Public Health Reports

Public Health Reports
2016, Vol. 131(6) 816-821

DOI: 10.1177/0033354916670133
phr.sagepub.com
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VA Suicide Prevention Applications Network: A National Health Care System–Based Suicide Event Tracking System

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Abstract

Objectives: The US Department of Veterans Affairs' Suicide Prevention Applications Network (SPAN) is a national system for suicide event tracking and case management. The objective of this study was to assess data on suicide attempts among people using Veterans Health Administration (VHA) services.

Methods: We assessed the degree of data overlap on suicide attempters reported in SPAN and the VHA's medical records from October 1, 2010, to September 30, 2014—overall, by year, and by region. Data on suicide attempters in the VHA's medical records consisted of diagnoses documented with E95 codes from the *International Classification of Diseases, Ninth Revision*.

Results: Of 50518 VHA patients who attempted suicide during the 4-year study period, data on fewer than half (41%) were reported in both SPAN and the medical records; nearly 65% of patients whose suicide attempt was recorded in SPAN had no data on attempted suicide in the VHA's medical records.

Conclusion: Evaluation of administrative data suggests that use of SPAN substantially increases the collection of data on suicide attempters as compared with the use of medical records alone, but neither SPAN nor the VHA's medical records identify all suicide attempters. Further research is needed to better understand the strengths and limitations of both systems and how to best combine information across systems.

Keywords
veterans, suicide, prevention

Effective surveillance systems are the cornerstone of public health: they (1) inform the development of prevention strategies tailored to the characteristics and needs of established or newly emerging high-risk populations and (2) evaluate the impact of newly implemented programs. The 2012 National Strategy for Suicide Prevention and the resulting research agenda emphasized a need for improved data to inform suicide prevention.[1,2] The 2012 strategy also recognized veterans as a population at elevated risk for suicide.[1] Upon launching its Suicide Prevention Program after passage of the Joshua Omvig Veterans Suicide Prevention Act in 2007,[3] the US Department of Veterans Affairs (VA) implemented numerous suicide prevention initiatives and worked to develop the capacity for timely and accurate data on suicide events to support clinical care and case management.[4]

Since 2007, the VA has staffed at least 1 suicide prevention coordinator at each medical center and large outpatient clinic, who, among other duties, works with clinical staff members to identify and manage patients at risk for suicide.[5] Suicide behavior reports are completed for all known suicide events (ie, deaths, attempts, and serious suicidal ideation) by

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Box 1. Overview of the US Department of Veterans Affairs' Suicide Prevention Applications Network

Implementation

The Joshua Omvig Veterans Suicide Prevention Act was passed in 2007, reinforcing suicide prevention as a top priority in the US Department of Veterans Affairs (VA):

- The VA Center of Excellence for Suicide Prevention was established to support the development of a comprehensive suicide prevention program.
- The VA Deputy Under Secretary for Health for Operations and Management announced mental health funding through the Office of Mental Health Services for suicide prevention coordinators (SPCs) at each VA facility.

Suicide prevention coordinators

At least 1 full-time SPC (typically a nurse or social worker) is assigned to each VA facility and is responsible for the following:

- Identifying and tracking high-risk veterans (ie, all suicide attempters and patients with serious suicidal ideation) and tracking appointments and coordinating enhanced care between veterans and providers
- Educating providers, veterans, families, and communities about warning signs and available treatments
- Establishing and maintaining a gatekeeper training program with nonclinical frontline staff members
- Working with community resources and groups to improve recognition of high-risk veterans

Suicide behavior reports

The Suicide Prevention Applications Network compiles suicide behavior reports (SBRs) completed by SPCs for all known and reported suicide attempts, deaths, and cases of serious suicidal ideation. SBRs include:

- Event characteristics (ie, date and time)
- Event mechanisms
- Clinical factors known to the SPC through medical record review
- Documentation of safety plans in place

Clinically, the completion of an SBR and entry of a suicide event into Suicide Prevention Applications Network indicates risk for suicide and results in:

- Placement on the Veterans Health Administration high-risk list
- Patient treatment flag being marked in the patient's Veterans Health Administration medical record
- Enhancements to care and case management

the clinical provider or suicide prevention coordinator who was first made aware of the event. Suicide prevention coordinators submit these reports to a centralized database that forms part of an internal resource known as the Suicide Prevention Applications Network (SPAN; Box 1), which was established in 2009 (Box 2). Suicide behavior reports consist of details about the event, including dates, circumstances, method of injury, health information from the medical record, and information about safety planning discussed with the patient. Suicide behavior reports may be completed for events treated in inpatient and outpatient care settings and for events that suicide prevention coordinators are made aware of that were not treated at a Veterans Health Administration (VHA) medical center.

