Suicide Risk Assessment Received Prior to Suicide Death by Veterans Health Administration Patients With a History of Depression

Eric G. Smith, MD, MPH; Hyungjin Myra Kim, ScD; Dara Ganoczy, MPH; Claire Stano, MA; Paul N. Pfeiffer, MD, MS; and Marcia Valenstein, MD, MS

ABSTRACT

Objective: To examine the quality of suicide risk assessment provided to veterans with a history of depression who died by suicide between 1999 and 2004.

Method: We conducted a case-control study of suicide risk assessment information recorded in 488 medical charts of veterans previously diagnosed with major depression, depression not otherwise specified, dysthymia, or other, less common *ICD-9-CM* depression codes. Patients dying by suicide from April 1999 through September 2004 or comparison patients (n = 244 pairs) were matched for age, sex, entry year, and region.

Results: Seventy-four percent of patients with a history of depression received a documented assessment of suicidal ideation within the past year, and 59% received more than 1 assessment. However, 70% of those who died of suicide did not have a documented assessment for suicidal ideation at their final Veterans Health Administration (VHA) visit, even if that visit occurred within 0 through 7 days prior to suicide death. Most patients dying by suicide denied suicidal ideation when assessed (85%; 95% CI, 75%–92%), even just 0 through 7 days prior to suicide death (73%; 95% CI, 39%–94%). Suicidal ideation was assessed more frequently during outpatient final visits with mental health providers (60%) than during outpatient final visits with primary care (13%) or other non–mental health providers (10%, $P < .0001$).

Conclusions: Most VHA patients with a history of depression received some suicide risk assessment within the past year, but suicide risk assessments were infrequently administered at the final visit of patients who eventually died by suicide. Among patients who had assessments, denial of suicidal ideation appeared to be of limited value. Practice changes are needed to improve suicide risk assessment among patients with histories of depression, including the development of assessment and prevention strategies that are less dependent on the presence or disclosure of suicidal ideation at scheduled medical visits.

J Clin Psychiatry 2013;74(3):226–232

Submitted: *April 13, 2012; accepted November 12, 2012 (doi:10.4088/JCP.12m07853).*
Corresponding author: *Eric G. Smith, MD, MPH, MD-152, Edith Nourse Rogers Memorial VAMC, 200 Springs Rd, Bedford, MA 01730 (Eric.Smith5@va.gov).*

Visits with patients who have current or recent depressive disorders provide an opportunity for clinicians to assess their risk for suicidal behavior and to implement interventions to enhance safety. Such interventions may include providing quality care for their depressive disorders, referring patients to higher levels of care when needed (eg, specialty mental health services or hospitalization), or other measures to enhance safety (eg, safety planning or reducing access to means).

Unfortunately, some patients die by suicide soon after a clinician visit. Approximately 45% of persons dying by suicide visited a primary care provider, and 19% visited a mental health provider, within 1 month of suicide.[1] In the Veterans Health Administration (VHA), approximately 51% of patients with a history of depression who die by suicide have seen a VHA provider in the last month.[2]

Thus, the final visit prior to suicide represents the last opportunity for a clinician to appropriately assess suicide risk and potentially intervene to avoid this tragic outcome. To date, relatively few studies have examined what transpires during these final visits.[3–6] These limited findings indicate that only a minority of patients who die by suicide are assessed for suicidal ideation at their final visit (findings range from 16%[5] to 38%[4]), and among those assessed, most (> 70%) deny suicidal ideation.[3,5,7] However, these studies examined the assessment received by a broad sample of patients dying by suicide rather than a more specific high-risk group.

In this study, we focus on the high-risk group of patients previously diagnosed with depression. We also examine in greater detail than previous studies the extent of suicide risk assessment administered by clinicians at the final visit before suicide and the interventions that clinicians implemented (eg, safety planning, means assessment) or considered (eg, hospitalization). Our secondary objectives included evaluating whether the occurrence of a documented clinician-administered suicide risk assessment varied by provider type (mental health vs non–mental health provider) or depended on whether the visit occurred shortly before suicide. Lastly, we examined the rates of endorsement of suicidal ideation and planning during these final health care visits by patients who later died by suicide.

METHOD

Data Sources

We conducted a nested case-control study using the VHA's National Registry for Depression (NARDEP).[8] The NARDEP includes administrative data for VHA patients with depression diagnoses. It was developed and is maintained by the VHA's Serious Mental Illness Treatment Resource and Evaluation Center, a Program Evaluation Center of the VHA Office of Mental Health Operations. The NARDEP includes patient demographic and utilization information from fiscal year 1997 forward and medication information from fiscal year 1999 forward. These data were linked to data from the National Death Index, which is

Clinical Points

- From 1999 through 2004, suicide risk assessment at the final Veterans Health Administration (VHA) visit was infrequent, although it was much more common in mental health settings than primary care settings.
- Suicide risk assessment is complicated by the observation that most individuals dying by suicide who were assessed at their final visit denied suicidal ideation.
- Augmentation of routine screening, such as increased emphasis on addressing chronic risk factors (eg, access to means), may be important in reducing suicide risks.

maintained by the National Center for Health Statistics, part of the Centers for Disease Control and Prevention, and provides information on all causes of death, including suicide. The study was conducted with institutional review board approval from the Veterans Affairs Health System.

