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Suicide Risk in Nursing Homes and Assisted Living Facilities: 2003–2011

Briana Mezuk, PhD, Matthew Lohman, PhD, Marc Leslie, MS, and Virginia Powell, PhD

Approximately 40% of adults aged 65 years and older will need skilled residential nursing care at some point in their lifetime.¹ Older adults have among the highest suicide risks in the United States²; the rate of suicide among men aged 65 years and older is 30 per 100 000; by contrast, it is 7 per 100 000 for men younger than 25 years.³ A key element of suicide prevention is the identification of points of engagement to interact with potential victims.⁴ Risk factors for suicide, such as social isolation, depression, and functional impairment, are common among long-term care (LTC) residents,^{5–7} and these facilities may therefore be important locations for preventing suicide among older adults. Indeed, the 1987 Nursing Home Reform Act mandated screening of LTC admissions to facilitate appropriate placement and increased psychiatric services,⁸ and the Minimum Data Set 3.0 includes a mandatory screener for depressive symptoms and suicidal ideation.⁹ Nearly 1.5 million adults reside in nursing homes,^{10,11} and another 1 million reside in assisted living facilities.¹²

Little is known regarding risk and protective factors for suicide in LTC.¹³ In 2011 the Substance Abuse and Mental Health Services Administration released a tool kit on preventing suicide in senior-living communities, which notes,

We do not know how many residents of senior living communities attempt suicide or die by suicide. But, we do know that a suicide in a facility . . . profoundly impacts the lives of everyone concerned—residents, families, and staff.^{14(p4)}

Suicidal ideation is common among LTC residents, with between 5% and 33% reporting ideation (active or passive) within the past month.¹⁵ As a result, suicide risk may be substantial in these facilities despite countervailing factors such as regular monitoring by staff and limited access to lethal means. The handful of studies that have compared incidence of completed suicide in LTC to the general community

Objectives. We investigated the epidemiology of suicide among adults aged 50 years and older in nursing homes and assisted living facilities and whether anticipating transitioning into long-term care (LTC) is a risk factor for suicide.

Methods. Data come from the Virginia Violent Death Reporting System (2003–2011). We matched locations of suicides (n=3453) against publicly available resource registries of nursing homes (n=285) and assisted living facilities (n=548). We examined individual and organizational correlates of suicide by logistic regression. We identified decedents anticipating entry into LTC through qualitative text analysis.

Results. Incidence of suicide was 14.16 per 100 000 in nursing homes and 15.66 in the community. Better performance on Nursing Home Compare quality metrics was associated with higher odds of suicide in nursing homes (odds ratio [OR] = 1.95; 95% confidence interval [CI] = 1.21, 3.14). Larger facility size was associated with higher suicide risk in assisted living facilities (OR = 1.01; 95% CI = 1.00, 1.01). Text narratives identified 38 decedents anticipating transitioning into LTC and 16 whose loved one recently transitioned or resided in LTC.

Conclusions. LTC may be an important point of engagement in suicide prevention. (*Am J Public Health.* 2015;105:1495–1502. doi:10.2105/AJPH.2015.302573)

are mixed, with 1 reporting higher¹⁶ and another reporting lower¹⁷ risk in these settings.

Suicidal behavior in LTC likely reflects a combination of factors shared with community cases (e.g., presence of a psychiatric disorder), as well as factors that are unique to LTC (e.g., facility characteristics). For example, bed size (number of beds) and high staff turnover have been associated with higher risk of suicidal behaviors among residents.^{18,19} However, these studies were conducted in the 1980s, prior to the growth of assisted living,²⁰ which reduces their applicability to modern facilities. Finally, it is unknown whether the transition to LTC, or the process of having a loved one transition, is a risk factor for suicide.²¹ These transitions often involve a complex interplay of social and psychological factors, including feelings of autonomy, social connectedness, and identity,^{22,23} and can produce feelings of anxiety, loneliness, and hopelessness because they affect a people's sense of being at home, which is not simply their physical residence.²⁴ Such transitions have potential implications for the

psychological well-being of caregivers of the person moving into LTC as well.²⁵

To identify whether LTC settings are important points of engagement for reducing suicide risk among older adults,^{4,26} we analyzed data from the 2003 to 2011 Virginia Violent Death Reporting System (VVDRS). We aimed to (1) describe the epidemiology of completed suicide in nursing homes and assisted living facilities, (2) examine whether facility characteristics were related to suicide risk, and (3) assess whether the process of transitioning into an LTC facility was associated with suicide.