SPAN is primarily used to identify high-risk veterans (ie, all suicide attempters and patients with serious suicidal ideation) and to track appointments and coordinate care between veterans and providers (Box 1). Data from SPAN are also used to determine the number of patients who attempt suicide. Thus, SPAN is a national health care system–based suicide event tracking system that contains data on patients beyond those collected by hospital emergency departments after suicide attempts. The US Department of Defense has a similar system in place, the Department of Defense Suicide Event Report.[6,7] The Data and Surveillance Task Force of the National Action Alliance for Suicide Prevention recently reviewed existing suicide event surveillance systems to highlight their attributes, strengths, and weaknesses and to make recommendations for improving suicide surveillance.[6] SPAN, in its current state, has many attributes that the task force recommended for improving suicide surveillance, such as standard language, key data elements (eg, injury mechanism), and timely reporting (eg, quarterly updates).

SPAN provides data on the incidence and characteristics of suicide and suicide attempts among people who use VHA services. Because a small portion of VHA service users (ie, eligible dependents) are not veterans, SPAN may capture a small number of nonveteran suicide events. Periodic

Box 2. Evolution of the US Department of Veterans Affairs' Suicide Prevention Applications Network (SPAN)

2009

- SPAN implementation

2010

Number of events increased to approximately 1300 per month because of:

- Transition from paper to electronic suicide behavior reports
- Addition of serious suicidal ideation events along with attempts and reports

2012

- Event nomenclature updated to include Self-Directed Violence Classification System, providing a more detailed and standardized approach for event-type classification

2014

- Revision of SPAN application into 5 functional areas: client, plan, event, reminders, and contact log
- Active-duty suicide events began to be included in SPAN

systematic evaluations of the system can provide information to support enhancements and improve reporting.[2,8] SPAN is a passive system that relies on routine reporting of suicide events and is not directly linked to or checked against the VHA's medical records.

The primary objective of this study was to compare data on attempted suicides collected in SPAN with data on attempted suicides in the VHA's medical records to determine the extent of overlap between the 2 data systems. Secondary objectives were to (1) assess differences in data among regional VA health care networks (Veterans Integrated Service Networks [VISNs])[9] and (2) compare our findings with a previous VHA program evaluation project that assessed the case ascertainment of suicide deaths in SPAN in 2011 (VHA, unpublished data, 2011). Findings will be used to inform research based on these systems, provide information to enhance nonfatal suicide event surveillance in the VA, and guide the development of similar programs in other large health care systems.

Methods

The study population included all people with a history of VHA service use inside and outside the United States and a reported suicide attempt between October 1, 2010, and September 30, 2014 (ie, fiscal years 2011-2014). Some people had >1 suicide attempt during the study period, but the unit of analysis for this evaluation was the person (ie, suicide attempter), not the suicide event. We compared data on suicide attempters in SPAN with data on suicide attempters in the VHA's medical records. For 2011-2012, the SPAN event type ''attempt'' was used to identify suicide attempts (Table 1); for 2013-2014, the Self-Directed Violence Classification System (SDVCS),[10] which was added to SPAN in 2012 (Box 2), was used. The SDVCS is a standardized validated instrument that objectively determines the type of self-harm event. For this analysis, SDVCS categories consisted of the following: suicide attempt without injury; suicide attempt without injury, interrupted; suicide attempt with injury; and suicide attempt with injury, interrupted. In our examination of the VHA's medical records, we broadly defined a diagnosed suicide attempt as an *International Classification of Diseases, Ninth Revision* (*ICD-9*) code of E950 to E959 in any diagnostic field.[11] This analysis was completed as part of a quality improvement project and received institutional review board approval by the Office for Suicide Prevention, US Department of Veterans Affairs.

We matched people who had any number of diagnosed suicide attempts with people who had any number of SPAN-reported suicide attempts during the same period by linking data from the 2 systems via social security numbers. We compared data by system for the full study period and by fiscal year. We completed all analyses at the person level: if a person was identified in both systems during a given period (overall or fiscal year), that person was considered to be captured in both systems, regardless of whether the attempt dates were the same or different across systems. For example, among the 33 360 people who attempted suicide and were identified in SPAN, 4428 (13.3%) attempted suicide more than once during the 4-year study period (range, 6.7%-7.7% per year); however, we did not consider repeat attempts in this assessment.

