

Chapter 24

ARMY SUICIDE SURVEILLANCE: A PREREQUISITE TO SUICIDE PREVENTION

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INTRODUCTION

“Mental health specialists are now able to predict and prevent many suicides.” At first glance, this statement (and those similar to it) appears to be a reasonable expectation of behavioral health providers. Suicidal ideation is a common presenting problem in outpatient settings,^{1,2} and when suicides do occur, they inflict a tremendous emotional toll on family, friends, coworkers, and the broader community. Caring for the psychological needs of individuals requires providers to make suicide risk assessment and prevention a high priority. A general awareness of the significant amount of research that has been conducted to inform clinical decisions about suicidal patients may also suggest that clinicians can predict and prevent many suicides. Hundreds of studies have added to the body of knowledge about suicide, and there are a number of well-respected peer-reviewed journals dedicated solely to suicide research. Furthermore, there is a general recognition that behavioral health providers have specialized training

in suicide intervention. Behavioral health providers are often viewed as experts in suicide assessment and prevention, and psychologists are regularly consulted about acute suicide potential in specific individuals, both within the military and in the civilian sector.

However, a closer analysis of the literature supporting the quoted statement suggests that more caution may be indicated. What does it mean to predict suicide? What does current research demonstrate about clinicians’ abilities to predict suicide? How does prediction relate to prevention, and what does it mean to prevent suicide? This chapter will review some of the current literature on suicide prediction, suggesting that population surveillance studies provide an important tool to improve knowledge about suicidal behaviors in the military. It will describe an ongoing epidemiological surveillance project in the US Army, and propose future directions that will maximize the benefits of the program.

SUICIDE PREDICTION DEFINED

What does it mean to predict suicide? Prediction requires an individual to “foretell on the basis of observation, experience, or scientific reason.”³ Thus, suicide prediction implies an ability to anticipate future behavior. Obviously, truly knowing the future is not possible, but case law suggests that defendants in legal cases should have intervened when results were “reasonably foreseeable.”⁴ Certainly, clinical providers are tasked with predicting “reasonably foreseeable” suicide behaviors. Patients often present to providers with questions about their own safety. In addition, US Army commanders frequently consult psychologists for assistance in determining whether suicide is a “rea-

sonably foreseeable” outcome for one of their soldiers. Providers are not only asked to assess *if* a patient will attempt or complete suicide, but *when*. A patient with a high risk of an imminent suicidal behavior requires a different intervention than an individual with chronic risk factors but no imminent risk of self-harm.

A key question, therefore, relates to the definition of “reasonably foreseeable.” What research is available to help clinicians predict suicidal behaviors? How well can trained mental health experts currently foresee suicidal behaviors? The next section reviews some of the current research on suicide prediction in an attempt to inform future research priorities.

RESEARCH ON THE PREDICTABILITY OF SUICIDAL BEHAVIORS

Can providers currently predict suicidal behavior? Extensive research has been conducted to identify factors that might help in suicide prediction. Many variables have been studied, including demographic factors, specific risk factors, periods of elevated risk, psychopathology, psychiatric comorbidity, medical disorders, substance use, personality disorders, and personality traits. This body of work has produced some helpful information. For example, individuals who complete suicide are more likely to be white male adolescents or older adults.⁵⁻⁷ Chronic or recurrent depression,⁸ especially with comorbid alcoholism,⁹ also increases the risk of suicide. In addition, hopelessness, relationship problems, living alone, chronic medical problems, and a family history of suicidal behaviors

appear related to suicide completion.^{10,11} Most individuals who complete suicide were seen in primary care within a month of their death,¹² but were less likely to be under the care of a behavioral health provider.¹³ Individuals who complete suicide use methods more likely to be fatal, and therefore often die on their first attempt.¹⁴ At the same time, there is strong evidence that a prior suicidal behavior increases the risk of a future suicide attempt¹⁵ or completion.¹⁶

A variety of other risk and protective factors have varying degrees of support.^{10,11} Unfortunately, many of these are based on a single study, or on contradictory evidence.¹⁷ Although a significant body of research exists on the topic of suicide, few well-designed studies are available to answer some of the most basic

questions in the field. Suicide research is extremely complex because of the low base rate of completions; ethical problems associated with studying high-risk individuals; biases in retrospective data; the cost of conducting well-designed studies; and differences in suicide rates by gender, age, and ethnicity.