METHODS

The VVDRS is part of the National Violent Death Reporting System and is sponsored by the Centers for Disease Control and Prevention. The goal of the national reporting system is to monitor violent deaths (e.g., homicide, suicide, and undetermined). Eighteen states host these programs, and in 2003 the Virginia Office of the Chief Medical Examiner implemented

the program, making Virginia the first jurisdiction with a statewide medical examiner system to do so.^{27,28}

The VVDRS uses the methodology, definitions, coding schema, and database software of the national system.^{29–31} Information from death certificates, law enforcement reports, crime labs, and medical examiner reports is pooled into a single database, which includes information on demographic characteristics and circumstances surrounding the death (e.g., recent stress, health problems). The VVDRS also includes data on specific location (i.e., street address) of both place of residence and place of injury. Decedent records also include detailed text narratives that describe circumstances surrounding the death abstracted from the Office of the Chief Medical Examiner and law enforcement reports. We limited our analysis to suicides ($n = 3453$) and undetermined deaths ($n = 229$) from 2003 to 2011 among adults aged 50 years and older who were residents of, and died in, Virginia. We excluded suicides and undetermined deaths that occurred in prisons or jails ($n = 17$).

Data Collection

We collated addresses of nursing homes from Nursing Home Compare (NHC), an online, publicly available consumer resource that describes the characteristics of all Medicare- and Medicaid-certified nursing homes in the United States.³² These data include organizational characteristics such as facility size, ownership, and staffing, as well as performance measures determined by the Center for Medicare and Medicaid Services. Resident information is provided only in aggregate (e.g., percentage of residents prescribed antipsychotic medications). We collated addresses of assisted living facilities from the Virginia Department of Social Services license records, also publicly available online.³³ We downloaded and compiled these databases between March and June 2013. At the time of the study, 285 nursing homes and 548 assisted living facilities operated in Virginia. Medicare and Medicaid certify 90% of nursing home beds in Virginia; two thirds are for profit, 30% are nonprofit, and 4% are government owned (e.g., Veterans Health Affairs), consistent with national averages.³⁴

Although the VVDRS includes a location code for whether a suicide occurred in a supervised living facility, there is likely misclassification of nursing home and assisted living settings; many of these facilities are colocated within hospitals or in continuing care retirement communities, and residents in assisted living are often in private apartments. Instead, we identified suicide and undetermined deaths in LTC facilities by matching the addresses of both the decedent location of residence and the location of injury against facility addresses abstracted from NHC and Virginia Department of Social Services data through Fine-Grained Record Integration Linkage software, version 2.1.5 (Emory University, Atlanta, GA; Figure A, available as a supplement to the online version of this article at <http://www.ajph.org>).³⁵ The program uses prespecified search algorithms to determine whether text from 2 sources refers to the same entity. It matches records in cases where data entry is syntactically different between sources (e.g., 123 West Main St, Apt. 5E versus 123 W. MAIN STREET, 5E) or when data-entry errors prevent exact matches; it estimates a degree of certainty for each possible record match. In cases where the program determined matches with certainty less than 90%, 2 authors (B.M. and M.L.) reviewed and adjudicated the possible match.

VVDRS data also include qualitative text case narratives for each decedent that describe the contributing circumstances to death. The text of these narratives is abstracted from Office of the Chief Medical Examiner records, law enforcement interviews with key informants (e.g., family members), and death scene investigations (e.g., suicide notes) through standardized procedures.^{25–27} These narratives are intended to provide additional context regarding the contributions of recent events, interpersonal factors, and mental and physical health to each death. We searched all VVDRS narratives with the following terms: “assisted,” “continuing care,” “convalescent,” “group home,” “hospice,” “institution,” “long-term,” “long term,” “nursing,” “old folks,” “retirement,” and “senior,” and we abstracted the common themes from narratives that referenced at least 1 of these words ($n = 109$ decedents).

