Treatment of Veterans With Depression Who Died by Suicide: Timing and Quality of Care at Last Veterans Health Administration Visit

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Objective: To examine the recency and quality of the last Veterans Health Administration (VHA) visit for patients with depression who died by suicide.

Method: We obtained services and pharmacy data for all 1,843 VHA patients with diagnosed depressive disorders (*DSM-IV* criteria) who died by suicide from April 1999 through September 2004. We ascertained the location and timing of their final VHA visit. For visits occurring within 30 days of suicide, we examined 3 quality indicators: (1) evidence that mental illness was a focus of the final visit, (2) adequacy of antidepressant dosage, and (3) recent receipt of mental health services.

Results: Just over half of the patients (51%) with depression diagnoses had a VHA visit within 30 days of suicide. A minority of these patients (43%) died by suicide within 30 days of a final visit with mental health services, although 64% had received such services within 91 days of their suicide. Among the 57% of patients who died by suicide within 30 days and who were seen in non–mental health settings for their final visit, only 34% had a mental health condition coded at the final visit, and only 41% were receiving adequate dosages of antidepressant (versus 55% for those last seen by mental health services) ($P < .0005$).

Conclusions: Veterans Health Administration patients with depression who died by suicide within 30 days of their final visit received relatively high rates of mental health services, but most final visits still occurred in non–mental health settings. Increased referrals to mental health services, attention to mental health issues in non–mental health settings, and focus on antidepressant treatment adequacy by all providers might have reduced suicide risks for these patients.

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Over the past decade, suicide has been increasingly recognized as a major public health problem.[1–6] Many studies, primarily from the United Kingdom and Scandinavia (reviewed in 2002 by Luoma et al[7]), have reported that individuals in the community who died by suicide often have had contact with a health care provider shortly before their death. In their review, Luoma et al[7] reported that 45% of persons in the general population who died by suicide had had contact with a primary care provider within 1 month of suicide. In contrast, lower percentages of individuals had had contact with a mental health provider within 1 month (19%) and 1 year (32%) of suicide. Thus, most individuals were not receiving mental health treatment at the time of suicide, and many individuals were not known to have a mental disorder until after the suicide.[8–10] While it has not yet been conclusively determined to what degree treatment of depression reduces future suicide risk, a recent randomized study[11] indicated that structured depression treatment delivered in primary care settings can reduce suicidal ideation. A recent nonrandomized study[12] has also indicated that the initiation of either antidepressants or psychotherapy is typically associated with reduced suicide attempts. This finding may, however, reflect referral patterns and a general benefit of starting depression treatment, rather than an effect specific to either medications or psychotherapy.

As a result of these data, many health care systems have introduced programs targeting primary care physicians in an effort to improve their recognition and treatment of psychiatric conditions that increase suicide risks, such as depression.[13,14] The Veterans Health Administration (VHA) in particular has recently introduced several educational and clinical initiatives designed to improve the detection and treatment of individuals with depressive disorders, in addition to implementing other suicide risk reduction strategies.[6] (The VHA is an integrated health care system that treats exclusively veterans and serves approximately 22%–23% of US veterans.[15,16]) Although recognition and treatment of depression is an important early step in suicide prevention, further efforts may be needed to reduce risk of suicide among patients recognized as having depressive disorders. These efforts may include specific quality improvement measures for services provided to depressed individuals across clinical areas (eg, primary care, specialty mental health care).[17]

For this study, we focused on 1,843 suicides that occurred in a cohort of all VHA patients who, over a 5.5-year study period, received either (1) more than 1 diagnosis of depression or (2) the prescription of an antidepressant in addition to a diagnosis of depression. We first determined the percentage of patients with depression who died by suicide who had a clinical encounter shortly before suicide (reasoning that there may have been opportunities to intervene and reduce suicide risks at these last, proximal clinical encounters). We then examined (1) whether a recent encounter had occurred with a mental health provider, (2) whether there was a focus on a mental health condition at the time of the final visit, and (3) the adequacy of pharmacologic treatment for depression. To our knowledge, this study is the first to focus

on the timing of the last visit before suicide in patients with depressive disorders—and the first to examine these specific indicators of quality of care received by patients with depression shortly before suicide.

METHOD

Data Sources

The data for this report were collected from the VHA's National Registry for Depression,[18] maintained by the VHA Serious Mental Illness Treatment Resource and Evaluation Center in Ann Arbor, Michigan. The National Registry for Depression includes data from a variety of Veterans Administration (VA) sources for over 2.2 million patients diagnosed with depressive disorders in VA facilities from fiscal year 1997 forward. These data were linked to data from the National Death Index (which provides information on all causes of death, including suicide). This study was approved by the Institutional Review Board of the Ann Arbor VA Medical Center.