The literature supporting the risk factors reviewed above suggests that even when all the known risk factors are considered together, they may only account for a small proportion of the variance in suicidal behaviors. That is, the known risk factors do not provide clinicians with sufficient information to predict suicide. This assertion is strongly supported by studies that have attempted to predict future suicides using many of the known risk factors described above. In one study at a psychiatric hospital, 1,906 inpatients with affective disorders were linked to their manner of death during a 2- to 14-year follow-up period. Using suicide risk factors judged to have the most robust evidence, researchers attempted to predict which patients would later complete suicide. In the follow-up period, 46 patients completed suicide. None were correctly predicted by the researchers.

In a similar study, 4,800 psychiatric inpatients were prospectively followed for 4 to 6 years.¹⁸ Using a variety of risk factors, the researchers explored several approaches to predicting future suicides. Like the study described above, they characterized their own results as wholly “unsuccessful,” even when alternative statistical approaches were employed in later studies.¹⁹ Other studies^{20,21} have reported similar results.

Unfortunately, failure to prospectively identify appropriate numbers of suicide completions is only one of the problems related to suicide prediction. A second problem relates to the high false-positive rate of current suicide prediction models. That is, the probability that a person will complete suicide when known risk factors are positive is low.¹⁷ The implications of this problem are magnified exponentially by the fact that suicide is a very rare behavior. This problem is not simply a matter of statistical trivia, but has significant implications for the use of provider time and costs of treatment.

IMPORTANCE OF SUICIDE PREDICTION

Is suicide prediction important? Because current research to support suicide prediction is immature, and well-designed suicide research is extremely difficult and costly to conduct, it may be worth considering whether prediction is actually an important goal. Unfortunately, an analysis of the question results in the inescapable conclusion that without a reasonable ability to predict suicide, prevention efforts are extremely ineffective and costly.

To illustrate the point, the following is an adaptation of an example provided by Gaynes et al.²² Assume that a provider could predict suicidal behaviors with 80% sensitivity and 70% specificity (rates similar to depression screening). A provider who saw 10,000 patients over a number of years, 10 of whom truly attempt suicide, would correctly predict 8 suicide attempts while committing 2,997 false-positive errors. Thus, even if clinicians could predict suicide with this level of sensitivity and specificity, they would still miss 20% of the suicides, and the low base rate of suicide behaviors would result in significant costs related to false-positive errors.

In summary, behavioral health providers do not currently have the information they need to predict suicidal behaviors with any significant degree of accuracy. This conclusion is shared by many in the field. At the end of one of the prediction studies reviewed above, Pokorny stated, “Identification of particular persons who will (complete) suicide is not currently feasible.”^{18(p249)} After reviewing the literature on suicide prediction, Paris stated that “it is not possible to predict suicide with any degree of accuracy.”^{23(p235)} Bryan and Rudd stated that there is an “inability to predict suicidal behavior reliably.”^{24(p186)}

Although many of the studies reviewed above were based on actuarial prediction models, conclusions about the accuracy of clinical judgment do not differ from those summarized for statistical prediction models. Gaynes et al stated, “Despite the public health import of suicide and the Surgeon General’s call to action, evidence to guide the primary care clinician’s assessment and management of suicide risk is extremely limited.”^{22(p831)} Goldstein et al made the sobering statement that beyond identifying individuals with multiple risk factors, “it appears unrealistic for the general public or the legal system to expect that health professionals be able to predict suicide in specific patients based on our present knowledge.”^{25(p422)} Many clinicians and researchers prefer to define the clinician’s role in terms of a “risk assessment process,”²⁴ suggesting a general recognition that providers are not capable of predicting suicide.

Prediction is in many ways a prerequisite of prevention. In order to prevent a condition, prevention programs must generally be able to predict, with some degree of accuracy, who will benefit from a preventive effort. Without any predictive information, preventive actions can still be conducted, but high-risk individuals cannot be targeted, the effective components cannot be evaluated, and the costs are significant. Options for population-targeted preven-

tion programs include conducting preventive activities with no one, with random individuals (or those with the most financial resources), or with groups who are *believed* to be at greater risk. These options are usually unacceptable. Clearly, when there is reason to believe that effective preventive efforts are available, failure to conduct any such activities is far from ideal. Performing preventive efforts among only those with sufficient economic resources devalues human life. However, applying preventive efforts to an entire population requires significant financial resources and exposes everyone in the group to any risks that are associated with the prevention efforts. Predictive information is essential for helping clinicians and patients balance the costs and benefits of specific preventive efforts.