Patients were identified from the larger NARDEP cohort who had received either 2 diagnoses of depression or a diagnosis of depression plus an antidepressant prescription. Diagnosis of depression was defined by having an administratively recorded *International Classification of Diseases, Ninth Revision, Clinical Modification* (*ICD-9-CM*)[9] diagnostic code of 296.2x, 296.3x, 298.0, 300.4, 309.0, 309.1, 311, 296.90, 296.99, 293.83, or 301.12. In addition, we excluded patients with bipolar I disorder, schizophrenia, or schizoaffective disorder diagnoses. From the 1,892 VHA patients meeting these criteria who died by suicide from April 1, 1999, through September 30, 2004, a sample who had a VHA visit during the study period was randomly selected and stratified by year of entry into the depression cohort, sex, and geographic region (of the patient's VHA facility of most use). Because of the small number of females in the VHA who died by suicide (2.9% of the suicides with a history of depression), all female cases were included (an approximately 3.8-fold oversampling). For each patient dying by suicide, a 1:1 match was performed with a randomly selected comparison patient alive on the date of suicide death (index date), meeting inclusion criteria and of the same stratum and age (± 5 years). This procedure resulted in 244 age-, sex-, region-, and entry year–matched pairs whose charts were abstracted for this analysis.

Administrative data. The NARDEP data files were used to supply all demographic and diagnostic information. Diagnostic data variables were based on diagnostic codes using *ICD-9-CM* recorded in any diagnosis field of inpatient or outpatient visits.

Chart information. Information regarding suicide risk assessments was abstracted by chart review of the VHA electronic medical record. Data were abstracted regarding the assessment and documentation of suicidal ideation and planning, access to suicidal means, and clinical actions considered or performed (consideration of hospitalization or the conduct of safety planning). All notes for the 365 days preceding suicide death/index date were reviewed by chart abstractors with the aid of a previously validated electronic medical record search engine (EMERSE).[10] The EMERSE search engine highlights words in predefined search bundles. Search bundles were developed, pilot-tested, and refined for each variable to broadly capture all the notations related to the specific conditions (eg, "suicide attempt" or "hurt" for the suicide attempt variable). Each of 4 chart abstractors received training to improve the accuracy of the chart review; however, 92% of study patients were reviewed by 1 reviewer (C.S.). If a patient saw multiple providers on their final day of VHA contact, a patient was scored as "assessed for suicidal ideation" if any notes from that day discussed the presence or absence of suicidal ideation. Documented telephone encounters with providers were considered to be the final encounter if these occurred after the last face-to-face visit.

Data Analysis

Demographic and clinical characteristics, utilization patterns, and assessment rates for our matched samples (Tables 1–3) were compared by either McNemar test (dichotomous variables) or paired *t* test (continuous variables). Our matched samples included subcohorts in which we stratified our sample based on suicide imminence (ie, whether the suicide deaths among the patients dying by suicide occurred within 0 through 30 days of the final visit (n = 111 pairs) or within 0 through 7 days (n = 43 pairs)). Exact 95% confidence intervals were derived for the proportion of patients denying suicidal ideation.

For our analysis of suicidal ideation assessment rates by provider specialty (mental health or non–mental health), we restricted our investigation to outpatient final visits. This restriction was to avoid biasing our comparison by location of care, given that a greater number of patients receiving mental health provider evaluations were either inpatients or had telephone final visits. Fisher exact test was used to determine statistical significance. For the subset of analyses that restricted the sample only to patients with either a current diagnosis of depression or antidepressant use, qualifying diagnoses of depression were required to be given on the day of last visit and were limited to a diagnosis of major depressive disorder or depression not otherwise specified to limit any effects of diagnostic heterogeneity. Current antidepressant use was defined as the patient's having an antidepressant prescription with at least a day's supply of the antidepressant on the date of the last visit.

All analyses were carried out using SAS, version 9.3 (SAS Institute; Cary, North Carolina).

RESULTS

Table 1 lists the demographic and clinical characteristics of our matched sample. Individuals who died by suicide were more likely to receive VHA mental health care, to be discharged from a mental health inpatient stay, and to be diagnosed with a mental health condition at their final visit.