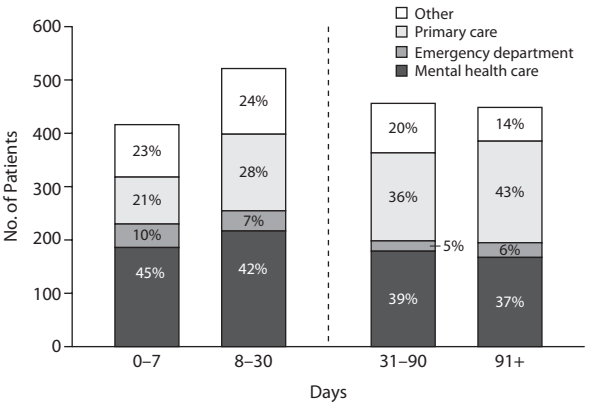
Study Design

The observation period for this retrospective cohort study extended from April 1, 1999, through September 30, 2004. Patients were included in the cohort if they had received (1) a diagnosis of a depressive disorder (defined as *DSM-IV* code 296.2x, 296.3x, 298.0, 300.4, 309.0, 309.1, 311, 296.90, 296.99, 293.83, or 301.12) *and* an antidepressant medication prescription, or (2) a diagnosis of a depressive disorder on 2 separate days during the study period. We excluded patients with bipolar I disorder, schizophrenia, or schizoaffective diagnoses during the observation period or the year prior to their entry into the cohort since these diagnoses have additional implications for treatment and the risks of suicide.

Study Population

We focused on 1,843 cohort members who died by suicide during this time period. This number represents approximately 22% of all deaths by suicide among VHA patients for this period. We characterized their final visit prior to suicide by whether they completed their final visit with a mental health provider (as determined by VHA clinic stop codes in the 500 series and 690, 692, 693, and 179 or by a psychiatric bed section or psychiatric diagnosis as primary inpatient diagnosis), a primary care provider (VHA clinic stop codes 301, 303, 305, 306, 309, 310, 312, 322, 323, 348, 350, 531, or 563), an emergency department provider (VHA code 102), or "other" provider. "Other" providers were a diverse, heterogeneous collection of providers including specialist physicians, dental services, audiology services, nurses, social workers, prosthetics providers, preventive care providers, and medical inpatient providers. Telephone encounters (current procedural terminology [CPT] codes 99371, 99372, and 99373) were excluded from study analyses. We reviewed progress notes of all patients who initially appeared to die by suicide the day of their final visit to exclude encounters that were actually documentation of the patients' death (patients were then assigned their immediately preceding visit as their final visit).

Figure 1. Time From Last Veterans Health Administration Visit to Suicide, by Type of Service at Last Visit (N = 1,843)[a]



[a]Percentages inside the bars indicate the percent of suicides in that time period with a final visit with that type of service. The dotted line indicates the time period (0–30 days from final visit) focused upon in subsequent analyses.

Population Characteristics

We determined demographic and clinical factors associated with the length of time from last visit to death by suicide (0–30 days versus 31+ days from last visit). For patients who died by suicide within 30 days of their last visit, we then determined the association between their demographic and clinical factors and the clinical service seen at last visit. Significance of the relationships between patient demographic and clinical factors and proximity of the last visit to suicide was assessed using χ^2 tests.

Potential Indicators of Quality of Care

The potential quality indicators we examined were defined as follows:

Existence of a final visit proximal to suicide. The timing of the last visit relative to the date of suicide was determined.

Recent treatment from a mental health provider. We determined the proportion of the sample, by service, receiving mental health treatment in the last 91 days.

Focus on mental health at the final visit. We determined the proportion of the cohort that had any mental health disorder coded at the last visit, as well as the proportion with a mental health disorder coded as the primary diagnosis or as the sole diagnosis. We also determined the proportion receiving a specific diagnosis of depression at the final visit.

Adequacy of antidepressant treatment. Using the method of Oquendo et al,[19] antidepressant daily dosages were classified as "adequate" as follows: ≥ 200 mg of imipramine, amitriptyline, desipramine, trimipramine, clomipramine, maprotiline, doxepin, or fluvoxamine; ≥ 76 mg of nortriptyline; ≥ 41 mg of protriptyline, selegiline, tranylcypromine, or isocarboxazid; ≥ 20 mg of paroxetine, fluoxetine, or citalopram; ≥ 100 mg of sertraline; ≥ 61 mg of phenelzine;

Table 1. Patient Characteristics by Type of Service Seen at Final Visit Occurring Within 30 Days of Suicide