An example from the field of dementia illustrates the latter point. Results from a number of studies suggest that high-dose treatment with the antioxidant vitamin E may slow disease progression and reduce the incidence of dementia.²⁶⁻²⁹ Recently, however, new safety concerns related to high-dose vitamin E treatments have emerged.^{30,31} Although prophylactic vitamin E supplementation may not be indicated for all older adults, some patients with known risk factors for Alzheimer's disease (eg, genetic vulnerabilities) may determine, after weighing the risks and potential benefits with their provider, that the risk-benefit ratio supports their use of vitamin E treatment. Advances in predicting dementia inform decisions related to preventive practices that may be associated with risks.

Similarly, suicide prevention efforts are not without risk. Although biological risks of suicide prevention may not apply, specific interventions to prevent suicide in a high-risk individual may violate confidentiality, harm the therapeutic relationship, increase stigma associated with treatment, decrease the probability of forthright conversations about suicidal ideation in the future, and increase the probability of treatment drop-out. In addition, population-based prevention efforts targeted at those for whom they are not appropriate may, at a minimum, reduce the effectiveness of

the program, because messages can be "washed out" for everyone receiving nonspecific prevention efforts and training.

Based on the low base rate of suicide behaviors and the current accuracy of suicide prediction, well-intentioned interventions are surely targeting many for whom the intervention is not needed. It may be argued that as long as the negative impact on nonsuicidal individuals is low and the intervention is palatable to the community, the effort is justified. However, when individuals are targeted for intervention efforts, clinicians are committing numerous false-positive errors. Many individuals who are not "truly suicidal" may be targeted with intrusive interventions and suffer adverse effects because of the inability to predict suicide.

This discussion is not arguing that efforts aimed at prevention should be ended; rather, it is emphasizing the importance of efforts to improve the ability to predict suicide behaviors. In fact, efforts aimed at prediction can contribute significantly to prevention efforts, because progress in prediction often illuminates keys for prevention programs. The following is another example from the literature on Alzheimer's disease. Genetic research has now shown that mutations in three genes cause many of the early onset (before age 65) Alzheimer's disease cases and that these genetic mutations result in a build-up of a toxic protein fragment called amyloid beta, which may eventually lead to the death of nerve cells. This information has been helpful, not only for genetic counseling and predicting which family members will develop the disease, but also for defining new treatment approaches. The genetic data has informed exciting new approaches to treatment and prevention that attempt to "normalize" amyloid beta levels. Significant discoveries about suicide prediction would likely suggest information about the etiology of suicide that could potentially be leveraged by prevention programs. Although the road from prediction to prevention may be less direct for suicide, findings of significant predictive value would, at a minimum, suggest a narrower population in which to focus prevention efforts.

EPIDEMIOLOGICAL SURVEILLANCE STUDIES

Although research has demonstrated that clinicians are currently unable to predict which individuals will complete suicide with any degree of accuracy, suicide reduction is an extremely important health goal, and suicide prediction is in many ways a prerequisite to suicide prevention. This section reviews the use of epidemiological surveillance studies as an important tool for improving suicide prediction.

Suicide is not alone in the prediction challenges it presents due to its low incidence. A key challenge in

many areas of medical and psychiatric research is the rarity of the disease or condition of interest. Improving the medical community's ability to predict these rare events requires research methods that are effective for studying low base-rate behaviors or diseases. Epidemiological surveillance studies offer just such a methodology.

Epidemiological methodologies are not composed of a single research design or statistical analysis. Rather, they comprise the body of methods that examine

the occurrence of health-related conditions or events in defined populations.³² Included among these are randomized controlled trials (RCTs), cohort studies, and case-control designs. In RCTs, subjects are randomly assigned to one of several exposures and prospectively followed to determine the effect on outcomes. Cohort studies are observational, in the sense that the researcher does not control which subjects are exposed to specific variables. A group of participants (a “cohort”) is instead identified and then classified based on its natural exposure to the variables of interest, and followed over time to measure outcomes. This approach allows for the study of some topics that cannot be studied through RCTs, but cohort studies are inefficient for rare outcomes because a huge sample size is required to identify a sufficient number of infrequent positive outcomes on which to base conclusions. In contrast, a case-control study identifies individuals who are positive for a specific outcome and compares them to controls who are negative for the outcome.