VHA patients who died by suicide were also more likely than comparison patients to have received a suicide risk assessment within the year prior to suicide: almost three-

Table 1. Patient Characteristics

Characteristic	Patients Dying by Suicide (n = 244)		Matched Comparison Patients[a] (n = 244)		*P* Value[b]
	n	%	n	%	
Sex, male	214	87.7	214	87.7	1.0
Race, white	206	84.4	195	79.9	.19
Ethnicity, non-Hispanic	238	97.5	232	95.1	.16
Disability (≥ 50% service connection)	41	16.8	56	23.0	.09
Final visit provider/setting					
Mental health provider	93	38.1	61	25.0	.001
Inpatient (mental health)	19[c]	7.8	1	0.4	< .0001
Inpatient (non–mental health)	4	1.6	4	1.6	1.0
Phone encounter	12	4.9	6	2.5	.16
Diagnosis at final visit					
Any mental health diagnosis	103	42.2	76	31.1	.01
Depression diagnosis	82	33.6	66	27.0	.12
	Mean	SD	Mean	SD	
Age, y	57.2	13.9	57.2	13.8	.87
Recency of final visit (days before index date[d])	63.3	74.1	58.4	75.8	.49

[a]Matched for age, sex, year of entry into the cohort, and region of the country.
[b]All *P* values are based on paired data analysis (McNemar test or paired *t* test).
[c]Of these, 58% were diagnosed with depression or a suicide attempt.
[d]Date of suicide death or, for matched comparison patients, date of suicide death in paired case.
Abbreviation: SD = standard deviation.

quarters (74%) received at least 1 assessment of whether they were experiencing suicidal ideation (Table 2A). This proportion was significantly different from the rate of assessment for suicidal ideation (60%) for comparison patients not dying by suicide ($P = .0009$). A majority of patients dying by suicide (59%) received more than 1 assessment of suicidal ideation in the year prior to suicide (versus 41% of comparison patients, $P < .0001$; Table 2A). Forty-two percent of patients dying by suicide also received at least 1 assessment of whether they had a plan for suicide, and 25% had their access to suicidal means assessed (Table 2A). Among patients only seen by non–mental health services over this period, rates of assessment among patients dying by suicide were substantially lower for all of these measures, and no statistically significant differences with comparison patients were noted except for the consideration of hospitalization (Table 2B).

While overall assessment rates over the previous year are of interest, particularly for interventions less dependent on timing for their value (eg, discussion of access to means), of particular interest for this study is how likely assessments were to occur when the need for them might be particularly great: during the final VHA visit for each patient before suicide. Table 3 indicates that 70% of patients with a history of depression who died by suicide did not have an assessment of suicidal ideation documented in their chart at their final visit prior to suicide. Patients who died by suicide did have somewhat higher documented assessment rates for suicidal ideation than comparison patients (30% versus 20%, $P = .01$). Assessment for suicidal planning was infrequent but also differed for patients dying by suicide (7%) versus comparison patients (3%, $P = .02$).

Safety planning at final visit occurred infrequently but differed for patients dying by suicide (5%) versus comparison patients (1%, $P = .01$), whereas assessment of access to means or consideration of hospitalization was similarly infrequent and not significantly different between patients dying by suicide and comparison patients. Of further note, 85% (95% CI, 75%–92%) of patients dying by suicide in our cohort who received an assessment denied suicidal ideation at their final visit (Table 3).

Rates of assessment for suicidal ideation at final visit did increase significantly when the sample was restricted to the approximately two-thirds of the sample with the clearest indication of possible depression on that date (ie, those patients who either received a diagnosis of depression on the day of the final visit or had an antidepressant prescription extending to the date of the final visit). Rates of assessment at final visit among patients dying by suicide with current depression or treatment increased significantly to 40.1% ($P < .0001$) and among comparison patients to 26.1% ($P = .0012$) compared to rates for patients without a depression diagnosis or active antidepressant treatment at the last visit.

We investigated whether rates of suicidal ideation assessment differed for patients receiving substance abuse treatment or with comorbid posttraumatic stress disorder (PTSD). Patients receiving substance abuse treatment at their final visit and subsequently dying by suicide were only half as likely to receive an assessment of suicidal ideation (33%) as other patients dying by suicide seen by mental health providers at final visit (67%), although, possibly due to small numbers, this finding was not statistically significant ($P = .07$). No difference in rates of assessment for suicidal ideation was noted among patients with a comorbid PTSD diagnosis in the past year.

The pattern of greater assessment rates for patients seen by mental health providers than for those seen by non–mental health providers (Table 2A and 2B) over the past year was borne out strongly during the final visit before suicide: 60% of patients dying by suicide who were seen by mental health outpatient providers at their final visit were assessed for suicidal ideation versus only 13% seen by primary care providers and 10% by other outpatient non–mental health providers ($P < .0001$; Table 4A). Generally similar proportions of comparison patients received a suicidal ideation assessment (Table 4A), especially those comparison patients seen by mental health providers (57% compared to 60% dying by suicide).

