Developing a Research Strategy for Suicide Prevention in the Department of Defense

Status of Current Research, Prioritizing Areas of Need, and Recommendations for Moving Forward

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Preface

In response to concerns about the elevated rate of suicide among U.S. service members, the congressionally mandated Task Force on the Prevention of Suicide by Members of the Armed Forces offered a series of recommendations to help strengthen the U.S. Department of Defense (DoD) suicide prevention programs. The task force's final recommendation was for DoD to "create a unified, strategic, and comprehensive DoD plan for research in military suicide prevention ensuring that the DoD's military suicide prevention research portfolio is thoughtfully planned to cover topics in prevention, intervention, and postvention" (U.S. Department of Defense Task Force on the Prevention of Suicide by Members of the Armed Forces, 2010, p. ES-18).

The RAND Corporation was asked to provide guidance that DoD can use to develop this recommended unified, strategic, and comprehensive plan. The study was organized around three overarching research aims: (1) catalog research being conducted on suicide prevention that is directly relevant to military personnel, (2) examine whether current research maps onto DoD's strategic research needs related to suicide prevention, and (3) ensure that any proposed DoD research strategy aligns with the national research strategy and is integrated with DoD's data, surveillance, and program evaluation strategies. RAND took a multidisciplinary approach to meeting these three aims, drawing from the disciplines of psychology, epidemiology, statistics, and economics. This report presents the results of the study. It should be of interest to policy officials charged with implementing suicide prevention programs, analysts who compile suicide prevention research portfolios for program evaluation or other purposes, and others who are engaged in ensuring a comprehensive response to suicide among service members, including members of Congress and military and veteran service organizations.

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Summary

The U.S. Department of Defense (DoD) has been increasingly concerned about the elevated rate of suicide among U.S. service members. At the end of the last decade, a report by the RAND Corporation (Ramchand et al., 2011) and another by the congressionally mandated Task Force on the Prevention of Suicide by Members of the Armed Forces offered a series of recommendations to help strengthen DoD's suicide prevention programs. The task force's final recommendation was for DoD to "create a unified, strategic, and comprehensive DoD plan for research in military suicide prevention ensuring that the DoD's military suicide prevention research portfolio is thoughtfully planned to cover topics in prevention, intervention, and postvention" (U.S. Department of Defense Task Force on the Prevention of Suicide by Members of the Armed Forces, 2010, p. ES-18).

Shortly after the task force report's release, the National Action Alliance for Suicide Prevention (NAASP), a public-private partnership charged with advancing the National Strategy for Suicide Prevention, established the Research Prioritization Task Force to develop "an agenda for research with the stated goal to reduce morbidity (attempts) and mortality (deaths), each by at least 20% in five years and 40% or greater in 10 years, *if implemented fully and successfully*" (NAASP, 2014, p. 7; emphasis in original). This report, produced by the RAND National Defense Research Institute, represents an effort to assist DoD in creating a strategic research plan that aligns with the national research agenda.

This study's objective was to provide guidance that DoD could use to develop the recommended unified, strategic, and comprehensive plan. The study was organized around three overarching research aims: (1) catalog research being conducted on suicide prevention that is directly relevant to military personnel, (2) examine whether current research maps onto DoD's strategic research needs related to suicide prevention, and (3) ensure that any proposed DoD research strategy aligns with the national research strategy and is integrated with DoD's data, surveillance, and program evaluation strategies. We took a multidisciplinary approach to achieving these three aims, drawing from the disciplines of psychology, epidemiology, statistics, and economics.

What Suicide Prevention Research Being Done in the United States Is Directly Relevant to Military Personnel?

We conducted a comprehensive scan to identify *who* in the United States is funding research on suicide prevention that is relevant to military personnel and to catalog exactly *what* they were funding. We found that DoD is the largest single funder of suicide prevention research,

having recently funded 61 studies at a cost of more than $100 million. This figure does not include the Army Study to Assess Risk and Resilience in Servicemembers (known as Army STARRS), a $65 million study funded jointly by the U.S. Army and the National Institute of Mental Health. While DoD is the largest funder of suicide prevention research with relevance to military personnel in the United States, this total represents a little less than one-third of all relevant studies, with the U.S. Department of Health and Human Services (primarily through the National Institutes of Health), the U.S. Department of Veterans Affairs (VA), and the American Foundation for Suicide Prevention funding the remaining two-thirds.

The results focused primarily on DoD and overall trends relative to 12 NAASP categories representing "aspirational goals" for suicide prevention and seven Military Operational Medicine Research Program (MOMRP) categories that make up MOMRP's continuum of care framework. With respect to the NAASP categories, current suicide prevention research funded by DoD and other funders tends to focus on studies that attempt to identify *who* dies by suicide (i.e., risk and protective factor interactions), psychotherapeutic interventions to *treat* individuals at risk for suicide (i.e., psychosocial interventions), and ensuring that those at risk can *access* affordable, accessible, and effective care. We based this assessment on the number of studies funded and the total amount of funding devoted to these areas of research.

In contrast, relatively few studies funded by DoD and other entities focus on preventing reattempts among those who have previously attempted suicide or the reduction in access to lethal means. These were also areas for which there were relatively low amounts of funding. Interestingly, although prevention was an area of low overall spending, DoD's highest level of *mean funding per study* was for studies on the prevention of reattempts. Studies on access to lethal means are particularly underfunded across funders compared with the rest of the research portfolio, perhaps because of legislation that greatly restricted this type of research or because of the perceived lack of cultural acceptability of means reduction as an effective component of military suicide prevention. It is also notable that DoD funded fewer studies of biological interventions, compared with other funders, but it still accounted for 65 percent of all funding in this category.

Accounting for studies according to the MOMRP categories shows that most, by far, both overall and by DoD specifically, are being conducted on *who* is at risk of dying by suicide (i.e., epidemiology or basic science/neurological mechanisms). There are also a large number of studies focusing on treatment and prevention training/education. Similarly, the most funding by far is being spent on epidemiology/basic science/neurological mechanisms and treatment, with a moderate amount of spending on prevention education and training and on assessment. Among DoD studies, mean funding per study was highest for studies of treatment, epidemiology and basic science, and—surprisingly—postvention, despite the low level of overall funding going to studies on that topic. Indeed, relatively few studies are examining either postvention or recovery and return to duty, and there is very little spending by non-DoD funders in these areas as well, suggesting that if DoD does value research in these areas, it will likely have to fund the requisite studies. Indeed, recovery and return to duty may be particularly central to DoD's mission (despite DoD's relatively low funding levels for research in this area), but it may not be not viewed as a key area of research by other funders.

These results concerning research priorities should be interpreted with the caveat that they do not include the major Army STARRS study, for which the Army has allocated $50 million (of $65 million in total funding for the study) to examine 11 of 12 NAASP categories and all seven MOMRP categories of suicide prevention research. When we report that

funding is low in a given area, that assessment does not take into account Army STARRS research.

Which Suicide Prevention Research Needs Are DoD Priorities?

Having established what research DoD is conducting on suicide, we conducted an assessment of DoD's suicide prevention research needs to identify the department's priorities. We modified 12 aspirational goals identified by the NAASP Research Prioritization Task Force so that we could isolate the input and priorities of DoD stakeholders from those of other, non-DoD stakeholders. Table S.1 shows the modified set of aspirational goals and the shorthand used in the analysis.

We used the same procedures as the NAASP Research Prioritization Task Force, including identical online elicitation software and processes. We asked DoD stakeholders to consider the goals' merits on five grounds: (1) overall importance, (2) effectiveness, (3) cultural acceptability, (4) cost, and (5) learning potential (i.e., the amount that could be learned by pursuing strategies tied to the goals). Participants ranked the goals relative to the criteria using the online RAND ExpertLens™ elicitation process. Because of lower-than-anticipated participation among DoD stakeholders, we sought to confirm responses in two domains—effectiveness and learning potential—by implementing a modified expert elicitation among seven RAND researchers, all of whom have conducted recent research on or related to military suicide prevention.

According to these criteria, *gatekeeper training* stands out. Although DoD experts did not believe that this goal was currently very effective, they ranked it as important, culturally acceptable, and the least costly. The RAND panel ranked research relating to gatekeeper training as having the second highest learning potential. Furthermore, prior research suggests that these types of trainings are widely used in DoD. *Provider training* and strategies for enhancing *continuity of care* appear similarly promising in terms of their importance and effectiveness; however, the RAND panel ranked them as likely to yield low returns in future research, largely because they believed that there was not much more to learn about these approaches.

How Do DoD's Prioritized Needs Map Against the Ongoing Suicide Prevention Research?

We conducted a preliminary gap analysis by combining the data on research being conducted and the elicited DoD prioritized needs to examine whether current research on suicide prevention that is relevant to military personnel—in terms of both the number of ongoing studies and the amount of funds allocated—aligned with those DoD needs. We examined "needs" across the five domains: importance, effectiveness, cultural acceptability, cost, and potential learning. The aim was to help DoD begin thinking about a strategic research agenda for suicide prevention research.

The results suggest there is a gap between priorities and research. Specifically, current studies and funding align best with the domains of effectiveness and cost. In other words, more studies and more funding are going toward suicide prevention goals that are already ranked as most highly effective, as well as those considered the most costly to implement.