Models for Suicide Research

Consideration of these basic methodologies indicates that RCTs obviously cannot be conducted to determine the effect of numerous exposure variables (eg, child abuse, combat exposure) on suicide. Large cohort studies have clear advantages, but they are extremely costly and inefficient for rare events with delayed outcomes such as suicide. Case-control studies offer an efficient, ethical approach to improving suicide prediction. A case-control surveillance system can efficiently identify individuals with suicidal behaviors and compare them to control subjects.

THE SUICIDE RISK MANAGEMENT AND SURVEILLANCE OFFICE

History of the Office

To effectively execute the suicide surveillance mission, the US Army established the Suicide Risk Management and Surveillance Office (SRMSO), a Medical Command office based at Fort Lewis, Washington. In 2002 and 2003, questions for an epidemiological data collection tool called the Army Suicide Event Report (ASER) were fielded, and content was clarified and revised. The ASER evolved from a scannable, paper-based data capture and processing approach, to an electronic Microsoft Word form, to a Web form submitted on a secure site. On February 4, 2004, Army Suicide Event Reporting Implementation Guidance was signed by Major General Kenneth Farmer, Jr, Deputy Surgeon General. This was followed by a widely circulated memorandum signed by Major General Joseph Webb, Jr, Deputy Surgeon General, stating that “the

An Army Suicide Surveillance System

Although a number of suicide surveillance studies have been conducted in the United States and Europe (eg, the National Center for Injury Prevention, the World Health Organization Regional Office for Europe [WHO-EURO] Multicentre Study on Parasuicide), their results may not generalize to the US Army population. Soldiers represent a demographically distinct population that faces unique work-related stressors. The Army cohort is a younger, more ethnically diverse, and disproportionately male group compared to the broader US population.³³ Many soldiers are exposed to unique experiences and stressors, and as the Army mission changes over time, these work-related stressors can shift. Therefore, civilian suicide surveillance efforts may be of limited relevance.

An Army surveillance program offers a number of specific advantages. First, such efforts allow the Army to track trends over time as the military mission changes. Second, unique Army risk factors, such as deployments, combat exposure, training assignments, repeated geographic relocation, and others can be studied. Third, recommendations for refining the Army’s suicide prevention efforts can be generated. Finally, a suicide surveillance program may provide opportunities to evaluate the effectiveness of suicide prevention programs and policies.

Additional research on suicide in both the military and civilian sectors is clearly needed. Epidemiological surveillance studies represent one of the more efficient approaches to improving suicide prediction. The Army has recently established a long-term suicide surveillance program to supplement its other risk-tracking efforts.

behavioral health leadership at each medical treatment facility will complete the ASER in accordance with the Implementation Guidance.” The ASER requirement is also specifically addressed in the revised Army Regulation 600-63, *Army Health Promotion*.³⁴

Army Suicide Event Report Data Collection Process

The ASER is a data collection form intended to standardize the data collected on all suicidal behaviors among Army soldiers. Submission of an ASER is required for all suicide-related behaviors that result in death, hospitalization, or evacuation from theater. To support this requirement, SRMSO has worked with each medical treatment facility (MTF) to identify both a command and an ASER point of contact (POC). The command POC is generally the MTF commander

who is responsible for ensuring regional compliance with ASER requirements. The command POC also appoints a provider to serve as the ASER POC, who is responsible for either personally completing the MTF's ASERs, or ensuring that a qualified provider completes the requirements.

For suicide completions, the data collection process generally begins when SRMSO receives notification from the Armed Forces Medical Examiner's Office at the Armed Forces Institute of Pathology that a soldier's death has been confirmed as a suicide (Figure 24-1). Upon such notification, the ASER and command POC for the MTF are notified and requested to complete an ASER within 60 days. Alternatively, ASERs are commonly submitted after a suicide completion is identified locally; SRMSO then confirms this determination with the medical examiner's office.

For suicidal behaviors resulting in hospitalization or evacuation, the data-collection process requires ASER POCs to submit monthly reports for each MTF. This

reporting generally involves coordination with inpatient psychiatric personnel and outpatient behavioral health clinic personnel. Because no central system formally tracks nonfatal suicide behaviors, these reports are currently used to determine how many ASERs are required for each MTF. ASER POCs are notified when expected ASERs are past due (30 days).

Army Suicide Event Report Questions

Development of the current ASER content evolved from a structured review of the past versions and data, and a systematic review of the literature. The results of the review were assessed for evidence-based predictors of suicide risk, and additional identified questions were combined into the update of the ASER.