Characteristic	Total (N = 938), % (n)	Site of Final Visit: Mental Health (n = 405), % (n)	Primary Care (n = 233), % (n)	Emergency Department (n = 80), % (n)	Other (n = 220), % (n)	*P* Value[a]
Demographic						
Male	97.1 (911)	97.0 (393)	97.0 (226)	98.8 (79)	96.8 (213)	.8363
Age group						< .0001
18–39 y	9.2 (86)	14.3 (58)	4.7 (11)	8.8 (7)	4.6 (10)	
40–49 y	21.9 (205)	24.7 (100)	20.2 (47)	17.5 (14)	20.0 (44)	
50–64 y	36.5 (342)	39.0 (158)	32.2 (75)	36.3 (29)	36.4 (80)	
≥ 65 y	32.5 (305)	22.0 (89)	42.9 (100)	37.5 (30)	39.1 (86)	
White race	93.9 (803)	94.2 (341)	96.7 (206)	85.1 (63)	93.7 (193)	.0047
Hispanic ethnicity	2.9 (27)	2.7 (11)	3.4 (8)	2.5 (2)	2.7 (6)	.9496
Had inpatient mental health stay	34.8 (326)	50.9 (206)	18.5 (43)	27.5 (22)	25.0 (55)	< .0001
Diagnosis at last visit						
Any depression[b]	39.7 (372)	63.5 (257)	32.2 (75)	23.8 (19)	9.6 (21)	< .0001
Depression not otherwise specified	16.8 (158)	18.3 (13)	25.8 (60)	16.3 (13)	5.0 (11)	< .0001
Major depressive disorder	17.0 (159)	36.3 (147)	2.2 (5)	5.0 (4)	1.4 (3)	< .0001
Diagnosis in 12 months before suicide						
Any depression[b]	88.6 (831)	95.1 (385)	86.7 (202)	83.8 (67)	80.5 (177)	< .0001
Depression not otherwise specified	65.1 (611)	65.4 (265)	69.5 (162)	66.3 (53)	59.6 (131)	.1670
Major depressive disorder	41.7 (391)	61.7 (250)	21.0 (49)	32.5 (26)	30.0 (66)	< .0001
Psychotic depression	7.9 (74)	13.3 (54)	3.0 (7)	3.8 (3)	4.6 (10)	< .0001
Charlson Comorbidity Index[c]						< .0001
0	45.0 (422)	56.8 (230)	38.6 (90)	45.0 (36)	30.0 (66)	
1	20.9 (196)	19.3 (78)	24.5 (57)	20.0 (16)	20.5 (45)	
2	10.8 (101)	8.4 (34)	12.0 (28)	13.8 (11)	12.7 (28)	
> 2	23.4 (219)	15.6 (63)	24.9 (58)	21.3 (17)	36.8 (81)	
Diagnosis during or 12 months before cohort entry						
Major depressive disorder	25.2 (236)	38.8 (157)	12.0 (28)	16.3 (13)	17.3 (38)	< .0001
Drug or alcohol abuse/dependence	37.2 (349)	43.7 (177)	32.2 (75)	33.8 (27)	31.8 (70)	.0047
Alcohol abuse/dependence	32.9 (309)	39.3 (159)	24.0 (56)	31.3 (25)	31.4 (69)	.0011
Drug abuse/dependence	26.0 (244)	30.4 (123)	20.2 (47)	23.8 (19)	25.0 (55)	.0375
Posttraumatic stress disorder	24.7 (232)	35.1 (142)	16.7 (39)	11.3 (9)	19.1 (42)	< .0001
Other anxiety disorder	37.6 (353)	43.2 (175)	37.3 (87)	32.5 (26)	29.6 (65)	.0061
Psychotic disorder	7.4 (69)	8.4 (34)	5.2 (12)	10.0 (8)	6.8 (15)	.3591
Major depressive disorder with psychosis	4.8 (45)	5.9 (24)	4.3 (10)	3.8 (3)	3.6 (8)	.5517
Personality disorder	10.2 (96)	16.3 (66)	4.7 (11)	3.8 (3)	7.3 (16)	< .0001
No. of psychiatric diagnoses[d]						< .0001
1	30.8 (289)	19.8 (80)	39.5 (92)	42.5 (34)	37.7 (83)	
2–3	58.7 (551)	63.7 (258)	54.1 (126)	51.3 (41)	57.3 (126)	
≥ 4	10.5 (98)	16.5 (67)	6.4 (15)	6.3 (5)	5.0 (11)	