Measures

We derived individual characteristics from the VVDRS database.²⁹ Demographic characteristics

were age, gender, and race. We categorized means of self-harm as firearm, hanging–suffocation–strangulation, poisoning, cutting, fall, and other–unknown. Dichotomous variables represented 6 indicators of mental and physical health of decedents: current mental health problem, current depressed mood, currently receiving psychiatric treatment, current problems with alcohol or other substances, history of suicide attempts, and presence of contributing physical health problems. Two dichotomous variables described the social context: whether decedents were experiencing problems concerning family, finances, or intimate partner and whether they had experienced a recent personal crisis (e.g., divorce, job loss). Finally, a dichotomous variable indicated whether decedents had disclosed their plan to attempt suicide with others.

For nursing homes, we abstracted indicators of both structural and compositional characteristics from NHC.^{32,36} Structural characteristics were bed size, ownership (for profit, nonprofit, government, and religious), a dichotomous indicator of whether the facility was part of a continuing care retirement community, and whether the facility had a family or resident council (neither, resident or family council, and both resident and family council).

Compositional characteristics were 4 performance metrics reported by NHC: overall facility rating, health rating, staff rating, and quality rating, all measured on a 5-point scale. The health rating was based on the 3 most recent inspections as well as inspections in response to complaints in the past 3 years.³⁷ The quality rating was based on 9 measures (7 long stay and 2 short stay, e.g., percentage of residents with pressure ulcers–sores) derived from the Minimum Data Set.³⁸ The staff rating was based on registered nurse hours per resident day and total staffing hours (e.g., licensed practical nurses, certified nursing assistants) per resident day. The overall facility rating was a weighted composite of the health, staffing, and quality ratings. Details about these metrics are described elsewhere.^{37,38}

Additional specific performance measures from NHC for long-stay residents were percentage of residents in moderate or severe pain, percentage of residents who received a new prescription for an antipsychotic medication, percentage of residents who were physically restrained,

TABLE 1—Comparison of Decedents in Long-Term Care and Community Settings: Virginia, 2003–2011

Variable	Nursing Home or Assisted Living, No. (%) or Mean (SD)	Community, No. (%)	<i>P</i> ^a
Deaths	59	3623	
Cause of death			.028
Suicide	51 (86.4)	3402 (93.9)	
Undetermined	8 (13.6)	221 (6.1)	
Location of death			
Nursing home	25 (42.4)		
Assisted living facility	27 (45.8)		
Unknown type but matched to a facility ^b	7 (11.9)		
Age, y	77.9 (12.0)	63.3 (10.9)	< .001
Female	17 (28.8)	839 (23.2)	.35
White race	53 (89.8)	3292 (90.9)	.818
Manner of injury			< .001
Firearm	13 (22.0)	2279 (62.9)	
Hanging/suffocation	13 (22.0)	405 (11.2)	
Poisoning	7 (11.9)	572 (15.8)	
Cutting	9 (15.3)	84 (2.3)	
Fall	10 (17.0)	52 (1.4)	
Other/unknown	7 (11.9)	231 (6.3)	
Mental and physical health			
Depressed mood	20 (33.9)	1381 (38.1)	.589
Mental health problem	34 (57.6)	1896 (52.3)	.434
Receiving psychiatric treatment	32 (54.2)	1357 (37.5)	.01
Alcohol or substance use problem	< 5	728 (20.1)	.003
Physical health problem	17 (28.8)	1184 (32.7)	.578
History of suicide attempts	13 (22.0)	497 (13.7)	.084
Disclosed suicidal ideation	16 (27.1)	1222 (33.7)	.332
Social context			
Problems with family, finances, or spouse	7 (11.9)	1057 (29.2)	.003
Crisis in past 2 wk	6 (10.2)	915 (25.3)	.006

^aDetermined with Fisher exact test for categorical variables and Wilcoxon rank sum test for continuous variables.