For theoretically meaningful presentation of relevant risk factors for suicide and suicidal behavior, risk variables were organized into four categories using a prototype successfully implemented in the violence

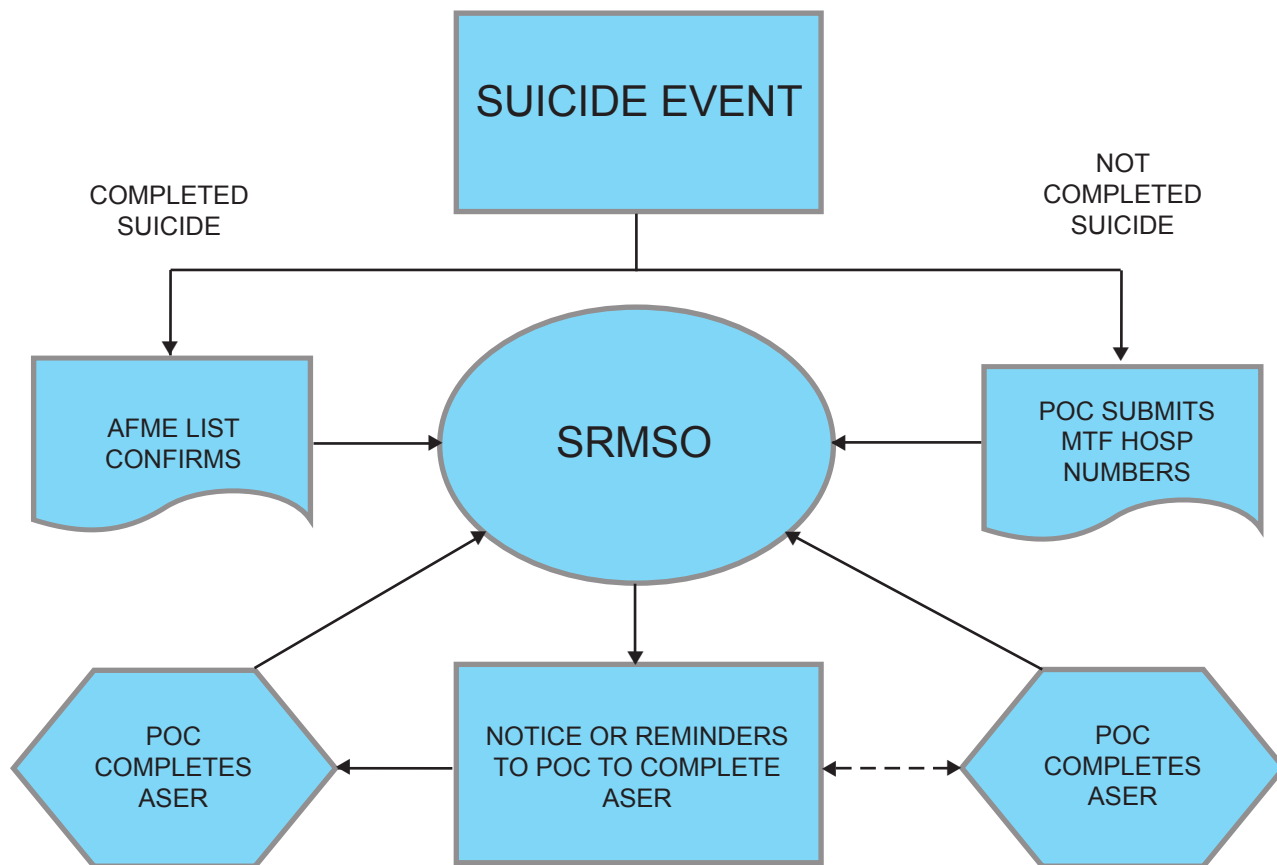


Figure 24-1. Army Suicide Event Report data collection.
 AFME: Armed Forces Medical Examiner's Office
 ASER: Army Suicide Event Report
 HOSP: hospital

MTF: medical treatment facility
 POC: point of contact
 SRMSO: Suicide Risk Management and Surveillance Office

risk assessment literature³⁵: (1) dispositional or personal factors (eg, demographics); (2) historical or developmental factors (eg, family history, prior suicidal behaviors, life events); (3) contextual or situational factors (eg, access to firearms, place of residence); and (4) clinical or symptom factors (eg, posttraumatic stress disorder, other psychiatric disorders or symptoms). This categorical banding of risks is intended to help organize the complex and multifaceted factors that contribute to suicidal behaviors. These factors were combined with a comprehensive set of questions related to the event (eg, method, location, injuries) to form the current ASER.

