table 2).

## DISCUSSION

In the aging populations, such as in Sweden, with a high prevalence of firearm ownership as well as a high prevalence of dementia [1–3], it is becoming increasingly important to understand who the persons owning a firearm are and how their suitability to own a firearm should be assessed. In this large register-based study in Sweden, 3.4% of persons with dementia owned a firearm, of whom 356 (22.2%) were reported as unsuitable to own it. We found that, when compared to the persons with dementia without firearm, firearm owners in SveDem were predominantly younger, more often male, and living alone without assistance of home care. Furthermore, living arrangement, dementia subtype, diagnosing unit, APD, and hypnotics prescription, MMSE score, and gender were the most relevant determinants of risk of being reported to the police as unsuitable to own a firearm in SveDem.

In a recent interview in the *Journal of American Medical Association*, emergency physician Emmy Betz highlighted concerns about the potential risks associated with persons with dementia owning firearms [41]. However, given the low contribution of elderly into the general crime statistics, the overall gravity of this issue seems to be understated and

Table 2

Odds ratios (OR) and 95% confidence intervals (CI) and the relative importance indicators (standardized coefficients (SC) and dominance rank (DR) based on the standardized general dominance statistic (SGDS)) of the association between predictors and being reported to the police as unsuitable to own a firearm

	OR (95%CI)	SC	SGDS	DR
<b>Diagnosis</b>				
Alzheimer's disease	Ref	Ref	0.011	2
Frontotemporal dementia	3.1 (1.56–6.18)	0.180		
Lewy body dementia	0.89 (0.53–1.5)	–0.030		
Mixed dementia	1.45 (1.06–2.16)	0.149		
Vascular dementia	1.38 (0.88–2.16)	0.131		
Other	1.59 (0.75–3.36)	0.075		
Unspecified	1.21 (0.83–1.78)	0.080		
<b>Age</b>				
< 74	Ref	Ref	0.0026	9
74–78	1.22 (0.74–2)	0.053		
79–84	1.22 (0.75–2)	0.051		
> 84	0.89 (0.51–1.55)	–0.074		
<b>Gender</b>				
Female versus Male	1.79 (1.2–2.67)	0.177	0.0084	5
<b>Mini-Mental State Examination</b>				
Very severe (0–10)	Ref	Ref	0.0072	6
Moderate severe (11–18)	0.97 (0.5–1.9)	–0.012		
Moderate (19–23)	0.65 (0.35–1.22)	–0.209		
Mild (24–30)	0.6 (0.32–1.13)	–0.245		
<b>Living arrangements</b>				
Living alone	Ref	Ref	0.0166	1
Nursing Home	2.14 (1.25–3.64)	0.152		
Living with another person	1.67 (1.17–2.38)	0.232		
<b>Diagnosing unit</b>				
Primary care versus Memory Clinic	0.59 (0.44–0.78)	–0.266	0.0094	4
<b>Daycare</b>				
Yes versus no	0.87 (0.4–1.89)	–0.030	0	14
<b>Homecare</b>				
Yes versus no	1.18 (0.86–1.63)	0.063	0.0028	8
<b>N-Methyl-D-aspartate receptor antagonists</b>				
Yes versus no	0.94 (0.59–1.5)	–0.009	0	14
<b>Acetylcholinesterase inhibitors</b>				
Yes versus no	0.91 (0.66–1.27)	–0.050	0.002	10
<b>Vascular drugs</b>				
Yes versus no	0.84 (0.65–1.08)	–0.084	0.0014	12
<b>Antidepressants</b>				
Yes versus no	0.74 (0.52–1.06)	–0.135	0.0018	11
<b>Antipsychotics</b>				
Yes versus no	2.42 (1.35–4.35)	0.184	0.0098	3
<b>Hypnotics</b>				
Yes versus no	1.77 (1.21–2.59)	0.171	0.0072	7
<b>Anxiety suppressors</b>				
Yes versus no	0.88 (0.56–1.37)	–0.033	0	14

has not received much attention, particularly among European researchers. Data surrounding persons with dementia in Sweden, who owned a firearm, resembled data from the US [42]. These findings indicate that persons with dementia who own a firearm may be more independent and overall have better health and therefore potentially still able to handle a firearm correctly. However, 23% of these persons had a moderate severe or very severe dementia. Furthermore, even though the overall use of psychiatric medication was slightly lower in this group, 4% of persons

with firearm used antipsychotic medication, 10% hypnotics, and 24% antidepressants. Psychotropics are most often prescribed for behavioral and psychological symptoms of dementia (BPSD) [43], which may include depression, anxiety, psychosis, irritability, and aggression [44]. In addition, given the high proportion of persons who lacked information on firearm ownership, it is possible that physicians often do not ask persons about their firearm status. Findings from different countries indicate that this is potentially a common problem. Only 85% of psychiatrists

and 50% of general practitioners in Australia reported “sometimes asking persons about firearm access” [45]. In a US study, only 27% of psychiatrist and 58% physicians treating older persons with depression and suicidal ideation had a routine system for identifying persons who owned firearms [46, 47].