^bUnknown-type facilities represent address matches to facilities that were no longer operational at the time of the data merger, but through public record searches were determined to be long-term care facilities in the past.

percentage of residents with depressive symptoms, and percentage of residents who experienced 1 or more falls with major injury. In total we abstracted data on 285 nursing homes, representing 31 647 beds.

Data on characteristics of assisted living facilities, abstracted from Virginia Department of Social Services license records, were more limited. We abstracted information on 3 structural characteristics: bed size, type of care provided (nonambulatory vs ambulatory), and license type (provisional–conditional, 1 year, or

2–3 years). Only 2 compositional characteristics, number of inspection violations and whether the facility had ever had a complaint-related inspection, were available. In total we abstracted data on 548 assisted living facilities, representing 32 475 beds.

Analyses

Initially, we used the Wilcoxon rank sum and Fisher exact tests to describe the individual characteristics of suicides and undetermined deaths that occurred in a LTC facility versus in

the community, as well as to compare the structural and compositional characteristics of LTC facilities that did and did not have a suicide decedent. We fit logistic regression models adjusted for age, gender, and race to identify significant individual-level correlates of suicide in LTC. We fit logistic regression models to identify organizational-level correlates of suicide in LTC, with adjustment for bed size and ownership (for nursing homes) and bed size and type of care provided (for assisted living facilities).

We estimated the cumulative incidence of suicide among adults aged 65 years and older in nursing homes by abstracting resident census data published in the Nursing Home Compendium, which reported that 85.3% of nursing home residents in Virginia were aged 65 years or older.³⁹ We estimated the range for the annual incidence of suicide among adults aged 65 years and older in nursing homes with this resident census data under scenarios that 80%, 85% and 90% of the resident population were in this age group from 2006 to 2011. We compared this to cumulative incidence of suicide in the community among the population aged 65 years and older in 2010 in data from the US Census.⁴⁰ Finally, although we did not use this variable in our main analysis, we calculated the sensitivity and specificity of the VVDRS indicator for supervised residential facility as an identifier of decedents in LTC.

We used NVivo version 9 software (QSR International, London, UK) to abstract common themes represented in the text of the 109 VVDRS narratives that included at least 1 of our LTC search terms. We used qualitative text analysis (e.g., word frequency, text content coding)⁴¹ to identify salient features represented in these narratives, which we organized into 3 groups: (1) decedents residing in LTC at the time of their death, (2) decedents anticipating transitioning to LTC, and (3) decedents with a loved one (e.g., spouse, parent) living in or transitioning to LTC. We derived these groups empirically from the text content analysis, rather than hypothesizing them a priori.

Our quantitative analysis used STATA version 11 (StataCorp LP, College Station, TX), and all *P* values refer to 2-tailed tests. To protect confidentiality, we did not report cells with fewer than 5 observations for analyses of individuals.

TABLE 2—Characteristics of Long-Term Care Facilities With and Without a Decedent: Virginia, 2003–2011