[a] 2×4, 3×4, or 4×4 χ^2 test as appropriate (4×4: strata of characteristic [age, Charlson Comorbidity Index] by service [mental health versus primary care versus emergency department versus other]; 3×4: number of psychiatric diagnoses versus service; 2×4: all other comparisons).
[b] Defined as *DSM-IV* codes 296.2x, 296.3x, 298.0, 300.4, 309.0, 309.1, 311, 296.90, 296.99, 293.83, or 301.12.
[c] The Charlson Comorbidity Index[20] refers to a weighted index of 19 medical conditions that takes into account the number and seriousness of comorbid medical illnesses. Included conditions range from cardiac and gastrointestinal conditions, liver and renal disease, diabetes, chronic obstructive pulmonary disease, cancers of the blood and solid organs, and acquired immune deficiency syndrome.
[d] Includes any or all depression diagnoses (counts as a single diagnosis), substance dependence or abuse, posttraumatic stress disorder, other anxiety disorder, bipolar II disorder, psychotic disorder, and personality disorder.

≥ 300 mg of moclobemide, nefazodone, or bupropion; ≥ 30 mg of mirtazapine; ≥ 225 mg of venlafaxine; and ≥ 400 mg of trazodone.

The statistical significance of each quality indicator was tested by χ^2 tests.

RESULTS

Existence and Location of a Final Visit Proximal to Suicide

The time interval between the last visit with a VHA provider and death by suicide for patients with diagnosed depression is presented in Figure 1. Just over half of the patients (51%) died by suicide within 30 days of a visit with a VHA provider.

Among patients seen within 30 days of suicide, 43% last saw a mental health provider (as either inpatient or outpatient), 25% last saw a primary care provider, 9% last saw an emergency room provider, and the remaining 23% last saw other providers. Table 1 indicates the demographic and clinical characteristics of patients who died by suicide within 30 days by the last VHA service seen. Patients last seen by mental health care were significantly more likely to have had an inpatient stay and were more likely to have a diagnosis of any depression, major depressive disorder, or psychotic depression in the 12 months before suicide. Patients last seen by mental health care were diagnosed with a larger number of psychiatric disorders, on average, and were more likely to have histories of alcohol abuse or dependence, drug abuse or dependence, posttraumatic stress disorder, other anxiety disorders, and personality disorders. Patients last seen by non–mental health services were more likely to be older and have more medical conditions.

Table 2. Receipt of Mental Health Specialty Care in the Last 91 Days by Location of Last Visit[a]

	Timing of Last Mental Health Visit Relative to Suicide			
Non–Mental Health Service Providing Last Visit	≤91 Days (n = 605), % (n)	≥92 Days (n = 192), % (n)	Never Received Mental Health Specialty Care[b] (n = 141), % (n)	*P* Value
Total (N = 938)	64.5 (605)[c]	20.5 (192)	15.0 (141)	NA
Primary care (n = 233)	33.5 (78)	34.3 (80)	32.2 (75)	.1135[d]
Emergency department (n = 80)	38.8 (31)	38.8 (31)	22.5 (18)	
Other (n = 220)	41.4 (91)	36.8 (81)	21.8 (48)	

[a]For patients who died by suicide within 30 days of final visit.
[b]During the study period.
[c]Includes 324 mental health outpatient and 81 mental health inpatient encounters that were the final encounter and occurred within 30 days of suicide, as well as 200 patients whose final visits were with another service but who had had a mental health visit in the last 91 days.
[d]2 × 3 χ^2 test (primary care versus emergency department versus other).
Abbreviation: NA = not applicable.

Table 3. Conditions Coded as Treated at Final Visit by Type of Service Provider (N = 938)[a]

Mental Health Diagnosis	Mental Health (n = 405), % (n)	Primary Care (n = 233), % (n)	Emergency Department (n = 80), % (n)	Other (n = 220), % (n)	*P* Value[b]
Any mental health diagnosis	96.1 (389)	48.1 (112)	37.5 (30)	18.2 (40)	<.0001
Mental health diagnosis is primary diagnosis	94.3 (382)	15.9 (37)	32.5 (26)	7.3 (16)	<.0001
Any depression	63.5 (257)	32.2 (75)	23.8 (19)	9.6 (21)	<.0001
Depression not otherwise specified	18.3 (74)	25.8 (60)	16.3 (13)	5.0 (11)	<.0001
Major depressive disorder	36.3 (147)	2.2 (5)	5.0 (4)	1.4 (3)	<.0001

[a]For patients who died by suicide within 30 days of final visit.
[b]2 × 4 χ^2 test (mental health versus primary care versus emergency department versus other).

Patients last seen in the emergency department were less likely to be white.

Tables 2–4 examine 3 potential indicators of the quality/intensity of care received by VHA patients who were last seen within 30 days of their suicide. Table 2 focuses on recent treatment by mental health specialty care, and Tables 3 and 4 examine treatment at their final visit.