Statistical Analysis

We evaluated concordance between SPAN and the medical records by computing the proportion of individual attempters in a given period (full 4-year study period and each fiscal year) who were captured in 1 system or both. We computed these proportions nationally across the VHA and by VISN. The VHA is the largest integrated national health care system

Table 1. Alignment of SPAN event types and medical record diagnoses for suicide attempts among Veterans Health Administration health care service users: 2011-2014

Medical Record: *ICD-9* Codes[11]	SPAN, 2011-2012: Event Type[a]	SPAN, 2013-2014: SDVCS[b]
NA	Suicide attempt	Suicide attempt without injury
NA	Suicide attempt	Suicide attempt without injury, interrupted
E950: Suicide and self-inflicted poisoning by solid or liquid substances	Suicide attempt	Suicide attempt with injury and suicide attempt with injury, interrupted
E951: Suicide and self-inflicted poisoning by gases in domestic use	Suicide attempt	Suicide attempt with injury and suicide attempt with injury, interrupted
E952: Suicide and self-inflicted poisoning by other gases and vapors	Suicide attempt	Suicide attempt with injury and suicide attempt with injury, interrupted
E953: Suicide and self-inflicted injury by hanging, strangulation, and suffocation	Suicide attempt	Suicide attempt with injury and suicide attempt with injury, interrupted
E954: Suicide and self-inflicted injury by submersion (drowning)	Suicide attempt	Suicide attempt with injury and suicide attempt with injury, interrupted
E955: Suicide and self-inflicted injury by firearms, air guns, and explosives	Suicide attempt	Suicide attempt with injury and suicide attempt with injury, interrupted
E956: Suicide and self-inflicted injury by cutting and piercing instrument	Suicide attempt	Suicide attempt with injury and suicide attempt with injury, interrupted
E957: Suicide and self-inflicted injury by jumping from high place	Suicide attempt	Suicide attempt with injury and suicide attempt with injury, interrupted
E958: Suicide and self-inflicted injury by other and unspecified means	Suicide attempt	Suicide attempt with injury and suicide attempt with injury, interrupted
E959: Late effects of self-inflicted injury	NA	NA

Abbreviations: *ICD-9*, *International Classification of Diseases, Ninth Revision*; NA, not applicable; SDVCS, Self-Directed Violence Classification System; SPAN, Suicide Prevention Applications Network.
[a]SPAN is the US Department of Veterans Affairs' internal suicide event tracking system for all Veterans Health Administration health care service users.
[b]SDVCS is a standardized, validated instrument that objectively determines the type of self-harm event.

in the United States, but it is also divided into 23 regional service networks, called VISNs. The VISN structure decentralizes the VHA system by assigning a VISN director and allowing some policies and procedures to vary on the VISN level. Analyzing differences in the overlap between SPAN and the medical record by VISN allowed for an assessment of geographic and administrative variability in suicide attempt capture within the VA.

Although this analysis focused on nonfatal suicide attempts, SPAN also captures information on suicide deaths among VHA users. A previous VA program evaluation project found that 774 of 2160 (35.8%) suicides in 2011 among VHA users who were identified through the National Death Index—the gold standard source for verifying occurrence and cause of death—were captured in SPAN (VHA, unpublished data, 2011). This analysis also identified VISN-level variability in SPAN suicide case ascertainment. Given these findings, we computed the Spearman correlation coefficient between previously estimated VISN-specific estimates for SPAN fiscal year 2011 case ascertainment of National Death Index–documented suicides and the VISN-specific percentage of all attempters captured in SPAN. We conducted all analyses with SAS 9.3.[12]