Since non–mental health providers may understandably focus on other problems if depression does not seem to be a current issue, we also examined rates of assessment by provider after removing patients without a current depression diagnosis or antidepressant use. Rates of assessment for suicidal ideation at final visit among patients dying by suicide did increase but only slightly: 68% of patients with current depression seen by mental health outpatient providers were assessed for suicidal ideation, versus 17% of patients seen by primary care providers and 15% seen by other outpatient non–mental health providers (Table 4B; $P < .0001$).

Table 2. Suicide Risk Assessment and Provider Actions During the Year Prior to Suicide Death

Provider Action	Patients Dying by Suicide n/n	%	Matched Comparison Patients n/n	%	Number of Discordant Pairs[a] (n & n)	*P* Value[b]
A. All Patients	(n = 244)		(n = 244)			
Suicidal ideation assessed	181/244	74.2	147/244	60.2	69 & 35	.0009
Suicidal ideation endorsed (among assessed patients)	113/181	62.4	28/147	19.0	NA (unmatched)	< .0001
Suicidal plan assessed	102/244	41.8	44/244	18.0	80 & 22	< .0001
Suicidal plan endorsed (among assessed patients)	60/102	58.8	6/44	13.6	NA (unmatched)	< .0001
Access to means assessed[c]	60/244	24.6	15/243	6.2	55 & 11	< .0001
Hospitalization considered[d]	91/221	41.2	17/220	7.7	76 & 6	< .0001
Received more than 1 assessment of suicidal ideation in past year	144/244	59.0	100/244	41.0	81 & 37	< .0001
B. Patients With No Mental Health Visits During That Year	(n = 69)		(n = 97)			
Suicidal ideation assessed	24/69	34.8	31/97	32.0		.74
Suicidal ideation endorsed (among assessed patients)	8/24	33.3	6/31	19.4		.35
Suicidal plan assessed	7/69	10.1	6/97	6.2		.39
Suicidal plan endorsed (among assessed patients)	4/7	57.1	3/6	50.0		1.00
Access to means assessed	5/69	7.3	3/97	3.1		.28
Hospitalization considered[e]	5/55	9.1	1/86	1.2		.034
Received more than 1 assessment of suicidal ideation in the past year	10/69	14.5	9/97	9.3		.33

[a]Discordant pairs reported as number of matched pairs in which patient dying by suicide was assessed (or action was taken) but comparison patient was not assessed (or no action was taken) & number of matched pairs in which patient dying by suicide was not assessed (or no action was taken) but comparison patient was assessed (or action was taken).
[b]For Table 2A, all *P* values are from McNemar test except for *suicidal ideation endorsed* and *suicidal plan endorsed*, for which matched pairs were not preserved (Fisher exact test used). For Table 2B, all *P* values are based on Fisher exact test (and no discordant pairs reported, since matched pairs were not used in the analyses).
[c]Assessment of access to means missing for 1 comparison subject (and 1 matched pair).
[d]Information concerning consideration of hospitalization missing for 23 patients dying by suicide and 24 comparison patients (and 43 matched pairs).
[e]Information concerning consideration of hospitalization missing for 14 patients dying by suicide and 11 comparison patients (and 25 matched pairs).
Abbreviation: NA = not applicable.

Table 3. Suicide Risk Assessment and Provider Actions at the Final Veterans Health Administration Visit

Provider Action	Patients Dying by Suicide (n = 244) n/n	%	Matched Comparison Patients (n = 244) n/n	%	Number of Discordant Pairs[a] (n & n)	*P* Value[b]
Suicidal ideation assessed[c]	73/244	29.9	49/244	20.1	57 & 33	.01
Suicidal ideation endorsed (among assessed patients)	11/73	15.1	2/49	4.1	11 & 2	.07[d]
Suicidal plan assessed	17/244	7.0	6/244	2.5	17 & 6	.02
Suicidal plan endorsed (among assessed patients)	4/17	23.5	0/6	0.0	4 & 0	.54[d]
Safety planning conducted	13/244	5.3	3/244	1.2	13 & 3	.01
Access to means assessed	6/244	2.5	3/244	1.2	6 & 3	.32
Hospitalization considered	3/222	1.4[e]	1/239	0.4[e]	3 & 1	.32

[a]Discordant pairs reported as number of matched pairs in which patient dying by suicide was assessed (or action was taken) but comparison patient was not assessed (or no action was taken) & number of matched pairs in which patient dying by suicide was not assessed (or no action was taken) but comparison patient was assessed (or action was taken).
[b]All *P* values are from McNemar test except where noted.
[c]Counts and rates of assessment of suicidal ideation for subsample restricted to the 157 patients dying by suicide and the 161 comparison patients with a current depression diagnosis (major depression or depression not otherwise specified) or current antidepressant use at final visit are 63 patients, 40.1% (patients dying by suicide) and 42 patients, 26.1% (comparison patients). Both rates are statistically different at *P* = .0012 or less from the rates for patients without current diagnoses or antidepressant use. *P* value for the comparison between patients dying by suicide and comparison patients equals .009 (Fisher exact test).
[d]*P* values based on Fisher exact test.
[e]Does not include the 22 patients dying by suicide and 5 comparison patients who were inpatients at the time of their final assessment, since they were already hospitalized.