Variable	Facility With Decedent, No. (%) or Mean \pm SD	Facility Without Decedent, No. (%) or Mean \pm SD	<i>P</i> ^a
Nursing homes			
Facilities	20	265	
Events			
Suicide	21 (84.0)		
Undetermined	4 (16.0)		
Beds	116.4 \pm 83.5	112.5 \pm 56.9	.939
Ownership			.159
For profit	10 (52.6)	185 (69.8)	
Nonprofit	7 (36.8)	61 (23.0)	
Religious	0	9 (3.4)	
Government	2 (10.5)	10 (3.8)	
Part of a continuing care retirement community	8 (42.1)	26 (9.9)	.001
Family/residents council			.727
None	1 (5.3)	9 (3.4)	
Resident or family council	13 (68.4)	178 (67.4)	
Both family and resident council	5 (26.3)	77 (29.2)	
General quality ratings (range 1–5)			
Overall rating	3.84 \pm 1.31	3.11 \pm 1.37	.022
Health rating	3.32 \pm 1.25	2.76 \pm 1.29	.067
Staff rating	3.89 \pm 1.02	2.97 \pm 1.25	.003
Quality rating	4.05 \pm 1.13	3.78 \pm 1.06	.171
Specific quality measures for long-stay residents			
Experiencing moderate/severe pain	9.43 \pm 6.1	10.68 \pm 7.8	.763
Receiving antipsychotic medication	22.84 \pm 12.1	22.59 \pm 8.8	.674
Physically restrained	0.39 \pm 1.4	1.29 \pm 5.5	.04
Depressed mood	9.42 \pm 5.65	4.51 \pm 5.6	.054
Experienced \geq 1 falls	3.16 \pm 2.26	3.22 \pm 2.2	.949
Assisted living			
Facilities	26	522	
Events			
Suicide	25 (92.6)		
Undetermined	2 (7.4)		
Bed size	106.5 \pm 60.6	56.9 \pm 53.8	<.001
Type of care			.127
Nonambulatory	22 (84.6)	365 (70.6)	
Ambulatory	4 (14.8)	152 (29.4)	
License type			.427
Provisional	2 (10.5)	20 (4.8)	
1 y	9 (47.4)	199 (47.7)	
2–3 y	8 (42.1)	198 (47.5)	
Inspection violations	54.8 \pm 52.6	61.9 \pm 52.0	.341
Inspection prompted by complaint	16 (84.2)	270 (64.8)	.061

Note. Missing data for resident council and overall quality measures (for nursing homes, *n* = 283); specific quality measures for long-stay residents (for nursing homes, *n* = 278); inspections promoted by complaint and number of inspection violations (for assisted living, *n* = 437); type of care (for assisted living, *n* = 544); license type (for assisted living, *n* = 437).

^aDetermined with Fisher exact test for categorical variables and Wilcoxon rank sum test for continuous variables.

RESULTS

Over the 9-year study period, 51 suicides and 8 undetermined deaths occurred among LTC residents. VVDRS location codes for these 59 cases were supervised residential facility (*n* = 30), hospital (*n* = 18), house–apartment (*n* = 4), motor vehicle (*n* = 3), and natural area (*n* = 2); parking lot and railroad each had 1 case. Eight community cases (i.e., address did not match to a LTC facility) were coded as occurring in a supervised residential facility. Assuming the address match as the gold standard, we calculated the VVDRS supervised residential facility location code to have a sensitivity of 49% (25/51 cases) and a specificity of 99.8% (3394/3402 cases) in identifying cases of suicide among LTC residents.

Quantitative Analysis

The characteristics of decedents in LTC and community settings are described in Table 1. Tables A and B (available as a supplement to the online version of this article at <http://www.ajph.org>) describe these characteristics for suicide deaths only. Decedents in LTC were older, but did not differ by gender or race from decedents in the community. Firearms and hanging were the most common means of suicide among LTC residents. After accounting for age, gender, and race, suicide decedents in LTC were more likely than those in the community to be receiving psychiatric treatment (odds ratio [OR] = 3.81; 95% confidence interval [CI] = 2.06, 7.02; *P* < .001), have a mental health problem (OR = 2.21; 95% CI = 1.21, 4.09; *P* < .010), and have a history of suicide attempts (OR = 4.02; 95% CI = 1.92, 8.40; *P* < .001; Table C, available as a supplement to the online version of this article at <http://www.ajph.org>). Decedents in LTC were marginally less likely than those in the community to have experienced a recent crisis (OR = 0.48; 95% CI = 0.20, 1.14; *P* = .094) and were significantly less likely to have a physical health problem identified as a contributing factor to their suicide (OR = 0.41; 95% CI = 0.22, 0.77; *P* < .005).