Results

A total of 50 518 unique people were identified as having at least 1 suicide attempt documented in SPAN or in the VHA's medical records during the study period. Among these, 28 959 had at least 1 diagnosis of attempted suicide in the medical record, and 33 360 had at least 1 suicide attempt reported in SPAN; data on suicide attempts for 11 801 (23.3%) people were collected in both systems (Table 2). Fewer than half (40.8%, 11 801 of 28 959) of people with a diagnosed suicide attempt were also reported in SPAN during the 4-year period; this proportion was approximately one-third annually (range, 27.4%-33.9% per fiscal year). Our estimate of the number of suicide attempters identified by SPAN may be conservative. In addition to the 40.8% of people with a diagnosed suicide attempt in the medical record who were captured in SPAN as having an attempt, 10.8% (n = 3114) of people whose attempted suicide was recorded in the VHA's medical records were noted in SPAN as having a different type of suicide-related event (eg, suicidal ideation, nonsuicidal self-harm). Conversely, 64.6% (21 559 of 33 360) of people with a documented suicide attempt in SPAN did not have a corresponding diagnosis in their medical records during the study period (Table 2). Overlap between the 2 systems decreased by year. The overall number of veterans who attempted suicide documented in both systems for fiscal year 2014 (1896 of 13 965, 13.6%) was lower than the number for the 3 previous years, whereas the proportion of people documented in SPAN alone was highest in 2014 (7038 of 13 965, 50.4%).

In 2011, estimates of diagnosed suicide attempts reported in SPAN by VISN ranged from 16.7% (633 of 1406) to

Table 2. Overlap in the capture of data on VHA service users who attempted suicide in SPAN[a] and the medical record: 2011-2014

Database	Suicide Attempters				
	2011-2014	2011	2012	2013	2014
Total, n	50518	15946	16339	16020	13965
Medical record only, %	34.0	40.8	43.9	46.3	36.0
SPAN only, %	42.7	38.2	36.2	35.6	50.4
Medical record and SPAN, %	23.3	21.0	19.9	18.1	13.6
VHA service users with a diagnosed suicide attempt in the medical record, n	28959	9846	10425	10316	6927
SPAN, %					
Nationally	40.8	33.9	31.2	28.1	27.4
VISN minimum[b]	21.1	16.7	16.5	15.6	12.6
VISN maximum[b]	34.6	33.0	32.9	28.7	28.4

Abbreviations: SPAN, Suicide Prevention Applications Network; VHA, Veterans Health Administration; VISN, Veterans Integrated Service Network.
[a]SPAN is the US Department of Veterans Affairs' internal suicide event tracking system for all VHA health care service users.
[b]The VHA is divided into 23 regional service networks called VISNs. Analyzing differences in the overlap between SPAN and the medical record by VISN allows for an assessment of geographic and administrative variability in the capture of data on suicide attempts in the US Department of Veterans Affairs. The presented VISN minimum and maximum values do not correspond to the same VISNs across columns. As such, corresponding sample sizes are not shown.

33.0% (360 of 1045); VISN-level variability in 2011 was lower than that observed for suicide death ascertainment in SPAN in 2011, which ranged from 23.5% (24 of 102) to 61.5% (40 of 65) across VISNs (VHA, unpublished data, 2011). We found no relationship between 2011 death case ascertainment and SPAN capture of diagnosed suicide attempters (Spearman correlation coefficient = 0.02, $P = .94$).

Lessons Learned

Although SPAN is an advanced system for tracking nonfatal suicidal behavior, it can be improved. Our study shows that fewer than one-third of VHA service users who were documented in the VHA's medical records as attempting suicide were also documented in SPAN. We observed moderate variability across administrative networks, but this finding does not appear to be related to variability in SPAN suicide death case ascertainment across networks. Our study also shows that SPAN includes data on a large number of people who attempted suicide but do not have corresponding diagnoses in the medical records, thus highlighting the importance of SPAN for tracking suicide attempts and raising questions about whether and how attempter characteristics vary among events captured in different systems. Furthermore, some people with diagnosed suicide attempts may be recorded as having a different nonfatal suicide event (ie, suicidal ideation or preparatory behavior) in SPAN. Together, these findings suggest the need to examine both SPAN and the medical records further to improve system-wide identification of veterans who attempt suicide.

Limitations

This study had several limitations. Not all SDVCS categories corresponded directly with an *ICD-9* code; this lack of correspondence posed a challenge when comparing and combining observations across systems. Because *ICD-9* E codes for suicide attempt are intended to be used as secondary diagnoses, a patient-physician encounter after a suicide attempt may be coded only with an *ICD-9* diagnosis that reflects the primary condition being treated, which is likely the injury resulting from a suicide attempt or an underlying or contributing disorder (ie, depression, bipolar disorder, schizophrenia). If an E code for the attempt itself was not noted in the medical record for all suicide attempts examined in this study, our analysis may have underestimated the true concordance between medical record diagnoses of suicide attempts and data on suicide attempts collected in SPAN.