Required Source Information

Completion of an ASER requires a review of all relevant and available records. In addition, interviews may be needed in some cases, especially when suicidal behaviors resulted in hospitalization or evacuation. These data sources are described in Table 24-1.

Suicide Risk Management and Surveillance Office Reports

SRMSO drafts regular reports of suicide findings and also responds to requests from senior leaders for specific analyses. SRMSO generates quarterly and an-

nual reports that are provided to the behavioral health consultants to the Surgeon General, the Army Suicide Prevention Program (G-1), and all ASER POCs and command POCs.

Future Directions

Current SRMSO efforts are focused on improving data quality and accessibility for senior leaders. First, SRMSO is pursuing approaches to populating the ASER database from existing Army and Department of Defense data sources. As described above, the ASER POC must collect all relevant documents and data, extract the information that applies to specific ASER questions, and enter the data manually without errors. Populating the ASER database from existing databases with data quality assurances eliminates many opportunities for error. Significant conclusions and recommendations are drawn from ASER data, and the importance of this data is growing. For example, the Office of The Surgeon General has funded a new Suicide Prevention Office that is charged, in part, with facilitating new Army-wide prevention efforts based on empirical evidence derived from ASER research, the only Army-wide source of information on most aspects of Army suicide. Improving the reliability of ASER data provides Army leadership and the Suicide Prevention Office an improved capacity to make sound conclusions and recommendations.

Second, SRMSO is exploring options to improve the accessibility of ASER data for senior leaders. Currently ASER data are available in an Oracle database at the Fort Lewis, Washington, SRMSO office. Qualified requesters must submit a request for a report to SRMSO. A researcher at SRMSO must then query the database and analyze the results. SRMSO then checks and re-checks the results to assure that they are accurate and will answer the questions asked. Finally, the SRMSO research team must determine the most meaningful graphical representation, create the graphs, and return the results to the requestor. Although SRMSO has a solid track record of timeliness and efficiency, this process is less than ideal, especially given the importance of suicide and the short suspense that Department of Defense leaders often face.

SRMSO is exploring options for a user-friendly data reporting tool that can be configured to rapidly extract information from data sets and provide reports using predetermined statistical analyses and intuitive visual output. The Web-based Injury Statistics Query and Reporting System on the Centers for Disease Control and Prevention Web site provides a good example of such a tool.⁶ The user is prompted to select types of data and appropriate categorical grouping variables. The graphical interface is not only informative but also

TABLE 24-1
SOURCE INFORMATION REQUIRED TO COMPLETE AN ARMY SUICIDE EVENT REPORT

Event	Required Data Sources
Completed suicide	Review of medical and behavioral health records Personnel and counseling records Investigative agency records (eg, Criminal Investigation Division) Records related to manner of death (casualty reports, toxicology, autopsy, suicide notes) Interview of coworkers and supervisors as needed and appropriate Interview of responsible investigative agency officer, as needed and appropriate Interview of other involved professionals and family members when appropriate
Attempted suicide	Interview of patient Review of medical and behavioral health records Interview of coworkers and supervisors as needed

interactive, allowing the user to drill down to get more specific information within a given domain. ASER data reported via a similar output generator would be delivered as an intuitive, interactive graphical output, rapidly generated to support the mission of senior leadership and healthcare providers.

A number of additional future directions are in the planning stages. One goal is to provide behavioral health clinicians access to relevant local ASERs to improve clinical care and safety planning. In addition, SRMSO is pursuing software functionality for

command and ASER POCs to view regional ASER data over time. Efforts are also underway to improve the size and quality of control samples to compare to Army data. A large control sample drawn from the Army at large would be of significant value. Finally, SRMSO is focusing on developing a longitudinal data set. Even with a population as large as the Army, some topics cannot be studied because of the low base rate of suicide completions (eg, many questions related to suicides in Iraq). Longitudinal data over several years will allow for richer analysis.

SUMMARY

This chapter reviewed the issues and expectations associated with the prediction of suicides. A generally pessimistic conclusion was drawn regarding the ability to predict suicides with the current level of knowledge. After reviewing meth-

ods that may improve prediction of suicide risk, the authors recommended a surveillance model. Finally, the surveillance process within the Army was reviewed in detail, outlining its process, challenges, and goals.

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