Recent Treatment From a Mental Health Provider

Table 2 shows that almost two-thirds of patients had seen a mental health provider within the last 91 days (43% of patients had completed their last visits with a specialty mental health provider, while an additional 21.5% had completed their last visit with a non–mental health provider but had seen a mental health provider within the prior 3 months).

However, 15% of patients had never received specialty mental health care during the study period, and 21% received mental health treatment in the last year but not within the last 91 days. Patients whose last visit was with their primary care provider as opposed to other non–mental health services were the least likely to have received recent mental health treatment (33.5% versus 38.8% and 41.4% for those last seeing emergency department or other providers, respectively) ($\chi^2_2 = 7.3$, $P = .0262$) or to have received any past mental health specialty care during the study period (32.2% never received mental health specialty care, versus 21.8%–22.5% seeing emergency department or other providers) ($\chi^2_2 = 7.0$, $P = .0082$). Additional analysis indicated that the elderly were at 3 times the risk of patients of other ages for not receiving any mental health specialty treatment during the study period (OR = 3.3; 95% CI, 2.3–4.8; $\chi^2_1 = 44.4$; $P < .0001$). Of the patients who died by suicide within 30 days of final visit who had never received mental health treatment, 56.7% were ≥65 years old.

Focus on Mental Health at Final Visit

We sought to determine how likely mental health conditions were to be a focus of the final visit through examining diagnostic codes recorded at the final visit. Table 3 indicates that, for patients who did not receive their final visit in mental health, little more than one-third of the final visits (34.1%) included coding for *any* mental health condition compared to 96.1% of mental health final visits ($\chi^2_1 = 370.3$. $P < .0001$), and only 14.8% had mental health conditions coded as the primary diagnosis, compared with 94.3% of mental health final visits ($\chi^2_1 = 582.0$, $P < .0001$). Rates of mental health diagnoses at the final visit were highest in primary care—but still were present in less than half of the visits (48.1%). Rates of diagnosis for depression were even lower, particularly for major depressive disorder.

We examined whether the likelihood of a mental health or depression diagnosis at the final visit was based on whether the patient had received recent (ie, within 91 days) mental health treatment. Rates of depression diagnoses were lower if a patient was last seen in primary care and had recently received mental health treatment than if they had not recently received mental health treatment (19.2% versus 38.7%, respectively; $\chi^2_1 = 9.0$, $P < .0027$), and rates of mental health diagnoses were nonsignificantly lower (42.3% versus 51.0%, respectively; $\chi^2_1 = 1.6$, $P < .21$). For the other services, rates were similar regardless of whether patients had received recent mental health services (data not shown).

Even when the final visit was with a mental health provider, only 63.5% of the final visits were coded with a depressive disorder diagnosis despite the fact that this cohort was selected on the basis of having a prior diagnosis of depression (Table 3). We examined the mental health diagnoses received by patients whose last visit within 30 days of suicide was with mental health providers but who did not receive a diagnosis of depression. Four categories of diagnoses made up approximately 84% of the diagnoses among those not receiving a depression diagnosis: adjustment disorders (33.8%), alcohol dependence (20.8%), drug abuse or dependence (15.6%), and anxiety disorders (13.6%).

Table 4. Rates of Overall Psychotropic Treatment, Antidepressant Treatment, and Adequate Antidepressant Treatment at Last Visit by Type of Service[a,b]

		Type of Service Seen at Last Visit				
Treatment at Last Visit	Total (N = 938), % (n)	Mental Health (n = 405), % (n)	Primary Care (n = 233), % (n)	Emergency Department (n = 80), % (n)	Other (n = 220), % (n)	*P* Value[c]
Percent receiving *any* psychotropic	83.2 (780)	90.4 (366)	77.3 (180)	72.5 (58)	80.0 (176)	< .0001
Percent receiving any antidepressant	69.9 (656)	80.3 (325)	62.2 (145)	57.5 (46)	63.6 (140)	< .0001
Percent receiving antidepressant at adequate dose	47.4 (445)	55.3 (224)	41.6 (97)	41.3 (33)	41.4 (91)	< .0001
Percent with current diagnosis of depression not otherwise specified or major depressive disorder receiving antidepressant at adequate dose	55.7 (172)[d]	58.2 (124)[d]	50.8 (33)[d]	58.8 (10)[d]	35.7 (5)[d]	.1785[e]

[a]For patients who died by suicide within 30 days of final visit.
[b]Based on the dosage in the prescription entered for the patient at the date of the last visit or, if no prescription was entered on that date, the most recent prescription prior to that date.
[c]2×4 χ^2 test (mental health versus primary care versus emergency department versus other).
[d]Denominators for percent of patients with a current diagnosis of depression not otherwise specified or major depressive disorder receiving adequate doses of antidepressants are n = 309 for total, n = 213 for mental health, n = 65 for primary care, n = 17 for emergency department, and n = 14 for other specialties.
[e]The *P* value for a 2×2 χ^2 test (mental health versus all other services combined) is .0005.