Table 5 examines whether assessment rates depended on how close in time the final visit was to suicide death. Patients seen close to suicide death (ie, within 7 or 30 days) might plausibly be exhibiting visible symptoms or behaviors or reporting stressors at a higher rate than patients seen more remotely, possibly prompting providers to assess suicide risk. However, similar to the full cohort, ≤ 30% of patients dying by suicide were assessed for suicidal ideation at their final visit in either of these subsamples.

Table 5 also indicates that, even among patients who died by suicide in the next 7 or 30 days, denial of suicidal ideation was the norm, not the exception. For example, 73% (95% CI, 39%–94%) of those who were assessed and died of suicide within 7 days of their final visit denied suicidal ideation.

DISCUSSION

While other VHA[5] and non-VHA[3,4,11] chart review studies have examined the rates of assessment of suicidal ideation

Table 4. Suicide Risk Assessment During Outpatient Final Visit by Provider Specialty

Group	Final Visit With Mental Health Provider n/n	%	Final Visit With Primary Care Provider n/n	%	Final Visit With Other Non–Mental Health Provider n/n	%	*P* Value[a]
A. All Patients							
Suicidal ideation assessed[a]							
Patients dying by suicide[b]	41/68	60.3	11/84	13.1	6/59	10.2	<.0001
Comparison patients[c]	34/60	56.7	7/86	8.1	4/86	4.7	<.0001
B. Among Patients With Current Depression Diagnosis or Antidepressant Use							
Suicidal ideation assessed[a]							
Patients dying by suicide[d]	36/53	67.9	8/48	16.7	4/27	14.8	<.0001
Comparison patients[e]	31/49	63.3	5/54	9.3	3/49	6.1	<.0001

[a]*P* values based on 2×3 χ^2 test. Because matched pairs were not preserved for the analyses by provider specialty, no discordant pairs are reported.
[b]Visit location missing for 9 patients dying by suicide.
[c]Visit location missing for 6 comparison patients.
[d]Visit location missing for 6 patients dying by suicide.
[e]Visit location missing for 4 comparison patients.

Table 5. Suicide Risk Assessment and Provider Actions for Patients Seen Shortly Before Suicide Death and Their Matched Comparisons

Provider Action	Dying by Suicide Within 30 Days of Final Visit (n = 111 Pairs): Dying by Suicide n/n	%	Comparison Patients n/n	%	*P* Value[a]	Dying by Suicide Within 7 Days of Final Visit (n = 43 Pairs): Dying by Suicide n/n	%	Comparison Patients n/n	%	*P* Value[a]
Suicidal ideation assessed	33/111	29.7	17/111	15.3	.006[b]	11/43	25.6	9/43	20.9	.53[b]
Suicidal ideation endorsed (among assessed patients)	9/33	27.3	1/17	5.9	.13[c]	3/11	27.3	0/9	0.0	.22[c]
Suicidal plan assessed	11/111	9.9	2/111	1.8	.01	4/43	9.3	0/43	0.0	NA
Suicidal plan endorsed (among assessed patients)	4/11	36.4	0/2	0.0	1.00[c]	3/4	75.0	0/0	0.0	NA[c]
Safety planning conducted	8/111	7.2	1/111	0.9	.02	2/43	4.7	0/43	0.0	NA
Access to means assessed	5/111	4.5	1/111	0.9	.10	3/43	7.0	0/43	0.0	NA
Hospitalization considered	3/97	3.1[d]	0/109	0.0	NA	1/36	2.8[e]	0/42	0.0	NA

[a]All *P* values are from McNemar test except where noted.
[b]Discordant pairs for *suicidal ideation assessed* for the 0- through 30-day analysis totaled 25 matched pairs in which patient dying by suicide was assessed but comparison patient was not assessed and 6 matched pairs in which comparison patient was assessed but not the patient dying by suicide. Six and 4 matched pairs, respectively, were discordant for *suicidal ideation assessed* in the 0- through 7-day analysis. For all other endpoints reported (*suicidal ideation endorsed*, *suicidal plan assessed*, *suicidal plan endorsed*, *safety planning conducted*, *access to means assessed*, and *hospitalization considered*), statistical significance was also reported based on discordant pairs. However, for these analyses, no concordant pairs were observed; thus, the counts provided in the table equal the number of discordant pairs.
[c]*P* values based on Fisher exact test.
[d]Does not include 14 patients dying by suicide and 2 comparison patients who were inpatients at the time of their final assessment.
[e]Does not include 7 patients dying by suicide who were inpatients at the time of their final assessment and 1 comparison patient who was an inpatient at that time.
Abbreviation: NA = not applicable.

among patients who died by suicide, our study is distinctive in its use of matched comparisons, examination of assessments occurring close to suicide death, and comparison of mental health and non–mental health providers. We observed that rates of assessment for suicidal ideation in the final visit prior to suicide are generally low (≤ 30%), consistent with previous findings,[3–5] even though our study specifically examined patients with current or previously diagnosed depression. Such patients may be particularly in need of more regular or more easily triggered suicide risk assessments. Our findings are consistent with our prior study,[2] which observed that veterans with a history of depression were not likely to receive mental health diagnoses or optimal antidepressant treatment at their final visit before suicide.