Table S.1
Modified DoD Aspirational Goals

NAASP Aspirational Goal	DoD Aspirational Goal	RAND Shorthand
Population-based risk-reduction/resilience-building	Implement population-based programs that reduce suicide risk factors and build resilience.	Risk reduction
Provider and gatekeeper training	Ensure non–health professionals (i.e., noncommissioned officers, chaplains) who come in contact with suicidal individuals are trained to identify, care for, and refer persons at risk.	Gatekeeper training
Provider and gatekeeper training	Train health care professionals to identify those at risk for suicide and to manage their treatment.	Provider training
Stigma reduction	Encourage service members and their families to be knowledgeable about and proactively seek treatment.	Help-seeking
Affordable, accessible, and effective care	Deliver high-quality treatments for mental illnesses (e.g., depression, post-traumatic stress disorder) that are associated with suicide.	Quality care
Population-based screening	Conduct population-based screening to identify those at risk for suicide.	Screening
Reduction in access to lethal means	Reduce service members' access to the means that they might use to take their own lives.	Reduced access
Psychosocial interventions for those at risk	Improve psychosocial interventions used by clinicians (e.g., psychiatrists, psychologists, social workers) to identify and treat those at risk for suicide.	Psychosocial interventions
Improved biological interventions	Identify biological interventions that clinicians could use to treat suicidal behavior.	Biological interventions
Prediction of imminent risk	Develop strategies to predict which individuals are at imminent risk of suicide.	Prediction
Enhanced continuity of care	Achieve continuity of care between providers, across installations, and with the civilian and VA systems.	Continuity of care
Prevention of reattempts	Implement strategies to prevent suicide reattempts.	Prevent reattempts
Risk and protective factor interactions	N/A	

NOTE: Goals are worded verbatim from the RAND ExpertLens elicitation exercise conducted for this study. The goal "risk and protective factor interactions" was excluded because we could not equate it with a specific aspirational goal.

However, there is no direct link between what is being funded and what DoD representatives perceive as important. Furthermore, while there are few studies and little funding is being allocated to goals ranked as least culturally acceptable, there are also few studies and little funding allocated to goals ranked as most culturally acceptable. Finally, there is an inverse relationship between the number of studies and the amount of funding allocated to goals with the most learning potential, with more studies and funding going toward goals ranked as having the lowest learning potential.

We improved on the preliminary gap analysis by creating an econometric model that uses the input from the needs assessment and incorporates additional parameters to rank or prioritize research in a way that yields maximum impact in terms of reduced mortality—a benefit-cost index that accounts for both the explicit benefit (i.e., suicides prevented) and the explicit cost of implementing an intervention. For each aspirational goal, we first calculated the benefit-cost index and used this information to rank the aspirational research goals in a way that accounted for effectiveness and cost. We then compared the result to the rankings of "importance" derived from the RAND ExpertLens panel. Using the index, we provide a preliminary snapshot of research priorities, with the *provider training* and *help-seeking* goals having the highest benefit-cost index values (93.3 and 49.6, respectively); the values for the other goals drop quickly, starting with 1.80 for *reduced access* and going down to 0.56 for *prediction*. Further analysis suggests that the ordinal ranking of goals that ranked in the middle of the group in the ExpertLens exercise are sensitive to the assumptions used to parameterize the model while the goals ranking very high and very low are least sensitive.

We also took the index value rankings and plotted them against the cultural acceptability rankings to highlight the strategies that look very promising based on the explicit benefit-cost index but carry high implicit implementation costs (i.e., those that ranked low with respect to cultural acceptability) and that, as a consequence, would need to be discounted. The scatterplot in Figure S.1 shows how the goals align, revealing that *psychosocial interventions*, *help-seeking*, and *reduced access* may need to be discounted.

Drawing on recent insights from the economics literature on research and development portfolio choice and learning value, we used both the benefit-cost index and future learning potential to provide even more insight into optimizing a suicide prevention research portfolio. Figure S.2 shows how the 12 strategies rank in terms of perceived learning values, with the

Figure S.1
Cultural Acceptability Ratings
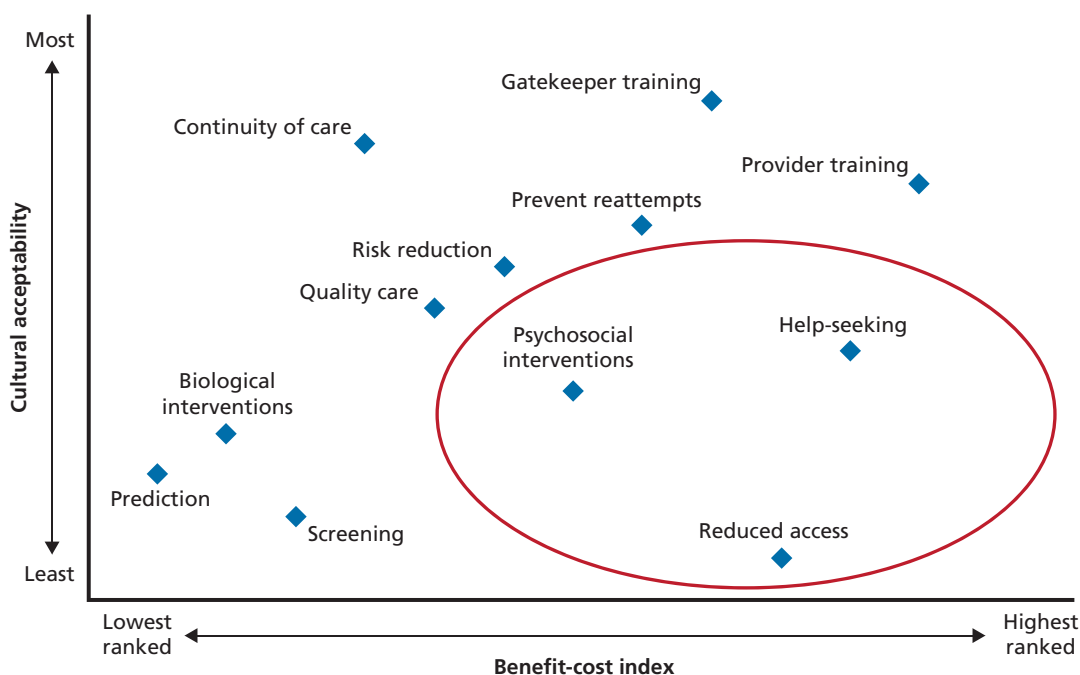
Figure S.2
Learning Potential Ratings
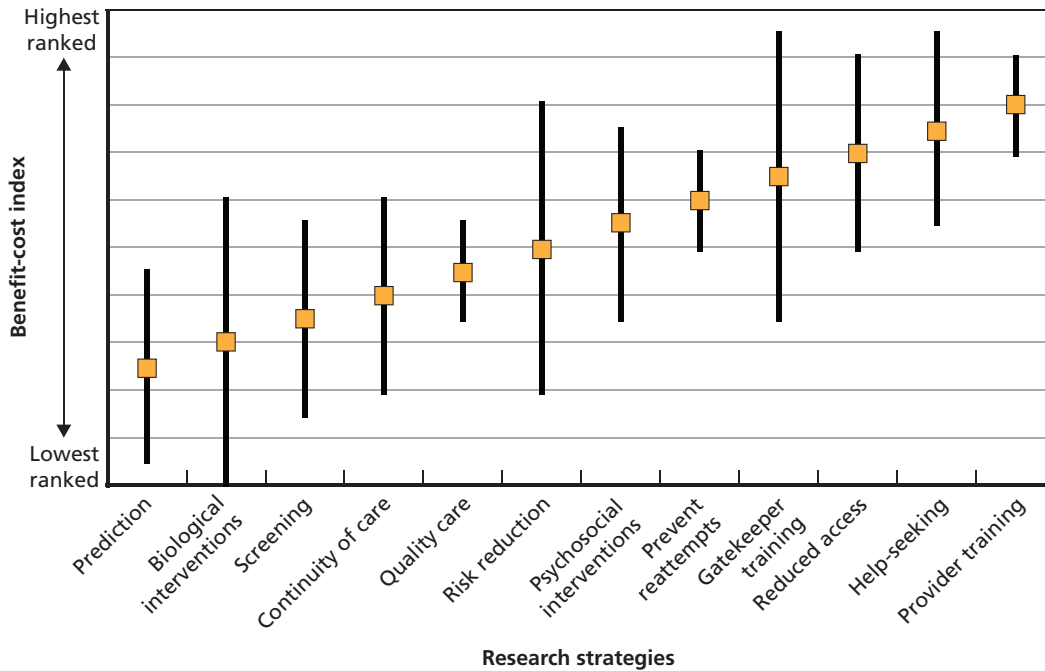
longer error bars reflecting more potential learning value. Although *provider training* ranked first in terms of our benefit-cost index, research in this field is perceived to be mature and thus has a low learning potential. *Help-seeking* ranked slightly lower but has greater learning potential. Because it has a higher learning value (i.e., greater uncertainty), it is possible that the maximum potential return for *help-seeking* is greater than the maximum potential return for *provider training*. The figure reflects this difference in that the top of the error bar for *help-seeking* is higher than the top of the error bar for *provider training*. *Gatekeeper training*, which also has a high learning potential, similarly offers a high maximum potential return. Population-based *risk reduction* is another strategy with a high learning potential, and its error bar overlaps those of several adjacent strategies with lower learning values.

Determining the proper investment model is especially complicated because of the inherent lack of traditional data sets to support the empirical analysis of research outcomes. We recognize that there are many "unknowns," and our methodology, combined with expert elicitation, is designed to organize the unknowns into a more manageable problem. Our primary goal was to provide and populate a metric in a field in which such a metric is lacking and to do so transparently. We believe that this process, and the ExpertLens elicitation exercise, provides a solid ground from which to make strategic recommendations that can inform the development of a comprehensive research program for suicide prevention in DoD.

How Can This Research Be Translated into Practice?

Although the ultimate objective of any suicide prevention research study is to provide empirically supported insight that can be used to improve or inform suicide prevention strategies,

there is a "research-practice gap" when it comes to disseminating research conducted in academic settings to individuals who may actually benefit from the findings. Based on a literature review, we outlined ten components for successfully adopting research programs in practice. We augmented this information by holding discussions with experts at RAND in the areas of education, substance abuse, occupational safety, criminal justice, behavioral health, and health care to identify "case studies" of research programs that have been successfully implemented into practice.

The first three components focus on demonstrating that the program is needed, that it has the potential to be successful at a particular site, and that it is rooted in scientific evidence. Successful diffusion begins with (1) *establishing evidence of an identified need*—that is, collecting data to demonstrate to organizational leaders and adopters on the ground that the innovation has relative advantages over an existing program. The next two components relate to examining the supporting evidence for a new program. Ensuring that the program has (2) *evidence of research quality* and (3) *evidence of real-world effectiveness* can help inform leadership decisions about which programs to adopt.