Conclusion

Because little is known about how VHA service users who attempt suicide differ by data collection system in clinical care or suicide risk characteristics, neither SPAN nor the medical record alone is optimal for conducting comprehensive surveillance of suicide attempts among those who use VHA services. The Department of Defense identified a similar need to combine the Department of Defense Suicide Event Report with other administrative records when studying nonfatal suicide events among US Army personnel.[7] Additional research is needed to (1) develop mechanisms for enhancing surveillance of suicide attempts for VHA service users, (2) improve understanding of the reporting of suicide attempts in SPAN and the VHA's medical records, and (3) document differences in characteristics and outcomes of VHA service users documented in either system. Such research will be instrumental in improving the VA's efforts to prevent suicide. Previous research and evaluation on SPAN or medical records alone to estimate the number of suicide attempts among veterans should be interpreted in the context of our findings: these estimates are not invalidated by the results of our study, but they may not

accurately represent the characteristics of all VHA patients with 1 or more suicide attempts.[4]

Lessons learned from evaluations of SPAN data can also inform nonfatal suicide event surveillance outside the VA. The use of SPAN data substantially increases the number of veterans whose suicide attempt is documented, as compared with use of medical records alone. SPAN is a unique and innovative system in that it does not rely on emergency room visits and it efficiently compiles data across a large national health care system. Integration of national data is made possible by the presence of local suicide prevention coordinators at all medical centers and by the use of suicide behavior reports as a standardized form that can be completed by trained clinicians or other qualified staff members. Use of the SDVCS in SPAN since 2012 generates specific, objective, and reproducible information on event type.[9] Based on our evaluation, however, a reporting system such as SPAN may not capture data on all suicide attempts among the patient population of interest. Optimal systems will likely require integration of a suicide tracking system such as SPAN and patient medical records and/or an active reporting system in which designated coordinators seek to identify additional VHA service users who attempt suicide from available administrative records.

Authors' Note

The conclusions and opinions expressed in this article are those of the authors and do not necessarily represent those of the US Department of Veterans Affairs.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

References

1. US Office of the Surgeon General, National Action Alliance for Suicide Prevention. *National Strategy for Suicide Prevention: Goals and Objectives for Action, 2012*. Rockville, MD: US Department of Health and Human Services; 2012.
2. National Action Alliance for Suicide Prevention, Research Prioritization Task Force. *A Prioritized Research Agenda for Suicide Prevention: An Action Plan to Save Lives*. Rockville, MD: National Institute of Mental Health and the Research Prioritization Task Force; 2014.
3. Pub L No. 110-110, HR 327, 110th Congress (2007).
4. Kemp J, Bossarte R. *Suicide Data Report*, *2012*. Washington, DC: US Department of Veterans Affairs; 2013.
5. Feeley WF; US Department of Veterans Affairs, Deputy Undersecretary for Health for Operations and Management. *Memorandum: Mental Health Funding for Suicide Prevention Coordinators*. Washington, DC: US Department of Veterans Affairs; 2007.
6. Data and Surveillance Task Force of the National Action Alliance for Suicide Prevention. Improving national data systems for surveillance of suicide-related events. *Am J Prev Med*. 2014;47(3)(suppl 2):S122-S129.
7. Ursano RJ, Kessler RC, Heeringa SG, et al; on behalf of the Army STARRS collaborators. Nonfatal suicidal behaviors in US Army administrative records, 2004-2009: results from the Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS). *Psychiatry*. 2015;78(1):1-21.
8. German RR, Lee LM, Horan JM, et al. Updated guidelines for evaluating public health surveillance systems: recommendations from the Guidelines Working Group. *MMWR Recomm Rep*. 2001;50(RR-13):1-35.
9. US Department of Veterans Affairs. Federal Practitioner 2015 directory: Veterans Integrated Service Network (VISN) guide. http://www.fedprac-digital.com/federalpractitioner/2015directory?pg=16#pg16. Accessed July 29, 2016.
10. Crosby AE, Ortega L, Melanson C. *Self-directed Violence Surveillance: Uniform Definitions and Recommended Data Elements, Version 1.0*. Atlanta, GA: National Center for Injury Prevention and Control; 2011.
11. World Health Organization. *International Classification of Diseases, Ninth Revision*. Geneva, Switzerland: World Health Organization; 1977.
12. SAS Institute Inc. *SAS: Version 9.3*. Cary, NC: SAS Institute Inc; 2011.