Assessment rates were no higher for patients seen shortly before suicide death: the majority (> 70%) of patients who died by suicide failed to receive an assessment of suicidal ideation at their final visit, even if seen within 0 through 7 days of suicide. A far stronger influence than timing on whether a patient received an assessment of suicidal ideation appeared to be whether their final visit occurred with mental health services. However, this increased assessment rate may have been primarily driven by higher rates of routine assessments of suicidal ideation by mental health providers than non–mental health providers for patients with histories of depression (since assessment rates for patients last seen by mental health providers were virtually identical among patients dying by suicide [60%] and comparison patients [57%]) rather than any particular ability of mental health providers to discern who might most need assessment. Even among patients last seen by mental health services, 40% were not assessed for suicidal ideation during the final visit before suicide.

At least 3 broad strategies could be envisioned based upon our findings: (1) enhancing the use of less time- and visit-sensitive approaches to suicide risk reduction, such as safety

planning, means restriction, and telephone crisis helplines; (2) developing expectations and/or means to refer as many patients reporting suicidal ideation as feasible to mental health services to take advantage of the higher rates of assessment occurring in that setting; and (3) decreasing the burden and increasing the routinization of suicide risk assessments. This last strategy has been suggested[12] and implemented[13] in a few locations using self-report depression rating scales that include a suicidal ideation item. There most likely is value in each of these approaches, and the VHA has taken action since the close of our study period (2004) in each of these areas.

Decisions concerning the value and drawbacks of strategies that increase the frequency of assessments of suicidal ideation are complex; several authors have written cogently on the potential limited yield of such a strategy, especially for general medical settings, given the high level of positive screens expected relative to suicide deaths and attempts.[14,15] Our findings further help illustrate why such efforts are challenging. Our data suggest that determining when to assess a patient for suicidal ideation is difficult, and, as others have also found,[7] there is a substantial likelihood for a negative response, even from someone who may shortly die by suicide. There is also a growing literature suggesting that crises associated with suicidal actions often have highly rapid onset. For example, near-lethal suicide attempts often occur on the same day as the crises associated with the attempt,[16,17] and surveys have found up to 43% of suicide attempts were unplanned.[18]

Despite these challenges, additional considerations support more routine suicide risk screening, at least in mental health settings. First, it can be argued that few activities mental health practitioners engage in are potentially of greater importance to the health and safety of their patients, even if screening is inefficient. Second, mental health providers routinely have more time to dedicate to mental health per encounter, creating time to conduct such screens and discuss their results. Routine assessments may also help destigmatize reporting suicidal ideation and empower patients to address this symptom of depression, even should it occur between sessions. Lastly, suicidality is one of the core criteria of major depressive episodes; thus, it is difficult to fully assess the condition of patients with current or recent depression without asking about it. Clearly, however, these considerations change substantially in the non–mental health setting, where time spent on suicide risk screening could take time away from addressing patients' other health concerns.

Regardless of one's viewpoint concerning the value of suicide risk screening, our data support broader, less time- and visit-sensitive approaches to suicide prevention, such as means restriction and safety planning. These approaches were relatively unused during our study period but are at the core of recent VHA practice changes. Since 2007, the VHA has enacted a suite of suicide prevention initiatives designed to both enhance care access and emphasize approaches that have value independent of a clinician visit, including safety planning, means restriction, and a highly publicized 24-hour telephone hotline (the Veterans Crisis Line).[19] Safety planning occurs jointly between clinicians and high-risk patients to develop personalized strategies that patients can employ between visits in response to the reemergence or intensification of suicidal ideation. These recent VHA initiatives would be specifically expected to improve the low rates of safety planning and assessment of access to means observed in this study, which ended prior to the start of these initiatives. The VHA also mandates flagging the medical records of patients judged as being at high risk for suicide, so all providers view information announcing their high-risk status at each VHA visit.

Of note, patients dying by suicide were more likely to endorse suicidal ideation at some point in the past year than at final visit (62% [Table 2A] versus 30% [Table 3], $P < .0001$). This observation parallels previous research findings that suicidal ideation at its worst point during a patient's lifetime is more predictive of suicide than current ideation.[20] Future research might investigate whether suicide risk assessments could be improved by also gathering information about worst lifetime suicidal ideation or whether patients with prior but not current suicidal ideation or plans should still receive interventions intended to reduce suicide risk (eg, safety planning and means restriction).