Following these first essential components are those related to having internal leadership and financial support for a program. These components are (4) *leadership buy-in* and *support from key stakeholders*, which can ensure that programs are championed and commissioned by individuals in a position to execute change within an organization (which is essential to the other nine components). Most programs also cannot exist without some form of (5) *funding or other institutional support* to finance the program's start-up, staff pay, and the infrastructure necessary to keep a program running on a day-to-day basis.

The remaining components deal primarily with the process of garnering support and disseminating the new program at the ground level (i.e., working with those involved in the actual implementation of the program). This can begin with (6) *collaboration with credible sponsors*, designing research programs with target audiences involved at the development stage. This also includes collaboration across and within organizations—across departments and disciplines—to promote innovation. When implementing a new program in a system with individuals who may be used to or invested in the current approach or who are now expected to perform additional or different duties, the (7) *provision of incentives or development of policies* can be helpful in promoting widespread diffusion of the program. In addition, the role of (8) *peer networks supportive of adoption* cannot be underestimated, because individuals learn about new practices from their peers. Providing adopters on the ground with (9) *dissemination materials* can facilitate the process of diffusion through marketing and the promotion of ideas. Step-by-step toolkits or guidelines can assist in this effort. Finally, when a new program is adopted, there should be an (10) *expectation of a cultural shift* that takes time and will require the continued support of new program adopters. Awareness of, and preparation for, resistance and delays in adoption can help leaders remain flexible in meeting the needs of their organization while supporting those charged with implementing the new program.

Recommendations

In light of the study results, we offer a series of ten recommendations (see Table S.2). The first is an overarching recommendation, and the remaining nine fall into three general categories: (1) areas in which DoD should prioritize research funding, (2) processes that DoD should

adopt or enhance to more efficiently allocate research funding, and (3) processes that DoD should adopt or enhance to ensure that evidence-supported suicide prevention strategies are integrated into current operations.

Table S.2
Study Recommendations

Category	Recommendations
Overarching Recommendation	1. Leadership is needed to provide strategic guidance for implementing a unified research strategy.
Areas in which DoD should prioritize research funding	2. Eliciting the opinions of relevant stakeholders can inform the development of DoD's research priorities.
	3. Research investment is needed to prioritize strategies with low benefit-cost values; policy changes are needed to make already high benefit-cost strategies more culturally acceptable.
	4. Funding agencies in DoD should make a proactive effort to fund effectiveness research, in which interventions that prior research (funded by DoD or another entity) has deemed efficacious are evaluated for their effectiveness in the military context.
Processes that DoD should adopt or enhance to more efficiently allocate research funding	5. DoD should have a central repository to identify and track the research it is funding on suicide prevention.
	6. The designated leadership agency in DoD (per recommendation 1) should continually reevaluate its research priorities in light of new research findings, new policies, and the adoption of new suicide prevention strategies.
Processes that DoD should adopt or enhance to ensure that evidence-supported suicide prevention strategies are integrated into current operations	7. DoD should encourage both formal and informal collaboration across the DoD entities responsible for funding and implementing suicide prevention programs and strategies.
	8. Agencies that fund suicide prevention research and those responsible for implementing suicide prevention programs should keep abreast of new research, bearing of mind the quality of different studies. Efficiencies may be gained by creating a centralized clearinghouse for this purpose, perhaps capitalizing on existing sources.
	9. Agencies and organizations within DoD should be encouraged to adopt evidence-based technologies. Such encouragement may include funding, materials, and technical assistance.
	10. Both leadership buy-in and peer engagement are key in promoting new technologies.

Acknowledgments

Abbreviations

AFRL	Air Force Research Laboratory
AFSP	American Foundation for Suicide Prevention
AHRQ	Agency for Healthcare Research and Quality
Army STARRS	Army Study to Assess Risk and Resilience in Servicemembers
BPD	borderline personality disorder
CDC-NCIPC	Centers for Disease Control and Prevention, National Center for Injury Prevention and Control
CDMRP	Congressionally Directed Medical Research Programs
CPG	clinical practice guideline
DBT	dialectical behavior therapy
DCoE	Defense Centers of Excellence
DHHS	U.S. Department of Health and Human Services
DoD	U.S. Department of Defense
EAP	employee assistance program
HOPE	Hawaii's Opportunity Probation with Enforcement
ICU	intensive care unit
MOMRP	Military Operational Medicine Research Program
MSRC	Military Suicide Research Consortium
NAASP	National Action Alliance for Suicide Prevention
NIH	National Institutes of Health
NIMH	National Institute of Mental Health
NIOSH	National Institute for Occupational Safety and Health
OEF	Operation Enduring Freedom

OIF	Operation Iraqi Freedom
PTSD	post-traumatic stress disorder
R&D	research and development
RCT	randomized controlled trials
RDT&E	research, development, test, and evaluation
SAMHSA	Substance Abuse and Mental Health Services Administration
STRONG STAR	South Texas Research Organizational Network Guiding Studies on Trauma and Resilience
TAGGS	Tracking Accountability in Government Grants System
VA	U.S. Department of Veterans Affairs
VHA	Veterans Health Administration

Introduction

Background

The U.S. Department of Defense (DoD) has been increasingly concerned about the elevated rate of suicide among U.S. service members. At the end of the last decade, a report by the RAND Corporation (Ramchand et al., 2011) and the final report of the congressionally mandated Task Force on the Prevention of Suicide by Members of the Armed Forces offered a series of recommendations to help strengthen DoD's suicide prevention programs. The task force's final recommendation was for DoD to "create a unified, strategic, and comprehensive DoD plan for research in military suicide prevention ensuring that the DoD's military suicide prevention research portfolio is thoughtfully planned to cover topics in prevention, intervention, and postvention" (U.S. Department of Defense Task Force on the Prevention of Suicide by Members of the Armed Forces, 2010, p. ES-18).

Shortly after the task force report's release, the National Action Alliance for Suicide Prevention (NAASP), a public-private partnership charged with advancing the National Strategy for Suicide Prevention, established a Research Prioritization Task Force to develop "an agenda for research with the stated goal to reduce morbidity (attempts) and mortality (deaths), each by at least 20% in five years and 40% or greater in 10 years, *if implemented fully and successfully*" (NAASP, 2014, p. 7; emphasis in original). This report, produced by the RAND National Defense Research Institute, represents an effort to assist DoD in creating a strategic research plan that aligns with the national research agenda.

Study Purpose

This study's objective was to provide guidance that DoD could use to develop the recommended "unified, strategic, and comprehensive DoD plan for research in military suicide prevention." To meet this objective, the study was organized around three overarching research aims:

1. Catalog current research being conducted on suicide prevention of direct relevance to military personnel.
2. Examine whether current research maps onto DoD's strategic research needs related to suicide prevention.
3. Ensure that any proposed DoD research strategy aligns with the national research strategy and is integrated with DoD's data, surveillance, and program evaluation strategies.

Approach

We took a multidisciplinary approach to meeting these three aims, drawing from the disciplines of psychology, epidemiology, statistics, and economics. We began by conducting a comprehensive scan to identify *who* in the United States was funding research on suicide prevention that is relevant to military personnel and to catalog exactly *what* they were funding. Simultaneously, we assessed DoD's suicide prevention research needs. We did so by conducting an online consensus-building exercise with DoD representatives who, because of their organizational affiliation, play a role in DoD's suicide prevention activities. This process enabled us to rank or prioritize DoD-specific research goals, rather than applying national rankings generated by the NAASP.

Our next task was to compare the results from our catalog of ongoing research to the identified needs of military personnel. This mapping exercise provided a fairly crude understanding of which DoD-specific research needs are being addressed by existing research and where there are gaps. We improved on this task by utilizing a benefit-cost framework capturing the input from the needs assessment and incorporating additional parameters to provide guidance on how to rank or prioritize research in a way that yields maximum impact in terms of reduced mortality.

Part of a unified and comprehensive research strategy is having a process in place by which research findings can be integrated into policy and practice to better prevent suicides. Thus, our next task was to identify state-of-the art strategies that facilitate the diffusion of research into practice. We did so primarily through a literature review, which was enhanced by case studies of effective dissemination identified in both the literature and through our discussions with subject-matter experts at RAND.

The final task was to synthesize the findings from the aforementioned tasks, recognizing the limitations of each, to construct a series of recommendations across three domains: (1) areas in which DoD should prioritize research funding, (2) processes that DoD should adopt or enhance to more efficiently allocate research funding, and (3) processes that DoD should adopt or enhance to ensure that evidence-supported suicide prevention strategies are integrated into current operations.

Organization of This Report

This remainder of this report is organized into six chapters. In Chapter Two, we present a summary of all research related to suicide prevention that is directly relevant to military personnel and funded by DoD, the U.S. Department of Veterans Affairs (VA), other government agencies, and private foundations. (Appendix A provides descriptions of each of the studies that met our inclusion criteria.) In Chapter Three, we present our method for documenting and prioritizing DoD's suicide prevention research needs and the results of our analysis. In Chapter Four, we describe how the needs identified in Chapter Three align with current, ongoing research catalogued in Chapter Two. In Chapter Five, we extend our analysis of research prioritization by constructing an empirical model to estimate how strategic investment in research might quickly and efficiently reduce suicide deaths. It is becoming increasingly clear both inside and outside DoD that strategies and processes are needed to encourage the dissemination of research findings and incorporate them in practice. Thus, in Chapter Six, we highlight ten

guiding principles that need to be considered when translating research findings into practice. Finally, in Chapter Seven, we synthesize the material from the preceding chapters and present our conclusions and recommendations for creating "a unified, strategic, and comprehensive DoD plan for research in military suicide prevention."

The report also includes a series of appendixes. The tables in Appendix A present key information on ongoing studies of relevance to suicide prevention among military personnel. Appendix B provides an alternative way of describing the allocation of research funds than what is presented in Chapter Two. Appendix C discusses the statistical procedure we used to extract rankings from the RAND ExpertLens™ panel. Appendix D shares user feedback on RAND ExpertLens. Appendix E offers a detailed description of the sensitivity analysis that accompanies the empirical model presented in Chapter Five. Finally, Appendix F discusses research domains and approaches for assessing research quality.