Adequacy of Antidepressant Treatment

Table 4 indicates that less than half of those who died by suicide within 30 days of their last health care visit were receiving antidepressant at adequate dosage (47.4%) on the date of the final visit. This percentage increased for those patients whose last visit was with mental health services (55.3%) versus other settings (41.3%–41.6%; $\chi^2_3 = 17.7$, $P < .0005$). A major determinant of these relatively low rates of adequate antidepressant treatment appears to be the substantial fraction of individuals receiving no antidepressant treatment (from 19.7% who had a mental health final visit to 42.5% who had an emergency department final visit). When we limited our analysis to patients seeing a non–mental health provider at final visit, rates of adequate antidepressant treatment were significantly higher for patients who had received recent mental health specialty care (52.0%) versus those who had not (35.1%) ($\chi^2_1 = 14.6$, $P = .0001$).

We also restricted our analysis to individuals who received specific depression diagnoses (depression not otherwise specified or major depressive disorder) the day of their final visit to examine whether one possible reason for the low rates of adequate antidepressant treatment is that some individuals were no longer considered depressed. Rates of adequate depression treatment did increase modestly to 55.7%, were no longer statistically differed between services ($\chi^2_3 = 3.5$, $P < .3182$), and were numerically similar (ranging from 50.8%–58.8%), except for other providers (35.7%).

As a subgroup analysis, we examined individuals who died by suicide within 7 days of their final visit (416 patients). We observed generally similar patterns of care to that received by individuals who died by suicide within 30 days of their final visit. Rates of mental health specialty care utilization were similar (65.8% had had mental health specialty visits in the last 91 days; 20% had seen mental health providers, but not within the last 91 days; and 14.1% had not seen mental health providers during the study period). The proportion of individuals whose final visit was with inpatient mental health services was also similar (8.6% for those who died by suicide within 30 days, 10.1% for those who died by suicide within 7 days). A similar pattern across services in the prevalence of final-visit psychiatric diagnoses was observed: a 96% rate of psychiatric diagnoses for final mental health visits, a 46% rate for primary care, 40% for emergency department visits, and 23% for visits with other providers ($\chi^2_3 = 176.5$, $P < .0001$). Individuals who died by suicide within 7 days of their final health care visit had experienced higher rates of antidepressant adequacy, although the pattern of antidepressant adequacy across services was similar: 82% of patients last seen by mental health providers had adequate antidepressant treatment, followed by 64% of patients last seen by other providers, 63% of those last seen by primary care, and 56% of those last seen by emergency department providers ($\chi^2_3 = 21.8$, $P < .0001$).

DISCUSSION

Our study indicated that approximately half (51%) of VHA patients with depression who died by suicide from 1999 to 2004 saw a health care provider in the month before suicide. Given the proximity of these final visits to the patients' deaths by suicide, we assumed that many of these patients may have been experiencing substantial depression symptoms and possibly suicidal ideation at the time of this final visit. We focused our subsequent analyses of potential quality indicators on these patients who died by suicide within 30 days of their final VHA visit.

Many patients who died by suicide within 30 days of their final visit saw a mental health provider either for their final visit (43%) or within the 3 months prior to suicide (64.5%). Despite this fact, adequate antidepressant treatment was only incompletely provided (45% of patients who last saw a mental health provider and 58% of patients who saw other services were not receiving adequate doses of antidepressants). Furthermore, as others have observed,[21] if a patient was not seen by a mental health provider for their final visit, psychiatric diagnoses were usually not recorded, suggesting that mental health issues were usually not a focus of the final visit. This is particularly concerning since, despite the high

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level of engagement of patients with identified depressive disorders with mental health specialty care, the majority saw a non–mental health provider at their final visit. Primary care, the emergency department, and other services remain "on the front lines" of caring for suicidal individuals, even for those receiving mental health specialty care.

Our data suggest that when patients with depressive disorders receive their last visit outside of mental health or the emergency room, their mental health conditions are often not the focus of the meeting. While it may not be realistic to expect non–mental health clinicians, trained to attend to myriad physical conditions, to routinely devote encounters substantially to mental health, patients with diagnosed depressive disorders may need more careful screening and attention.