To understand what is considered by physicians in Sweden when deciding to report a person as unsuitable to own a firearm, we used all persons’ characteristics available in SveDem. The most important factors used by clinicians when making their decision identified in our study were: patients’ living arrangements, diagnosis of FTD, use of psychotropic medication (APD and hypnotics), female gender, and severity of dementia.

The use of psychotropic medications and type of dementia may reflect underlying causes of behavioral changes potentially leading to violent behavior of persons with dementia. As previously mentioned, psychiatric medication is mostly used to alleviate behavioral and psychological symptoms of dementia. Violent acts in these persons are rarely instrumental toward goal but rather stem from cognitive decline, disinhibition, paranoia, or agitation and are often a reactive consequence of frustration [48, 49]. Secondly, behavioral-variant of FTD (bvFTD) is characterized by behavioral and executive deficits leading to the gradual loss of the ability to inhibit primary impulses [9, 50] potentially leading to impulsive and disinhibited behavior [50]. Most law breaking incidents have been noted in persons with neurodegenerations impairing frontotemporal and fronto-subcortical circuits (bvFTD and semantic variant of primary progressive aphasia (cvPPA) [51], whereas in AD, where hippocampal and posterior parietal-temporal circuits are most affected, criminal behavior is less frequent [51]. We have in a previous report shown that among persons with dementia unsuitable to have a driver’s license and therefore reported to the police the diagnosis of FTD was overrepresented [52]. The role of severity of dementia in VRA seems to be more complex. Severe dementia can limit person’s ability to plan and complete the suicidal act [16, 17], while the risk of suicide is elevated in early stages of dementia [17, 53]. On the other hand, cognitive impairment has been shown to be associated with the increased risk of psychotic symptoms [54] which may lead to increased risk of violent acts and/or potential accidents because of improper firearm handling. Finally, our results indicate that females have a higher risk of being reported to the police as unsuitable to own a firearm. This result contradicts our

preconceptions on gender and violent behavior [55]. Although among persons with mental illness, violent behavior was equal between men and women, the risk of violence among females may be underestimated [56]. However, it may also be possible that physicians used other person related information, e.g., BPSD, which is not included in SveDem. Sex differences in the BPSD were reported with men exhibiting more aggressive behavior and women more depressive symptoms [57], both important from the perspective of the access to firearm.

Persons living with another person have a higher risk of being reported. According to case studies, victims of crimes committed by patients with dementia are more likely to be family members or persons living in the same household [58]. Similarly, persons in close proximity to the person with dementia may have higher risk to be victims of the incidents caused by improper handling of firearms. A cohabitant could thus not only report the firearm status, but also, potentially, report a person as violent or unsuitable to possess a firearm. Persons receiving their diagnosis in primary care compared to in a memory clinic had lower risk of being reported to the police authorities as unsuitable to possess a firearm. This difference in approach between primary care and memory clinic requires further investigation.

To the best of our knowledge, this is a first large, registry-based, study exploring the importance a wide range of characteristics of persons with dementia used by physicians when deciding whether or not to report a person as unsuitable to own a firearm. This study has several shortcomings. First, we did not have access to possible criminal records of the persons concerned so we could not confirm if persons who were reported by physicians have also committed a crime. Second, we had had a fraction of missing data. To manage this, we used the multiple imputation method. Methodologists currently regard multiple imputation as a state-of-the-art technique as it improves accuracy and statistical power relative to other missing data techniques [35]. Moreover, the number of persons with firearms can be underestimated. Given the self-reporting nature of the firearm ownership variable, it is possible that some persons chose to hide this information or, due to cognitive decline, were not able to recall it. SveDem has a coverage of 43% and may not be representative of all persons with dementia. Moreover, the majority of firearm owners reside in the north of Sweden, which is underrepresented in SveDem. Furthermore, given the relatively low discrimination of our model

(AUC = 0.66) it is possible that additional factors predicting physicians' decision to report a person to the police authorities as unsuitable to own a firearm were not recorded in SveDem.

Firearm owners with dementia were mostly younger males who were still living more independent lives. Assessment of the ability to handle the firearm in the newly diagnosed persons with dementia is not easy. By biting the bullet, we refer to the need for practitioners to address this, what can be regarded as a difficult topic. Our findings, and that of others, indicate how the question about firearm status is not often asked. This suggests the need for a more efficient system for screening for firearm ownership to be established. Moreover, diagnosis of dementia does not necessary mean that a person is incapable to handle their firearm appropriately. Removing the firearm automatically at the time of dementia diagnosis could potentially increase the social isolation and compromise personhood of the person of dementia. In Sweden, when taking the decision about removing the firearm, combination of factors (type of dementia diagnosis, gender, severity of cognitive impairment, psychiatric medication, living arrangement) are taken into consideration. Following Betz et al. [59], we suggest that the date of firearm retirement should be proactively discussed between persons with dementia, family members, and healthcare providers. In this way, the safety of persons with dementia can be maintained without compromising their right to make their own decisions.

## CONCLUSION

Firearm owners with dementia were mostly younger males who were still living more independent lives. The decision to remove a weapon was not solely based on a diagnosis of dementia but a combination of factors was considered.

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## SUPPLEMENTARY MATERIAL

The supplementary material is available in the electronic version of this article: <https://dx.doi.org/10.3233/JAD-201365>.

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