Current Suicide Prevention Research in the United States That Is Directly Relevant to Military Personnel

In this chapter, we catalog *current* research being conducted in the United States on suicide prevention that is directly relevant to military personnel. Cataloging the research involved defining the bounds of research abstraction; creating a data abstraction form, including key categories of information on the studies; identifying funders of suicide prevention research through online searches and by asking key informants; abstracting the research using online sources, along with emails and interviews with researchers and research portfolio managers; and systematically categorizing the abstracted research to quantify the areas in which research is being conducted.

The following references provide reviews of *past* research that has been conducted on suicide prevention and found to be directly relevant to military personnel:

- Rajeev Ramchand, Joie Acosta, Rachel M. Burns, Lisa H. Jaycox, and Christopher G. Pernin, *The War Within: Preventing Suicide in the U.S. Military*, Santa Monica, Calif.: RAND Corporation, MG-953-OSD, 2011.
- Committee on Gulf War and Health, *Gulf War and Health, Vol. 6: Physiologic, Psychologic, and Psychosocial Effects of Deployment-Related Stress*, Washington, D.C.: National Academies Press, 2008.

Methods

Inclusion and Exclusion Criteria

Before beginning the task of abstraction, we developed a set of criteria and corresponding definitions, which we used to determine which studies should be included and which should be excluded. We applied the inclusion and exclusion criteria sequentially, such that the study first needed to be considered "recent research" to be included, and then the other criteria were applied. Working with the Defense Suicide Prevention Office, we established the following definitions for inclusion:

- *Recent* is any project funded in or after the year 2005.
- *Research* is any study that advances knowledge and theory, not evaluations that focus on the implementation of a specific program and are limited in scope. We *did* include large-scale program evaluations that seek to produce generalizable knowledge that goes beyond the specific program.

- *Direct relevance to military personnel* means that the research examines military or recent veteran samples or nonclinical samples of civilians comparable in age to military personnel. We operationalized this concept by including studies in which the sample or focus was on a population of a mean age between 13 and 65 years.

We excluded studies from our abstraction if the aggregate funding occurred before 2005, the study could not be considered as "research," or the study was not directly relevant to military personnel. Furthermore, research was excluded if the focus was on suicide or suicide prevention among individuals with serious mental illness, such as schizophrenia or bipolar disorder. Table 2.1 provides an overview of the inclusion and exclusion criteria.

Identifying Studies for Abstraction

Through a series of interviews and a review of past RAND work on suicide prevention research, we sought to identify all studies with direct relevance to military personnel that were funded by the U.S. Department of Health and Human Services (DHHS), VA, and DoD. In addition, we sought to identify all studies meeting our inclusion criteria funded by the American Foundation for Suicide Prevention (AFSP). Our focus on these agencies and organizations suggests that we may be missing studies funded by other government agencies (e.g., the U.S. Department of Homeland Security, U.S. Department of Education), private foundations (e.g., the MacArthur Foundation), or private companies (e.g., pharmaceutical or medical device manufacturers).

U.S. Department of Health and Human Services

We used the Tracking Accountability in Government Grants System (TAGGS) to identify research funded by DHHS (see TAGGS, undated). TAGGS is the reporting tool for data on all grants awarded by the 11 operating divisions of DHHS. We conducted TAGGS searches between the months of September and December 2012. Using the advanced search in the system, we set the key abstract word as "suicide." Consistent with our inclusion and exclusion criteria, we set the "fiscal year award made" as 2005 to 2012 and focused on awards categorized as "evaluation," "scientific/health research," or "social science research."

Table 2.1
Inclusion and Exclusion Criteria for Suicide Prevention Research Abstraction

Inclusion Criteria	Exclusion Criteria
1. Recent: Studies funded in or after 2005.	Program evaluations that do not produce generalizable knowledge
2. Research: Studies that advance knowledge and theory, not evaluations that focus on the implementation of a specific program and are limited in scope. We included large-scale program evaluations that seek to produce generalizable knowledge that goes beyond the specific program as "research."	Child sample, operationalized as child focus or mean age under 13
	Older adult sample, operationalized as mean age over 65
3. Direct relevance to military personnel: Studies that could be applicable to military personnel in that the research examines military or recent veteran samples or nonclinical samples of civilians comparable in age to military personnel (i.e., adolescent, adult).	Serious mental illness (e.g., schizophrenia or other psychotic disorder, bipolar disorder) or borderline personality disorder

U.S. Department of Veterans Affairs

To identify suicide prevention research funded by the VA, we used the Research Studies and Implementation Projects search engine on the website of the VA's Office of Health Services Research and Development (see HSR&D, undated). We conducted our search in November 2012 using "suicide" as the keyword.

We found the VA search engine to have some limitations. For example, funding amounts are not provided with the search results, and the database does not contain many studies funded before 2009. For the missing information and earlier studies, we sought assistance from the VA directly. In June 2013, the Office of Health Services Research and Development provided a list of suicide prevention research funded by the VA beginning in fiscal year 2006.

American Foundation for Suicide Prevention

The AFSP is the leading nonprofit organization for funding suicide prevention research. It awards research grants to established social science researchers, medical professionals, and young scholars in pursuit of an advanced degree. The research grant awards are listed by the year awarded on AFSP's website, which also includes general information on each study (see AFSP, undated). Because the organization's aim is to fund research pertaining to suicide prevention, we chose not to narrow our review and assessed all the research grants that were publicly listed when we conducted our review in November and December 2012.

U.S. Department of Defense

Identifying and abstracting research funded by DoD poses unique challenges. As a large, complex federal department, DoD comprises several components, organizations, and agencies, any one of which may support research activities related to suicide prevention. Unlike in DHHS, which is also diverse, there is no readily available central repository for cataloguing research activities funded across DoD. For example, each of the service components (the Army, Air Force, Navy, and Marine Corps) support intramural and extramural research activities related to suicide prevention, either through their operations and maintenance (O&M) funding or through their research, development, test, and evaluation (RDT&E) funding. The specific funding stream used to support the research can be difficult to identify. Studies funded by specific RDT&E programs or through designated research management program offices are more readily identifiable.

One of the primary funding streams for research on suicide prevention within DoD is the Congressionally Directed Medical Research Programs (CDMRP). The CDMRP was established by Congress in 1992 to oversee and administer medical research on specific disease-related topics designated by Congress. It has a specific disease focus and involves consumers in the process (from setting priorities to reviewing proposals). Congress designated the U.S. Army as executive agent of this program, and while the funded research is not required to be directly relevant to military populations or settings, many of the studies have a specific focus on the military. Among the most widely recognized programs managed by the CDMRP are its breast cancer and prostate cancer programs. The CDMRP is managed by the U.S. Army Medical Research and Materiel Command; its funding is allocated through specific line items set by Congress (not the President) in the Defense Health Budget as part of the yearly national defense appropriations legislation. While DoD can request funding for research on similar topics through its own budget requests to the President, the Secretary of Defense, and other defense leaders, it may not use congressionally set appropriations for the CDMRP for

other reasons. In 2007, Congress initiated the Psychological Health and Traumatic Brain Injury Research Program through CDMRP, which also provided a new research funding stream to support suicide prevention research.

U.S. Army Medical Research and Materiel Command also manages several other research programs, priorities, and funding lines, which are set through the President's Budget. The Military Operational Medicine Research Program (MOMRP) has specific areas of research related to suicide prevention. Several years ago, MOMRP took on an effort to "integrate and synchronize U.S. Department of Defense and civilian efforts to implement a multidisciplinary research approach to suicide prevention" and funded the Military Suicide Research Consortium (MSRC) through a large grant to Florida State University and the Denver VA Medical Center (see MSRC, undated).

Identifying funded research activities through CDMRP and MOMRP was relatively straightforward, given their emphasis and management. CDMRP has a searchable online mechanism for identifying funded awards. MOMRP staff also maintain detailed information on all funded research studies. However, because these are not the only DoD entities supporting research on suicide prevention, we also had to rely on key contacts in various DoD organizations and agencies, as well as other knowledgeable contacts, for assistance in identifying relevant research. In this way, we gathered information on DoD-funded studies through a combination of online resources and communication with research portfolio managers and funded investigators across DoD.

Data Abstraction

We developed a custom abstraction tool to collect pertinent data on studies that matched our criteria. Three members of the RAND study team abstracted all the information.

At times, a public search engine or databases did not provide all the information needed for abstraction. We filled such gaps through additional online research or direct communication with the study's principal investigator or a representative from the funding agency. Still, some detailed information remained unavailable, in which case we left the field blank.

Using the available information, we categorized each study according to the categories established by the NAASP and the MOMRP Continuum of Care categories. The NAASP categories were originally developed based on surveys with suicide prevention stakeholders, including individuals with personal experience with suicide, health care providers, policymakers and administrators, and researchers who identified aspirational goals for suicide prevention research (NAASP, undated). We categorized recent suicide prevention research into one or more of the NAASP categories: prevention of reattempts; enhanced continuity of care; provider and gatekeeper training; affordable, accessible, and effective care; psychosocial interventions for those at risk; risk and protective factor interactions; stigma reduction; population-based risk reduction/resilience-building; prediction of imminent risk; improved biological interventions; reduction in access to lethal means; and population-based screening.

MOMRP developed a continuum of care framework to describe military suicide research needs (Gutierrez, Joiner, and Castro, 2012). We also categorized recent suicide prevention research into one or more of the MOMRP categories: prevention education and training, early screening/intervention, assessment, treatment, recovery and return to duty, postvention, and epidemiology and/or basic science/neurological mechanisms. (Note that the first six categories are part of the continuum, whereas the last category is part of the foundation for the other research categories in the MOMRP approach to suicide research classification.)