Non–mental health clinicians may also pay less attention to mental health conditions when patients are also seen in mental health care, potentially feeling that these issues are addressed elsewhere. We found that patients last seen in primary care were significantly less likely to receive a diagnosis of depression at their final visit and nonsignificantly less likely to receive a diagnosis of any psychiatric disorder if they had received recent mental health treatment. The extent to which exacerbations of depression may be missed in these patients because it is assumed their conditions are being addressed elsewhere is unclear.

Our data, similar to previous reports,[8,22,23] also suggest that there may be additional room for referral to mental health specialty care, especially for elderly patients. Many elders who have died by suicide proximal to VHA appointments were never seen in mental health specialty care. This observation is similar to recent findings from Taiwan that men > 55 years old were the least likely to use a mental health provider in the year before suicide[22] and to older findings from Finland.[23]

The causes of lower use of mental health services by the elderly, in the VHA and elsewhere, are most likely multifactorial. Studies have indicated that many elderly patients may prefer to receive mental health services in a primary care setting rather than from specialty mental health services.[24,25] These findings have been part of the rationale for the VHA and other health systems to provide more mental health care integrated into primary care settings. However, our study indicates that many elderly patients with depression who die by suicide shortly after a visit were being seen in primary care and did not receive a diagnosis of depression or any other mental health condition at their final visit. Higher levels of referral to mental health services may be desirable for elderly patients who are willing to accept such referrals, along with further improvement of primary care services for patients who elect to remain in primary care. The VHA's integrated health care system facilitates such referrals, which may not be as easily achieved in more fragmented health systems or those limiting mental health specialty care access. The importance of adequate treatment of geriatric depression has been underscored by the recent US Food and Drug Administration meta-analysis of adult antidepressant trials, which found the elderly to be the only group with a statistically significant decrease in risk of suicide with antidepressant treatment.[26]

Although speculative, it is possible that primary care providers may not be factoring in the increased lethality of late-life depression[10] when deciding whether to refer—or may not realize that the increased number of medical conditions requiring management in elderly patients may make it more difficult for primary care physicians to also adequately manage mental health conditions.[27] In addition, it is possible that providers may be slower to recognize or more apt to discount suicidality in patients they have treated for a long period of time. It is worth noting that, among patients diagnosed with depression, almost 70% of suicide deaths that occurred within 30 days of a health care visit occurred in individuals aged 50 years and older, and 32.5% occurred in patients aged 65 years and older.

We found that less than half of our cohort was receiving antidepressants at an adequate dose at the last visit. Even when we restricted the sample to those clearly having a current diagnosis of depression at their last visit, almost half of our cohort (44%) still was not receiving adequate doses of antidepressant. While these rates easily exceed rates of toxicologically confirmed antidepressant use among suicide deaths from general population samples[28–33] and from psychological autopsies of samples with depression treated with older (pre–selective serotonin reuptake inhibitor) antidepressants[34] or samples with likely mental illness,[35] the fact that approximately one-half of patients with diagnosed depression seen proximal to their suicide were not receiving adequate doses of antidepressants suggests a potential target for quality improvement efforts.

Limitations of our study included the fact that our methodology relied on routinely recorded administrative data, which did not permit the addressing of the adequacy of suicidal assessment that patients received in their final visit. As other reports[36,37] have found, suicide assessments may have been conducted, and the patient may not have communicated suicidal intent. This might have occurred because patients were not yet suicidal; were unaware of, discounted, or concealed their suicidal vulnerability; or were judged by the clinician not to be at high suicide risk. Thus, it cannot be inferred that clinicians in our study failed to complete these assessments without chart reviews. Second, for our analysis of the prevalence of coding of mental health conditions at the final visit, it is possible that providers may have actually addressed mental health conditions more frequently than reflected in diagnostic codes (eg, if providers were concerned about stigmatizing the patient). All patients in our cohort had, however, already received at least 1 coded diagnosis of depression. Third, antidepressant usage could partly qualify patients for entry into the cohort (in conjunction with at least 1 diagnosis of depression), possibly resulting in higher rates of antidepressant treatment than if our definition had exclusively used diagnostic codes. Fourth, because of our focus on the VHA system of care, we are not able to determine whether veterans used non-VHA emergency departments,

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inpatient mental health units, or outpatient providers before suicide: the data given here are for the VHA system only. In addition, while our sample was a comprehensive subset of VHA patients, such patients are not representative of the entire veteran population or of patients in other settings of care. (For example, only approximately 22%–23% of all veterans use VHA health facilities.[15,16]) Thus, the generalizability of our findings to more demographically (eg, gender and racial/ethnic) or occupationally (eg, nonveteran) diverse populations and other health care systems cannot be determined. Last, this investigation's study period ends shortly before the initiation of several VHA suicide prevention initiatives (eg, increased screening in primary care, flagging of high risk patients, etc), which may have influenced the patterns reported here.