Of the 59 suicides and undetermined deaths that occurred in LTC, we matched 52 (46 suicides and 6 undetermined deaths) to a specific facility recorded in NHC or Virginia Department of Social Services data. Table 2

TABLE 3—Organizational-Level Correlates of Suicide in Long-Term Care Versus Community Settings: Virginia, 2003–2011

Variable	OR (95% CI)	AOR (95% CI)
Nursing homes (n = 285)		
Bed size	1.00 (0.99, 1.01)	1.00 (0.99, 1.01)
Ownership		
For profit (Ref)	1.00	1.00
Nonprofit	3.42 (1.33, 8.82)	3.54 (1.37, 9.16)
Religious/government	2.09 (0.42, 10.35)	2.16 (1.43, 10.72)
Part of a continuing care retirement community		
No	1.00	1.00
Yes	12.41 (4.78, 32.22)	12.35 (3.97, 38.38)
Overall rating	1.80 (1.20, 2.69)	1.95 (1.21, 3.14)
Health rating	1.53 (1.06, 2.22)	1.60 (1.06, 2.43)
Staff rating	2.11 (1.32, 3.38)	2.07 (1.21, 3.52)
Quality rating	1.56 (0.94, 2.59)	1.56 (0.91, 2.66)
Specific quality measures for long-stay residents		
Experiencing moderate/severe pain	0.94 (0.87, 1.02)	0.93 (0.85, 1.02)
Receiving antipsychotic medication	0.99 (0.95, 1.05)	0.99 (0.95, 1.05)
Physically restrained	0.81 (0.53, 1.22)	0.81 (0.53, 1.24)
Depressed mood	1.08 (1.03, 1.14)	1.09 (1.03, 1.15)
Experienced ≥ 1 falls	0.97 (0.78, 1.21)	0.95 (0.76, 1.19)
Assisted living (n = 548)		
Bed size	1.01 (1.00, 1.02)	1.01 (1.00, 1.01)
Type of care		
Nonambulatory (Ref)	1.00	1.00
Ambulatory	0.46 (0.16, 1.36)	0.64 (0.21, 1.94)
License type		
Provisional	1.19 (1.14, 9.99)	1.00
1 y (Ref)	1.00	1.07 (0.12, 9.28)
2–3 y	1.14 (0.43, 3.00)	0.91 (0.33, 2.50)
Inspections		
None	1.00	1.00
Violations	0.99 (0.38, 1.00)	0.99 (0.98, 1.01)
Prompted by complaint	2.70 (0.77, 9.49)	2.72 (0.72, 10.30)

Note. AOR = adjusted odds ratio; CI = confidence interval; OR = odds ratio. Nursing home estimates adjusted for bed size and ownership. Assisted living estimates adjusted for bed size and type of care.

describes the characteristics of the 20 nursing homes and 26 assisted living facilities in which a death occurred; Table D (available as a supplement to the online version of this article at <http://www.ajph.org>) reports these same statistics for suicide deaths only. Five facilities experienced more than 1 suicide (Table E, available as a supplement to the online version of this article at <http://www.ajph.org>).

Nursing homes that had a suicide decedent did not differ from those that did not in size or ownership, but were more likely to be part of

a continuing care retirement community. After accounting for size and ownership, nursing homes with a suicide decedent had significantly better overall rating scores (OR = 1.95; $P < .006$), health scores (OR = 1.60; $P < .027$), and staff scores (OR = 2.07; $P < .007$) and marginally better quality scores (OR = 1.56; $P = .104$) than nursing homes that did not experience a suicide, according to NHC metrics (Table 3). Additional adjustment for being part of a continuing care retirement community did not change these results. Nursing homes with

a suicide decedent had significantly greater proportions of residents with elevated depressive symptoms (OR = 1.09; $P < .004$). Assisted living facilities that had a suicide decedent were significantly larger than those that did not (OR = 1.01; $P < .001$), even after accounting for type of care provided.