We matched the appropriate NAASP and MOMRP categories to the studies by using all available information on each study's methods, objectives, and conclusions. The aims of the research dictated its categorization. For example, a study aimed at examining effective treatment techniques would likely be categorized as fitting under the "affordable, accessible, and effective care" NAASP category and the "treatment" MOMRP category. Many studies explored multiple aims and therefore were placed in multiple categories. The "risk and protective factor interactions" NAASP category and the MOMRP category "epidemiology and/or basic science/neurological mechanisms" were used to identify studies that examined the factors that contribute to suicide risk that could be applied to prevention. The MOMRP categories "early screening/intervention" and "assessment" differ in their application to a potential act of suicide. Whereas a survey that screens all new Army recruits would fit within the "early screening/intervention" category, a study that validates a checklist evaluating suicidal ideation would be considered "assessment." Studies that were categorized as "assessment" were often also included in the NAASP category "prediction of imminent risk." Understandably, as they both specifically involve those who have attempted suicide, the MOMRP category "recovery and return to duty" and the NAASP category "prevention of reattempts" often appeared together. Additional information on the studies' methods also informed their assignment to specific categories—for example, if information on a study's sample was relevant to the "provider and gatekeeper training" NAASP category.

All ratings were predominately completed by two raters, who alerted a third rater to any studies for which the categorization was ambiguous. For these ambiguous cases, a consensus rating method was used. A third rater also checked the assessments of the two main raters to ensure that they were consistent.

While investigating studies for categorization, the raters additionally noted the composition of the study's participants. Raters noted whether the study participants were civilians, veterans, or members of the armed services. If the latter, they noted the specific service or services (e.g., Army, Navy). Table 2.2 shows the information we gathered from the studies that satisfied the inclusion criteria presented in Table 2.1 and the NAASP and MOMRP categories.

Results

This section is divided into four categories. First, we present a summary of our search results, highlighting in aggregate the studies we identified and the number and amount funded by and across the four sources (DHHS, VA, AFSP, and DoD). Then, we present the number and amount funded by source across each of the NAASP and MOMRP categories. Though not a direct measure, the *number* of studies may be loosely interpreted as the number of different ideas or hypotheses that are being pursued. However, the "depth" of each study's investigation will be constrained by the funds available. Thus, we also present the amount allocated to each research category. Finally, we present information on the number and amount funded by source with respect to study participants.

It is important to note that, in our analyses across the NAASP and MOMRP categories, the total funding estimates are frequently overestimates. This is because studies could be categorized into more than one area, and it is impossible to tease out the funds spent on each objective. Thus, we attributed the total dollar amount for each study to a given category. As

Table 2.2
Data Abstraction Categories

Study Information Collected	Category
Study/contract number	NAASP category
Funder	Prevention of reattempts
Project/award title	Enhanced continuity of care
Project leader	Provider and gatekeeper training
Organization funded	Affordable, accessible, and effective care
Project start date	Psychosocial interventions for those at risk
Project end date	Risk and protective factor interactions
Total funding	Stigma reduction
Study abstract	Population-based risk reduction/resilience-building
Study aims	Prediction of imminent risk
Resulting publications	Improved biological interventions
Study design	Reduction in access to lethal means
Experimental	Population-based screening
Quasiexperimental	MOMRP category
Observational	Prevention education and training
Case study	Early screening/intervention
Sample size	Assessment
Data source	Treatment
Participants	Recovery and return to duty
Air Force	Postvention
Army	Epidemiology and/or basic science/neurological mechanisms
Marines	
Navy	
Coast Guard	
National Guard/Reserve	
Veteran	
Civilian	

such, the totals are not reliable because of double-counting,[1] but the information is still useful for examining the relative amounts of funding spent on different topics.

Studies Identified, Funders, and Funding

The majority of the studies we reviewed did not meet our established criteria for inclusion. We documented reasons for exclusion whenever possible. The most common reason for exclusion differed by organization. The systematic search of studies funded by DHHS yielded numerous results entirely unrelated to suicide prevention. In contrast, most studies funded by the AFSP were relevant, and the exclusions were predominantly because of study sample characteristics. While most reasons for exclusion were derived from our inclusion and exclusion criteria, we also commonly encountered duplicate entries for the same study and occasionally encountered entries that were not actually research studies. The reasons for exclusion are summarized in Table 2.3.

Table 2.4 provides an overview of the number of studies reviewed and ultimately included from the four funders, as well as the total amount of funding associated with these studies. Key information on all the studies included in this analysis is presented in Appendix A.

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[1] See Appendix B for an alternative allocation strategy in which we divided the total funding per grant by the number of areas in which a study was categorized, with each category receiving an equal proportion.

Table 2.3
Reasons for Exclusion

Reason	Number of Excluded Studies
No relevance (e.g., "suicide cells" in biology)	1,369
Duplicates	302
Not research	63
Serious mental illness (e.g., schizophrenia)	59
Elderly sample	16
Missing substantial information (e.g., name, abstract), mistake entry, nonworking link	9
Small-child sample	2

NOTE: The total sample size was 1,820 studies. Because of the lack of a unified reporting system for most DoD-funded studies, this sample includes CDMRP studies only.

U.S. Department of Health and Human Services

With respect to studies funded by DHHS, the search criteria described here yielded 1,542 results. After an assessment using our inclusion and exclusion criteria, we incorporated 49 of the results into our abstraction of recent research on suicide prevention. The 49 studies totaled $43,215,850 in funding. Of the 49 studies meeting the inclusion criteria, 44 were funded by the National Institutes of Health (NIH), which accounted for $39,745,981, or 92 percent of relevant DHHS funding. The National Center for Injury Prevention and Control at the Centers for Disease Control and Prevention (CDC-NCIPC) and the Agency for Healthcare Research and Quality (AHRQ) funded three and two of the included studies, respectively. No study or evaluation by the Substance Abuse and Mental Health Services Administration (SAMHSA) met our inclusion criteria.

U.S. Department of Veterans Affairs

Our search for VA studies generated 30 results, five of which met our inclusion criteria. The Office of Health Services Research and Development provided us with an additional ten studies, for a total of 15 included studies with $8,125,622 in associated funding.

American Foundation for Suicide Prevention

The AFSP provided information on 108 studies; we abstracted 92 of them, representing $7,214,781 in funding.

U.S. Department of Defense

Since its establishment in 2007, the CDMRP's Psychological Health and Traumatic Brain Injury Research Program has awarded 312 grants (some being multiple grants to the same research effort). We reviewed the 312 grants and found 26 studies that fit our inclusion criteria, representing $48,859,439 in funding.

We identified 33 other relevant DoD studies; combined with the CDMRP funding, this brought total DoD funding for suicide prevention research to $107,274,505. (We were unable to obtain from U.S. Army Medical Research and Materiel Command the total funding amount for four studies, as noted in Appendix A.) We also identified two studies—the

Table 2.4
Funders of Suicide Prevention Research

Organization	Number of Studies	Number of Studies Meeting Inclusion Criteria	Total Funding ($)
DHHS (all)	1,542	49	43,215,850
NIH	1,518	44	39,745,981
CDC-NCIPC	14	3	1,693,548
AHRQ	10	2	1,776,321
AFSP	108	92	7,214,781
VA	—	15	8,125,622
DoD (all)	—	61[a]	107,274,505[a]
Air Force Research Laboratory (AFRL)	—	3	10,325,000
CDMRP	—	26	48,859,439
Defense Centers of Excellence (DCoE)	—	5	6,810,573
U.S. Department of the Navy	—	1	6,989,000
MOMRP—MSRC	—	7	3,737,269[b]
MOMRP—other	—	19	30,553,224[c]
Army STARRS (DoD, NIH)	N/A	1	65,000,000
Total	1,680	218	230,830,758

NOTE: The table does not include the Millennium Cohort Study or STRONG STAR because it was not possible to precisely determine the proportion of funds going to suicide prevention within these larger studies.

The total number of VA and DoD studies could not be determined. Unlike the review of other sources of funding, there was no specific search engine or consistent protocol to identify most DoD and VA studies. These studies were largely identified through personal communication with funders and investigators, as well as through our literature review.

[a] Total DoD funding does not include Army STARRS

[b] The total funding amount for MOMRP—MSRC reflects only the four of seven studies with available funding information (i.e., three studies were missing funding information).

[c] The total funding amount for MOMRP—other reflects only the 17 studies with available funding information. (i.e., two studies were missing funding information).

Millennium Cohort study and the South Texas Research Organizational Network Guiding Studies on Trauma and Resilience (STRONG STAR) multidisciplinary post-traumatic stress disorder (PTSD) research consortium—that are related to but do not focus exclusively on suicide. Our investigation revealed that these studies have dedicated a relatively small amount of their funding directly to suicide prevention, and we could not accurately quantify this amount. Thus, these studies are excluded from all subsequent analyses in this report. (See Box 2.1 for a description of each study.)

Aggregated Results

Across all funding sources, a total of 218 studies met our inclusion criteria, with $230,830,758 in total funding.

Box 2.1
Large-Scale Studies Funded by DoD

Army STARRS
Army STARRS is a comprehensive, collaborative study focused on suicide. The five-year study was funded in 2009 in response to the growing suicide rate in the armed forces. The $65 million in funding jointly provided by DoD and NIMH supports the work of principal investigators from the Uniformed Services University of the Health Sciences, Harvard Medical School, the University of Michigan, and the University of California, San Diego. Army STARRS is organized into four primary research components: the Historical Data Study, the All Army Study, the New Soldier Study, and the Soldier Health Outcomes Study. While varied in approach, all Army STARRS research supports the project's main emphasis of protecting the health of soldiers.

Millennium Cohort Study
The Millennium Cohort Study is an ongoing DoD-funded prospective cohort study that boasts a sample of more than 150,000 active and non-active military personnel representing all service branches. Since 2001, researchers have administered triennial surveys to an increasing number of enrolled participants. The surveys include validated instruments for self-assessing physical and mental functional status. Results obtained from the self-assessments can be linked to a wide-ranging supply of individual information, such as the subject's occupation or past health care utilization. The study involves continually surveying all subjects every three years until 2022, for a 21-year period of data collection. In addition to assessing service members' health status over time, the Millennium Cohort Study aims to serve as a rich data source that can provide strong support for current and future epidemiological studies. Preliminary data analysis has already been published in medical journals.