Important limitations to our study exist. Our study is restricted to assessments documented in the chart. Providers might have assessed some patients but neglected to record the assessment or might have forgotten to assess a patient but recorded language that the patient lacked suicidal ideation (either from habit or due to risk management concerns). Given the low rates of assessment we observed generally, we suspect any bias for overreporting assessments is small, except possibly among mental health providers. For inpatient care, we chose to consider only documented assessments occurring on date of discharge as the final visit. Assessments may often have occurred at other times during the inpatient stay; however, it may be particularly important to reassess suicidal thinking immediately prior to discharge. Lastly, our case-control design, often standard in studies of rare events and essential here to efficiently target charts for abstraction, describes what occurred when suicide deaths were not averted but does not detect instances in which high-risk individuals received assessments/interventions that averted suicide.[3] Modified or different study designs would be needed to detect these events of effective assessment or intervention.

Because our study focuses on patients with a history of depression, some instances of nonassessment may simply reflect the provider's no longer viewing depression as a treatment priority (possibly in error). However, a subanalysis indicated that a lack of assessment for suicidal ideation at the final visit is still common among patients with current depression or antidepressant use (almost 60% of these patients dying by suicide were not assessed).

Because of the labor required to conduct the extensive chart review, only a small fraction of the patients with a history of depression dying and not dying by suicide could receive review. A matched case-control design was thus chosen to increase efficiency, ie, increase the likelihood that patients dying by suicide and comparison patients were

comparable with respect to major demographic (age and sex) and system-level (geographic region and dates of assessment) factors that might influence likelihood of assessment. Such matching introduces bias by design, intended to counterbalance confounding bias from imbalances in these key factors between cases and comparison patients.[21] Thus, it is possible our case-control design attenuates some differences in absolute rates of assessment between cases and controls in favor of presenting what are intended to be less confounded rates of assessment. More serious biases can result if factors used for matching are not associated with exposure or especially outcome. We examined one factor used for matching, age, and observed that rates of assessment for suicidal ideation at final visit did vary strongly by age (34% at final visit for patients < 65 years old versus 21% for patients ≥ 65 years old, $P = .05$). In previous work on this matched cohort, we reported that age was significantly related to suicide risk,[22] thus supporting the rationale for matching. Lastly, only part of the value of our study is provided by the comparison between patients dying by suicide and comparison patients; examining simply the assessment rates only among patients dying by suicide also has value.

In conclusion, in a comparison of matched patients with depressive disorders who died or did not die by suicide, we observed low rates of assessment for suicidal ideation, planning, or access to means at their final visit, regardless of whether a patient ultimately went on to die by suicide or the timing of the final visit prior to suicide death. Instead, we observed that whether the final visit occurred with a mental health provider had a much bigger impact on the likelihood of whether an assessment for suicidal ideation occurred. However, even a substantial number of patients seen by mental health providers did not receive an assessment of suicidal ideation at their final visit. Adding to the challenge of clinician-based suicide risk assessment, we also observed that a sizable majority of patients denied suicidal ideation, even among those who would subsequently die by suicide within a few days. These findings particularly suggest that clinician-based suicide risk assessment and prevention strategies need to go beyond simple reliance on patient endorsement of suicidal ideation.

Author affiliations: Department of Veterans Affairs (VA) Health Services Research and Development (HSR&D) Center for Health Quality, Outcomes, and Economic Research Bedford Center of Excellence (COE), Bedford, Massachusetts, and the Department of Psychiatry, University of Massachusetts Medical School, Boston (Dr Smith); the VA HSR&D Center for Clinical Management Research Ann Arbor COE, Serious Mental Illness Treatment Resource and Evaluation Center (SMITREC), Ann Arbor, Michigan (Drs Kim, Pfeiffer, and Valenstein and Mss Ganoczy and Stano); the Department of Psychiatry, University of Michigan Medical School, Ann Arbor (Drs Pfeiffer and Valenstein); and the Center for Statistical Consultation and Research, University of Michigan, Ann Arbor (Dr Kim).
Potential conflicts of interest: All authors report no potential conflicts of interest regarding the subject matter of this report.
Funding/support: Supported by VA HSR&D Career Development Award 09-216 to Dr Smith, by VA HSR&D Career Development Award 10-036-1 to Dr Pfeiffer, by VA HSR&D grant IIR 04-211-1 and National Institute of Mental Health (NIMH) grant NIMH R01-MH078698-01 to Dr Valenstein, and by HSR&D MRP 03-320. Space and technical and administrative resources were also contributed by SMITREC, Ann Arbor, Michigan.
Previous presentations: Some elements of this study were presented at the 29th Veterans Health Administration (VHA) HSR&D and Quality Enhancement Research Initiative National Conference; July 16–19, 2012; National Harbor, Maryland.
Disclaimer: The views expressed in this report are those of the authors and do not necessarily represent those of the Veterans Affairs Health Systems or the NIMH.
Additional information: Requests for access to the National Death Index dataset are made to the National Center for Health Statistics. See http://www.cdc.gov/nchs/data_access/ndi/about_ndi.htm for information. The National Registry for Depression is an internal analytic resource of the VHA and is not publicly accessible.