Finally, we estimated a range for the cumulative incidence of suicide in LTC among adults aged 65 years and older. The number of suicides in LTC and community settings from 2003 to 2011 is shown in Figure B (available as a supplement to the online version of this article at <http://www.ajph.org>). The annual cumulative incidence of suicide among adults aged 65 years and older in nursing homes ranged from 18.53 to 12.19 per 100 000 (Figure C, Table F, available as a supplement to the online version of this article at <http://www.ajph.org>), with an average incidence of 14.16 per 100 000 from 2006 to 2011. As a comparison, the incidence of suicide for adults aged 65 years and older in Virginia in 2010 was 15.66 per 100 000.

Qualitative Analysis

VVDRS narratives identified 109 cases that referenced LTC in some manner. Of those, 50 narratives indicated that the decedent resided in a nursing home or assisted living at the time of suicide (corresponding to 50/51 cases identified via address linkage). Thirty-eight narratives indicated that the decedent was anticipating transitioning to a facility, 5 narratives indicated the decedent had been recently discharged from a facility, and 16 narratives indicated that a family member of the decedent had recently transitioned (Table 4). Qualitative abstraction of these texts indicated that among decedents anticipating placement in a LTC facility, 23 (60.5%) threatened suicide or expressed a wish to die rather than enter LTC, and 20 (53%) had a history of a psychiatric disorder. Among decedents with a family member in LTC, 7 (44%) had a history of depression, and 6 (38%) had either attempted or threatened suicide in the past.

DISCUSSION

Over a 9-year period, approximately 3% of suicides among adults aged 50 years and older in Virginia were related to LTC in some

TABLE 4—Characteristics of Suicide Decedents Identified by Virginia Violent Death Reporting System Narratives: 2003–2011

Variable	Anticipating/Transitioning to LTC (n = 38), No. (%) or Mean \pm SD	Family Member/Loved One in LTC (n = 16), No. (%) or Mean \pm SD	Recently Discharged From LTC (n = 5), No. (%) or Mean \pm SD
Age, y	78.7 \pm 9.6	75.5 \pm 12.2	75.6 \pm 6.4
Male	32 (84.2)	14 (87.5)	5 (100)
White race	36 (94.7)	16 (100)	5 (100)
Manner of injury			
Firearm	30 (78.9)	14 (87.5)	< 5
Other	8	< 5	< 5
Contextual characteristics			
History of psychiatric disorder	20 (52.6)	7 (43.8)	< 5
Current physical health condition	30 (78.9)	5 (31.3)	5 (100)
Verbal threat or previous suicide attempt	23 (60.5)	6 (37.5)	< 5

Note. LTC = long-term care. History of psychiatric disorder encompasses any condition (e.g., major depression, schizophrenia). Physical health problem encompasses any major medical condition that was identified as a precipitating factor in the death (e.g., cancer, Parkinson's). Verbal threat or past attempt encompasses any explicit threat of self-harm or statements that the decedent "would rather die than live in a nursing home."

manner, including 51 deaths that occurred in a facility. Despite staff supervision and previous research suggesting that suicide risk is lower in these facilities,¹⁷ in our data the cumulative incidence of suicide among adults aged 65 years and older in nursing homes was comparable to community estimates. Coupled with the high prevalence of depression and suicidal ideation in these settings,¹⁵ these findings indicate that LTC should be treated as a point of engagement for preventing suicide. Many of the risk factors for suicide in the community were reflected in LTC, including White race, male gender, history of suicide attempts, and presence of a mental health problem. We also identified anticipation of transitioning into LTC, either for individuals themselves or their loved ones, as a contributor to suicide. The implementation of effective suicide prevention strategies requires rigorous evidence about risk and protective factors,^{2,4} and to our knowledge, our analysis provides the most comprehensive assessment of the epidemiology of suicide in LTC facilities to date.