STRONG STAR Multidisciplinary PTSD Research Consortium
STRONG STAR is a multi-institution research consortium funded by DoD. Specifically, STRONG STAR was allocated $35,989,697 from fiscal years 2007 to 2013, which was distributed among projects with differing approaches but a matching objective: developing and evaluating effective interventions for the "detection, prevention, and treatment of combat-related posttraumatic stress disorder (PTSD)" (STRONG STAR, undated). The large population of Operation Iraqi Freedom (OIF) and Operation Enduring Freedom (OEF) veterans in south-central Texas aids in the inclusion of both recently discharged veterans and active-duty service members.

The single largest study was the Army Study to Assess Risk and Resilience in Service-members (Army STARRS), for which $50 million was provided by the U.S. Army and $15 million was provided by the National Institute of Mental Health (NIMH, which also administers the program), for a total of $65 million (see Box 2.1). Given the magnitude of this study, we include it in our estimate and in Table 2.4 in the grand total being spent on suicide prevention research. However, we exclude it from the remainder of our funding analyses because its sheer size would complicate efforts to interpret funding trends.

With respect to the total number of studies funded, the single biggest funder was the AFSP, which funded 92 studies meeting our inclusion criteria.

With respect the total amount of funding, the biggest single funder was DoD, which funded a total of $107,274,505 in research related to suicide prevention, accounting for 65 percent of all research funding (see Table 2.4 and Figure 2.1), excluding the Army STARRS, Millennium Cohort, and STRONG STAR studies. As shown in Figure 2.2, almost half of these funds came from CDMRP. The NIH is the largest non-DoD contributor, providing 68 percent of the $58,556,253 in non-DoD funds going toward suicide prevention research (Figure 2.3).

Funding, by NAASP Category
Number of Studies

Across all funders, the most common area of recent research involved psychosocial interventions for those at risk (78 studies; see Table 2.5). The next most common areas of research were studies of risk and protective factor interactions (58 studies), prediction of imminent risk

Figure 2.1
**Proportion of Suicide Prevention Funding
from Different Sources**
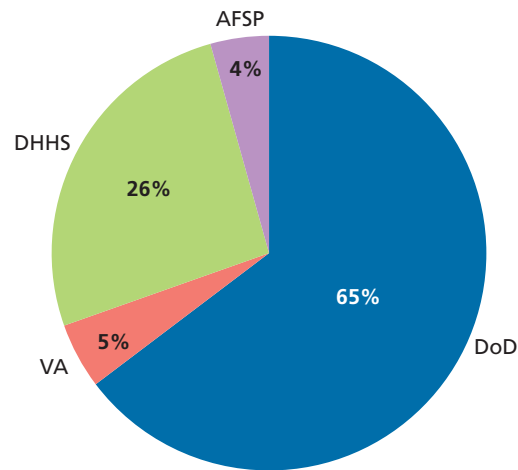
NOTE: Total funding = $165,830,758. The figure
does not include Army STARRS, the Millennium
Cohort Study, or STRONG STAR.
RAND *RR559-2.1*

Figure 2.2
**Proportion of Suicide Prevention Funding from
Different Sources: DoD**
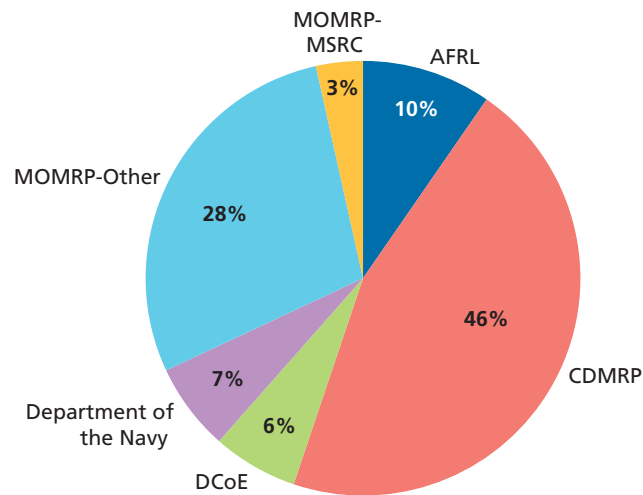
NOTE: Total funding = $107,274,505. The figure does not
include Army STARRS, the Millennium Cohort Study, or
STRONG STAR.
RAND *RR559-2.2*

Figure 2.3
Proportion of Suicide Prevention Funding from
Different Sources: Non-DoD
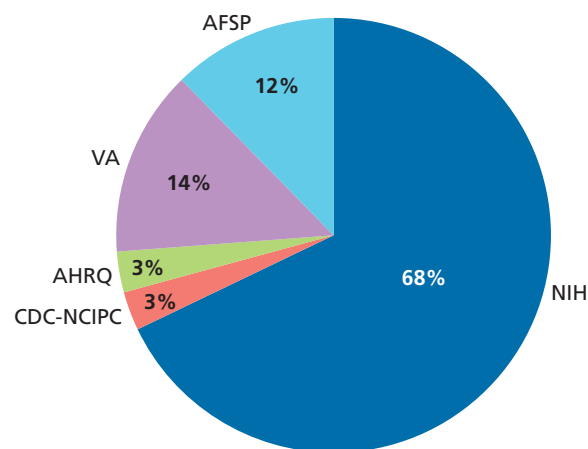
NOTE: Total funding = $58,556,253.
RAND *RR559-2.3*

(48 studies), and affordable, accessible, and effective care (45 studies). A moderate amount of research is being conducted on improved biological interventions (35 studies), enhanced continuity of care (27 studies), and population-based risk reduction/resilience-building and provider and gatekeeper training (23 studies in each category). We found fewer studies on population-based screening (11 studies), the prevention of reattempts among those who have previously attempted suicide (11 studies), and stigma reduction (11 studies), and there were only three studies on reducing access to lethal means.[2]

While it is informative to review the proportion of each funder's research portfolio that falls in each NAASP category (Table 2.5), another way to look at these data is to consider the proportion of research within each NAASP category that is being funded by each of the major funders (Figure 2.4). As shown, DoD is funding the majority of research on stigma reduction (64 percent of all studies in this category) and affordable, accessible, and effective care (67 percent); it is *not* funding much of the research on improved biological interventions (9 percent), prediction of imminent risk (13 percent), or prevention of reattempts (18 percent). These latter areas of research are being driven largely by funders outside DoD. Notably, the AFSP is funding three-quarters of all current studies on improved biological interventions, DHHS is funding more than half of studies on preventing reattempts, and, though the funding is relatively dispersed, the VA is supporting one-quarter of all studies on population-based screening.

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[2]   The limited amount of research on means restriction is partly the result of a 1996 congressional directive that "none of the funds made available for injury prevention and control at the Centers for Disease Control and Prevention may be used to advocate or promote gun control" (Kellermann and Rivara, 2013). The directive was extended to all of DHHS in 2011.

We did not include Army STARRS in this analysis because this large study encompasses so many different categories of research—as many as 11 of the 12 NAASP categories—that it would be difficult to interpret the results in each category. (The 11 NAASP categories are enhanced continuity of care; provider and gatekeeper training; affordable, accessible, and effective care; psychosocial interventions for those at risk; risk and protective factor interactions; stigma reduction; population-based risk reduction/resilience-building; prediction of imminent risk; improved biological interventions; reduction in access to lethal means; and population-based screening).

Table 2.5
Number of Studies in Each NAASP Category and Funding Totals

NAASP Category	Overall		DoD		VA		DHHS		AFSP	
	N	Amount ($)	N	Amount ($)	N	Amount ($)	N	Amount ($)	N	Amount ($)
Psychosocial interventions	78	74,640,366	29	58,007,419	6	3,237,510	13	10,943,483	30	2,451,954
Prediction of imminent risk	48	31,035,370	6	10,124,020	5	2,928,482	13	16,342,038	24	1,640,830
Risk and protective factors	58	75,417,791	24	52,752,931	7	4,130,210	27	16,544,878	0	1,989,772
Biological interventions	35	20,252,292	3	13,241,279	2	1,255,493	4	3,604,115	26	2,151,405
Affordable, accessible, and effective care	45	56,902,577	30	53,547,965	0	0	8	2,653,014	7	701,598
Enhanced continuity of care	27	41,399,005	7	26,534,042	4	2,553,215	4	11,142,280	12	1,169,468
Population-based risk reduction	23	32,228,568	10	26,322,413	2	972,757	6	4,555,098	5	378,300
Provider/gatekeeper training	23	26,274,020	9	20,154,686	0	0	7	5,417,617	7	701,717
Population-based screening	11	7,251,846	3	1,656,608	3	1,064,207	5	4,531,031	0	0
Prevention of reattempts	11	15,849,481	2	10,550,733	0	0	6	5,087,180	3	211,568
Stigma reduction	11	23,002,803	7	19,064,891	0	0	2	3,777,912	2	160,000
Access to lethal means	3	831,609	0	0	1	387,711	2	443,898	0	0

NOTE: The table does not include Army STARRS, the Millennium Cohort Study, or STRONG STAR. Totals by category exceed total funding because some studies are counted in more than one category.