Strengths of our study include a nationwide sample receiving care over 5+ years that is sufficiently large (1,843 suicide deaths, 938 within 30 days of final visit) to allow temporal and treatment patterns to be evaluated. In addition, the VHA databases allow linking of diagnostic, treatment, and demographic information, as well as linking between inpatient and outpatient care.

To put our results concerning the timing of visits prior to suicide into context, it is helpful to match the approach of other published reports[7] that examined the timing of care received by the entire cohort that died by suicide. Examining the entire cohort of 1,843 patients with depression who died by suicide, 27.1% of patients had seen a mental health provider within 30 days of suicide, and 65.4%, within a year. Not surprisingly, this rate of mental health specialty care contact compares extremely favorably with the rates reported by Luoma et al[7] for *general* samples of patients who died by suicide (ie, those with any diagnosis). Luoma et al[7] reported that, on average, 19% of patients saw a mental health care provider within 30 days of suicide (range, 7%–28%), and 32% saw a mental health care provider within 1 year (range, 16%–46%). Thus, substantially more of our cohort (64.5% vs 46.0%) received mental health specialty care than any of the general samples treated in other health care systems as reported by Luoma et al.[7] However, higher rates of mental health specialty care are expected for a cohort with identified depression: further research is needed to determine the VHA's performance, compared to care of samples from other health care systems, in treating individuals with depressive disorders who die by suicide.

We found few parallels in the literature for the main focus of our study, which not only characterized timing of final visits but also examined aspects of the quality of care patients received shortly before suicide to find targets for care improvement. The findings of this report suggest several areas for quality improvement in the quest to identify and treat suicidal behavior among depressed patients.

For specialty mental health providers, there is a clear need to ensure that patients with depression are receiving adequate dosage of antidepressant medication. In addition, it appears important to exercise care in deciding which patients in active mental health care are terminated from mental health specialty care or allowed to transition to low utilization of the service (20.5% of the sample who died by suicide within 30 days of their final visit had received previous mental health care, but not in the last 3 months). Care should be exercised to continue to attend to suicide risk if diagnoses are revised to nondepressive diagnoses. Finally, it is clear that mental health visits are often the final encounters of high risk patients with the VHA system, creating a need for systems, researchers, and providers to continue to examine how to provide more effective care in such sessions to help prevent suicide.

For non–mental health providers, several important issues emerge from our data, especially the need to continue to remain vigilant to suicidal crises or increases in suicidal risk even if a patient is receiving mental health specialty care. This may be challenging, especially when other, nonpsychiatric conditions are competing for attention.[27] For this reason, a low threshold for referral of patients potentially at suicide risk to mental health specialty care might be considered, along with encouraging referrals of elderly patients with depression in general who will accept mental health specialty care referral. We found that more than half of the patients who died by suicide without any previous mental health specialty care during our study period were elderly.

If efforts were made to implement and systematically follow up on treatment strategies that emphasized adequate doses of antidepressants (eg, use of the Patient Health Questionnaire-9, which includes a suicide item), then this single intervention might dually address the low rates of adequate treatment and the need to periodically monitor the intensity of depression and suicidality in depressed patients. Systems might also consider identifying and alerting providers of high-risk patients through high-risk chart flags and the routine query of family members[38,39] for possible suicide clues. The VHA has begun initiatives in several of these areas.

In conclusion, among this large sample of patients with depressive disorders who died by suicide within 30 days of their final visit, we found that (1) most patients had their last visit in non–mental health settings, (2) mental health conditions were infrequently a focus of their final visits in non–mental health settings, (3) many patients had inadequate antidepressant treatment, and (4) the elderly were disproportionately represented among those never seen in mental health specialty care. These data, potentially obtainable from administrative data from other health care systems as well, can inform future efforts to reduce suicide risks among patients with identified depressive disorders.

Drug names: bupropion (Wellbutrin, Aplenzin, and others), citalopram (Celexa and others), clomipramine (Anafranil and others), desipramine (Norpramin and others), doxepin (Zonalon, Silenor, and others), fluoxetine (Prozac and others), fluvoxamine (Luvox and others), imipramine (Tofranil and others), isocarboxazid (Marplan), mirtazapine (Remeron and others), nortriptyline (Pamelor, Aventyl, and others), paroxetine (Paxil, Pexeva, and others), phenelzine (Nardil), protriptyline (Vivactil and others), selegiline (Eldepryl and others), sertraline (Zoloft and others), tranylcypromine (Parnate and others), trazodone (Oleptro and others), trimipramine (Surmontil and others), venlafaxine (Effexor and others).

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