Depression is a more common diagnosis among new nursing home residents than dementia.⁴² LTC facilities intrinsically serve as both homes and places of care for residents, as

settings where people live and where they die.^{43,44} Approximately 22% of long-stay nursing home residents and 14% of assisted living residents die each year,^{45,46} and qualitative studies consistently report that residents comment on the visibility of death.^{47,48} Although it is not uncommon for residents to talk about dying, including expressing thoughts about suicide,^{15,49} staff are often reluctant to engage residents in these discussions.^{43,44} Residents often express relatively little anxiety about death, but rather concern about becoming dependent, including being distressed by witnessing the functional decline of other residents.^{43,44} However, it is important to note that research also indicates the positive role that LTC staff can play in promoting psychosocial well-being among residents.^{49,50}

Limitations

Several structural and compositional LTC facility characteristics were associated with suicide risk. These findings need to be replicated and must be interpreted with caution. Several processes are likely relevant. It may be that there is differential selection into better-performing nursing homes. All individuals must undergo Preadmission Screening and

Resident Review to identify whether skilled care is necessary and, if so, what types of services are needed, including psychiatric consultation⁵¹; individuals with more severe psychiatric needs may select into better-performing facilities that offer those services. Performance affects consumer demand, and thus better-performing facilities are able to be more selective and may preferentially admit individuals who have less functional impairment and are thus more capable of self-harm. Better-performing nursing homes may extend residents' lives or provide less restrictive environments, providing more opportunities for residents to harm themselves.

Because of the limitations of the data, we could not account for the demographic composition of facilities (other than bed size), clinical details about LTC utilization (e.g., duration of residence), or characteristics of the physical and social space (e.g., public spaces, private vs shared rooms) that may be relevant. Finally, better-performing nursing homes, particularly continuing care retirement communities, are generally more expensive^{52,53} and thus are more readily accessible to socioeconomically advantaged (i.e., private pay) families; it may be that this transition, in particular concerns about becoming dependent on others, is interpreted as a more severe loss of status for these individuals.

Although VVDRS narratives are constructed through standardized procedures, these are not clinical interviews, and as such their language (e.g., decedent was depressed) does not reflect psychiatric diagnoses. Information on facility characteristics was limited to those that were operating at the time of data abstraction and represent performance at only 1 time; however, NHC ratings are relatively stable over time,³⁸ and thus we do not feel this substantially affected our results.

We lacked information on quality metrics for assisted living facilities because this information is not publicly reported in Virginia. The cost, coverage, and regulation of assisted living facilities vary by state; for example, the cost of these services in Virginia is somewhat higher than the national average.⁵⁴ NHC health and overall quality ratings are based on relative facility performance within a state, and as a result we cannot generalize these results to nursing home facilities nationwide; however, Virginia NHC ratings are in line with national averages.⁵⁵

Conclusions

Our study had notable strengths, including the long follow-up period and novel data linkage. Suicides were recorded by the VVDRS, not the facilities themselves, and this data source is independent from databases of organizational characteristics, which protects against reporting and detection bias. Because we employed both quantitative and qualitative methods, we were able to examine the relationship between LTC and suicide risk more comprehensively than could be achieved with either approach alone.

The Substance Abuse and Mental Health Services Administration recommends both universal (e.g., sponsoring activities to promote social interaction, minimizing access to lethal means) and targeted (e.g., training staff to recognize and respond to depression) approaches to preventing suicide among LTC residents.¹⁴ As the LTC marketplace evolves,^{4,56} epidemiological research is needed to identify modifiable risk factors for suicide in these settings, and housing transitions more generally, in later life. Future research should explore the impact of state-level variability in policies regarding LTC licensing (particularly for assisted living); resident screening, eligibility, and placement; and coverage (e.g., Medicaid) for LTC and nonresidential alternatives (e.g., home health, day care), as well as more local factors (e.g., formal and informal support networks for older adults and their caregivers). ■

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Contributors

B. Mezuk conceptualized the study, developed the study design, conducted the quantitative data analysis, and wrote the first draft of the article. M. Lohman contributed to the development of the study design, conducted the qualitative data analysis, and assisted with the writing

of the article. M. Leslie and V. Powell provided access to the VVDRS data, assisted with the study design, and provided critical feedback on the article. All authors approved the final version of the article.

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Human Participant Protection

The institutional review board at Virginia Commonwealth University determined that this study did not qualify as human participant research because all participants were deceased at the time of data collection.

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