Figure 2.4
Proportion of NAASP Category Studies Being Addressed by Different Funders, by Number of Studies
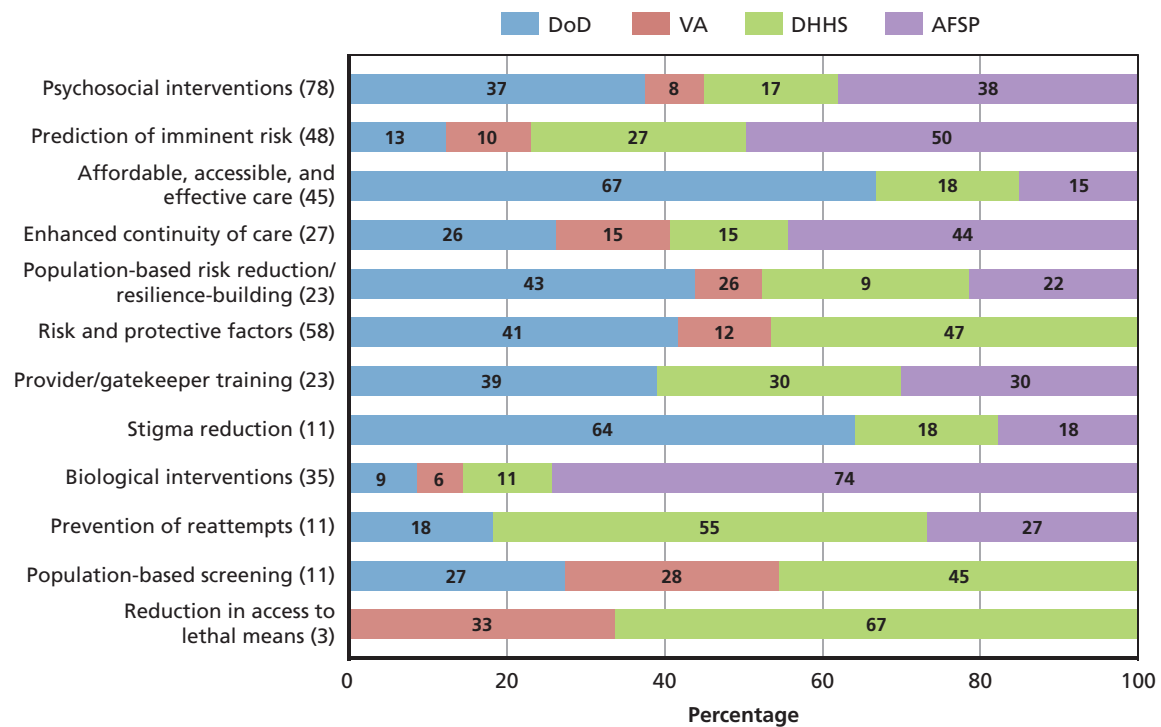
NOTE: The figure does not include Army STARRS. Values in parentheses next to each goal represent the total number of studies.

RAND *RR559-2.4*

Amount of Funding

Overall, across all categories of funders, the most funding is being spent on risk and protective factor interactions ($75.4 million) and psychosocial interventions for those at risk ($74.7 million; see Table 2.5). The next highest amount of funding is devoted to studies of affordable, accessible, and effective care ($56.9 million) and enhanced continuity of care ($41.4 million). A moderate amount of funding is devoted to studies of population-based risk reduction and resilience-building, prediction of imminent risk, provider and gatekeeper training, stigma reduction, and improved biological interventions (listed here from most to least funding). The least amount of funding is being spent on studies on the prevention of reattempts ($15.9 million), population-based screening ($7.3 million), and reducing access to lethal means ($831,609), a category with significantly less funding than the others.

Similar to the overall results, DoD's top areas of funding are studies on psychosocial interventions for those at risk ($58 million); affordable, accessible, and effective care ($53.5 million); and risk and protective factor interactions ($52.8 million). Its lowest priorities for funding are studies on the prevention of reattempts ($10.6 million) and population-based screening ($1.7 million). There is no study in DoD's portfolio focused on reducing access to lethal means. The top categories for VA funding are also risk and protective factor interactions ($4.1 million) and improved psychosocial intervention ($3.2 million).

The funding priorities look a little different for studies funded by DHHS and AFSP relative to funding allocations in DoD and the VA. DHHS prioritizes funding research on risk and

protective factor interactions ($16.3 million), but unlike DoD and the VA, DHHS allocates $16.3 million to studies on the prediction of imminent risk, making this the second highest funding category. Furthermore, studies of affordable, accessible, and effective care are a low priority at DHHS (~$2.7 million), while they are a relatively high priority for DoD. While the AFSP also prioritizes psychosocial interventions for those at risk ($2.5 million), it also prioritizes studies on improved biological interventions ($2.2 million), a topic that is not a high priority for other funders. Like DoD, the AFSP does not prioritize studies of population-based screening or reduced access to lethal means, devoting no funding at all to these areas of research.

As we did earlier, another way to examine the funding data is to consider the proportion of funding within each NAASP category that is being provided by each of the major funders (Figure 2.5). The most striking advantage of this perspective on the results is that it enables us to easily see what an important funder DoD is, accounting for more than half of all funding in almost all of the categories. Conversely, we can see that even though the AFSP funds the largest number of studies on biological interventions, it contributes only 11 percent of all funding in this area (65 percent comes from DoD). DoD is funding more than three-quarters of all current research on stigma reduction; provider and gatekeeper training; population-based risk reduction/resilience-building; affordable, accessible, and effective care; and psychosocial interventions. In contrast, other federal government agencies, such as NIH, are funding the majority of research on predicting imminent risk and population-based screening, to which DoD contributes less than 25 percent.

Figure 2.5
Proportion of NAASP Category Funding Being Addressed by Different Funders, by Amount Funded
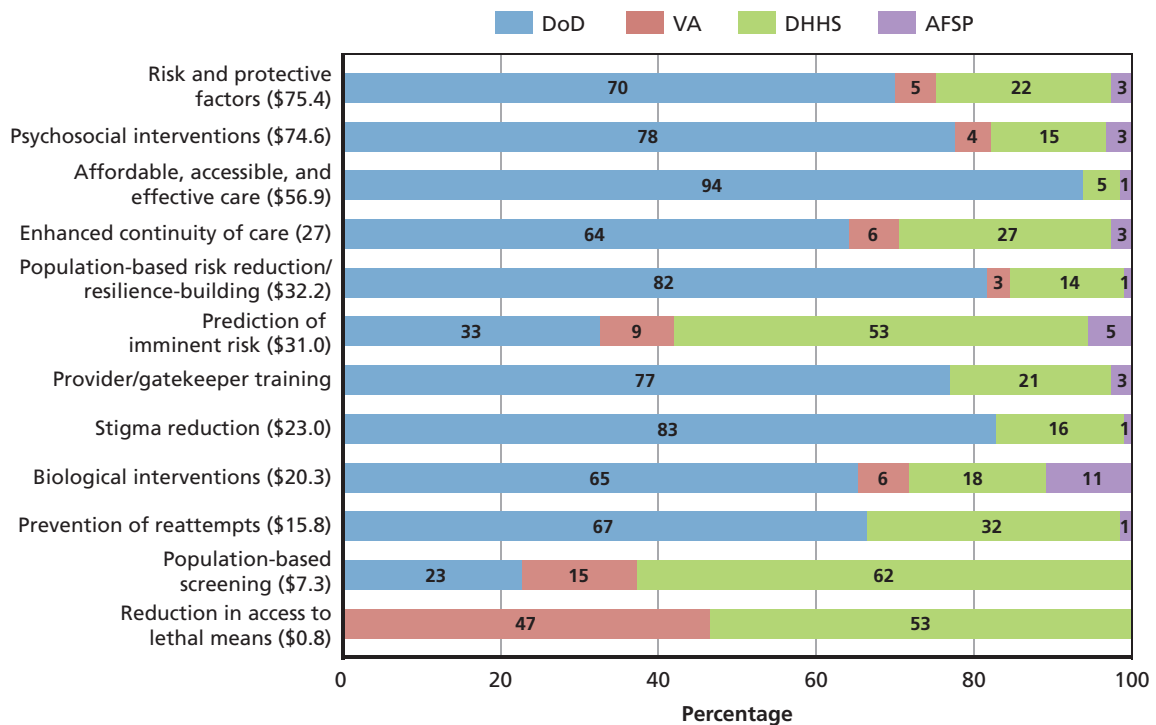
NOTE: The figure does not include Army STARRS, the Millennium Cohort Study, or STRONG STAR. Values in parentheses next to each goal represent the total amount funded, in $ millions.

We also examined the mean (i.e., average) funding amount for studies on each topic (see Table 2.6). The mean amount of funding per study likely reflects both the priorities of the funders and the costs of conducting certain kinds of studies. Across all study categories, DoD spends, on average, the most per study (approximately $1.8 million), whereas the AFSP funds studies at an average of $78,000. It is noteworthy that the amount spent on studies to prevent reattempts ($5.3 million) and improve biological therapies in DoD ($4.4 million) is much greater than the mean ($1.8 million). The mean funding level for VA studies is $540,000; for DHHS studies, it is closer to $900,000, with much more per study being spent on research that aims to enhance continuity of care ($2.8 million) and much less being spent on studies on ensuring affordable, accessible, and effective care ($331,627) and reducing access to lethal means ($221,949).

Funding, by MOMRP Category
Number of Studies
Overall, across all categories of funders, the most common MOMRP category of recent research by far was epidemiology and/or basic science/neurological mechanisms (144 studies), followed at quite a distance by studies of treatment (71) and prevention, education, and training (70; see Table 2.7). While quite a bit of research is also being done on assessment (47) and

Table 2.6
Mean Funding Amount for Studies in Each NAASP Category, by Funder

NAASP Category	Mean Funding ($)				
	Overall	DoD	VA	DHHS	AFSP
All categories		1,758,598	541,708	881,956	78,422
Minimum grant		65,786	69,025	32,150	20,000
Maximum grant		9,886,992	1,098,989	9,872,609	240,031
Psychosocial interventions	956,928	2,000,256	539,585	841,806	81,732
Prediction of imminent risk	646,570	1,687,337	585,696	1,257,080	68,368
Risk and protective factors	1,300,307	2,198,039	590,030	612,773	N/A
Biological interventions	578,637	4,413,760	627,747	901,029	82,746
Affordable, accessible, and effective care	1,264,502	1,784,932	N/A	331,627	100,228
Enhanced continuity of care	1,533,296	3,790,577	638,304	2,785,570	97,456
Population-based risk reduction/resilience-building	1,401,242	2,632,241	486,379	759,183	75,660
Provider/gatekeeper training	1,142,349	2,239,410	N/A	773,945	100,245
Population-based screening	659,259	552,203	354,736	906,206	N/A
Prevention of reattempts	1,440,862	5,275,367	N/A	847,863	70,523
Stigma reduction	2,091,164	2,723,556	N/A	1,888,956	80,000
Access to lethal means	277,203	N/A	387,711	221,949	N/A

NOTE: The table not include Army STARRS, the Millennium Cohort Study, or STRONG STAR.