REFERENCES

1. Luoma JB, Martin CE, Pearson JL. Contact with mental health and primary care providers before suicide: a review of the evidence. *Am J Psychiatry*. 2002;159(6):909–916.
2. Smith EG, Craig TJ, Ganoczy D, et al. Treatment of veterans with depression who died by suicide: timing and quality of care at last Veterans Health Administration visit. *J Clin Psychiatry*. 2011;72(5):622–629.
3. Isometsä ET, Heikkinen ME, Marttunen MJ, et al. The last appointment before suicide: is suicide intent communicated? *Am J Psychiatry*. 1995;152(6):919–922.
4. Draper B, Snowdon J, Wyder M. A pilot study of the suicide victim's last contact with a health professional. *Crisis*. 2008;29(2):96–101.
5. Denneson LM, Basham C, Dickinson KC, et al. Suicide risk assessment and content of VA health care contacts before suicide completion by veterans in Oregon. *Psychiatr Serv*. 2010;61(12):1192–1197.
6. Vannoy SD, Robins LS. Suicide-related discussions with depressed primary care patients in the USA: gender and quality gaps. a mixed methods analysis. *BMJ Open*. 2011;1(2):e000198.
7. Busch KA, Fawcett J, Jacobs DG. Clinical correlates of inpatient suicide. *J Clin Psychiatry*. 2003;64(1):14–19.
8. Blow FC, Valenstein M, Austin K, et al. *Specialty Care for Veterans with Depression in the VHA: 2002 National Depression Registry Report*. Ann Arbor, MI: VA National Serious Mental Illness Treatment Research & Evaluation Center (SMITREC), VHA Health Services Research & Development; 2003.
9. Practice Management Information Corporation. *ICD-9 CM: International Classification of Diseases, 9th Revision, Clinical Modification, 6th Revision*. Los Angeles, CA: PMIC; 2000.
10. Seyfried L, Hanauer DA, Nease D, et al. Enhanced identification of eligibility for depression research using an electronic medical record search engine. *Int J Med Inform*. 2009;78(12):e13–e18.
11. Fischer LR, Wei F, Solberg LI, et al. Treatment of elderly and other adult patients for depression in primary care. *J Am Geriatr Soc*. 2003;51(11):1554–1562.
12. Uebelacker LA, German NM, Gaudiano BA, et al. Patient Health Questionnaire depression scale as a suicide screening instrument in depressed primary care patients: a cross-sectional study. *Prim Care Companion CNS Disord* 2011;13(1).
13. Lawrence ST, Willig JH, Crane HM, et al. Routine, self-administered, touch-screen, computer-based suicidal ideation assessment linked to automated response team notification in an HIV primary care setting. *Clin Infect Dis*. 2010;50(8):1165–1173.
14. Gaynes BN, West SL, Ford CA, et al; US Preventive Services Task Force. Screening for suicide risk in adults: a summary of the evidence for the US Preventive Services Task Force. *Ann Intern Med*. 2004;140(10):822–835.
15. Pokorny AD. Suicide prediction revisited. *Suicide Life Threat Behav*. 1993;23(1):1–10.
16. Simon OR, Swann AC, Powell KE, et al. Characteristics of impulsive suicide attempts and attempters. *Suicide Life Threat Behav*. 2001;32(suppl):49–59.
17. Harvard Injury Control Research Center, Harvard School of Public Health. Means matter: suicide, guns, and public health. p 5. http://www.hsph.harvard.edu/means-matter/. Accessed November 13, 2012.
18. Borges G, Angst J, Nock MK, et al. A risk index for 12-month suicide attempts in the National Comorbidity Survey Replication (NCS-R). *Psychol Med*. 2006;36(12):1747–1757.
19. Knox KL, Kemp J, McKeon R, et al. Implementation and early utilization of a suicide hotline for veterans. *Am J Public Health*. 2012;102(suppl 1):S29–S32.
20. Beck AT, Brown GK, Steer RA, et al. Suicide ideation at its worst point: a predictor of eventual suicide in psychiatric outpatients. *Suicide Life Threat Behav*. 1999;29(1):1–9.
21. Rothman KJ, Greenland S, Lash TL. *Modern Epidemiology*. Philadelphia, PA: Wolters Kluwer Health/Lippincott Williams & Wilkins; 2008.
22. Kim HM, Smith EG, Ganoczy D, et al. Predictors of suicide in patient charts among patients with depression: importance of prescription drug and alcohol abuse. *J Clin Psychiatry*. 2012;73(1):e1269–e1275.