Table 2.7
Number of Studies in Each MOMRP Category and Funding Totals

MOMRP Category	Overall		DoD		VA		DHHS		AFSP	
	N	Amount ($)	N	Amount ($)	N	Amount ($)	N	Amount ($)	N	Amount ($)
Prevention training/education	70	48,349,971	27	37,430,134	6	3,049,476	11	5,991,756	26	1,878,605
Early screening/intervention	44	40,576,088	8	11,764,318	0	0	22	27,831,254	14	980,516
Assessment	47	42,157,964	10	20,286,221	8	4,664,720	10	15,773,247	19	1,433,776
Treatment	71	95,944,007	33	73,638,120	3	1,555,725	16	18,963,599	19	1,786,563
Recovery and return to duty	1	85,000	0	0	0	0	0	0	1	85,000
Postvention	8	10,259,375	4	9,930,842	0	0	0	0	4	328,533
Epidemiology and/or basic science/ neurological mechanisms	144	104,595,649	38	73,252,842	10	5,921,616	34	20,366,322	62	5,054,869

NOTE: The table does not include Army STARRS. Totals by category exceed total funding because some studies are counted in more than one category.

early screening/intervention (44), there are relatively few studies examining either postvention (8) or recovery and return to duty (1). This pattern generally holds when we examine the results by funder, with epidemiology and/or basic science/neurological mechanisms the largest category being investigated across all funders.[3]

Figure 2.6 presents the proportion of research in each MOMRP category that is being funded by each of the major funders. This figure shows that DoD is responsible for half of all studies on postvention (with the AFSP responsible for the remaining half) and almost half of all treatment studies.

Amount of Funding

As shown in Table 2.7, comparable amounts are being spent on epidemiology and/or basic science/neurological mechanisms ($105 million) and treatment ($96 million). In contrast, only $85,000 is being spent on studies related to recovery and return to duty. There is roughly $10 million being spent on studies related to postvention and just under $50 million being spent individually on prevention education and training, assessment, and early screening/intervention.

Figure 2.7 reiterates that DoD is a large funder of suicide prevention research, accounting for more than half of the research funds in four of the seven categories. Then again, the single study on recovery and return to duty is being funded by the AFSP, whereas DHHS is responsible for 69 percent of funds allocated to early screening and intervention.

It is also interesting to consider the mean (i.e., average) funding amount allocated by different entities (see Table 2.8). We already discussed total funding amounts by agency. Within

Figure 2.6
Proportion of MOMRP Category Studies Being Addressed by Different Funders, by Number of Studies
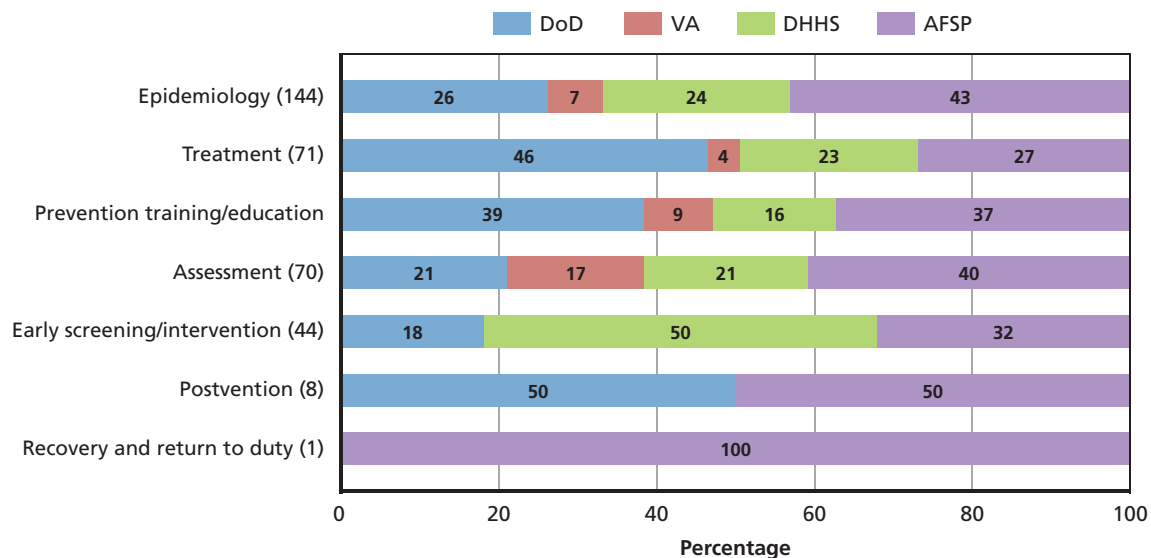
NOTE: The figure does not include Army STARRS. Values in parentheses next to each goal represent the total number of studies.
RAND *RR559-2.6*

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[3] Once again, we did not include Army STARRS in this analysis because that large study encompasses so many categories that it muddies the interpretation of the overall results. This study falls under all seven MOMRP categories described here.

Figure 2.7
Proportion of MOMRP Category Studies Being Addressed by Different Funders, by Amount Funded
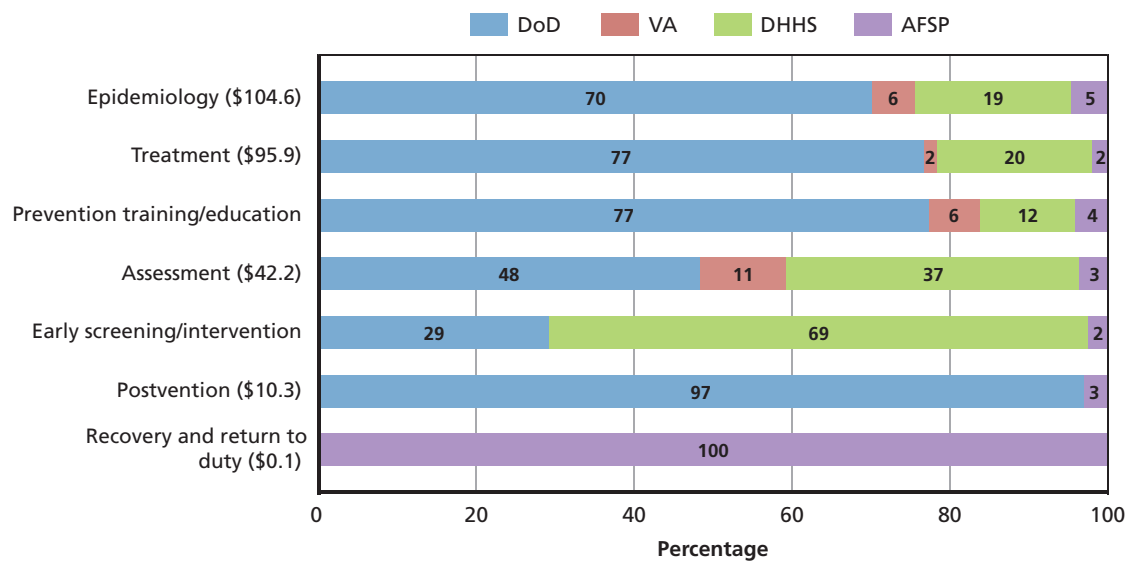
NOTE: The figure does not include Army STARRS, the Millennium Cohort Study, or STRONG STAR. Values in parentheses next to each goal represent the total amount funded, in $ millions.
RAND *RR559-2.7*

Table 2.8
Mean Funding Amount for Studies in Each MOMRP Category, by Funder

MOMRP Category	Mean Funding ($)				
	Overall	DoD	VA	DHHS	AFSP
Prevention training/education	690,714	1,386,301	508,246	544,705	72,254
Early screening/intervention	922,184	1,470,540	N/A	1,265,057	70,037
Assessment	896,978	2,028,622	583,090	1,577,325	75,462
Treatment	1,351,324	2,231,458	518,575	1,185,225	94,030
Recovery and return to duty	85,000	N/A	N/A	N/A	85,000
Postvention	1,282,422	2,482,711	N/A	N/A	82,133
Epidemiology and/or basic science/ neurological mechanisms	726,359	1,927,706	592,162	599,009	81,530

NOTE: The table does not include Army STARRS, the Millennium Cohort Study, or STRONG STAR.

the MOMRP categories, it is noteworthy that studies on treatment and postvention have, on average, the highest levels of funding. Although there are only eight postvention studies, their high value is driven by DoD funding: The four studies that DoD has funded related to postvention average roughly $2.5 million. The mean funding level for studies funded by DoD ranges from $1.4 million to $2.5 million, while DHHS studies ranged from approximately $500,000 to $1.6 million, depending on the category. Mean funding levels in DHHS were highest for assessment and early screening and intervention, whereas DoD funding levels

were highest for postvention, treatment, and assessment. Across MOMRP categories, VA studies average between $500,000 and $600,000, while AFSP studies across categories average between $70,000 and $100,000.

Conclusion

We catalogued current suicide prevention research that is relevant to military personnel, including studies of comparable civilian samples. We found that DoD is the single largest funder of suicide prevention research, having recently funded 61 studies at a cost of more than $100 million. This figure does not include Army STARRS, a $65 million study funded jointly by DoD and NIMH. While DoD is the largest funder of suicide prevention research with relevance to military personnel in the United States, this total represents a little less than one-third of all relevant studies.

Although we detailed results for all the major funders, in the discussion, we focus primarily on DoD and overall trends. With respect to the NAASP categories, current suicide prevention research funded by DoD and other funders tends to focus on identifying *who* dies by suicide (i.e., risk and protective factor interactions), psychotherapeutic interventions to *treat* individuals at risk for suicide (i.e., psychosocial interventions), and ensuring that those at risk can access affordable, accessible, and effective care. This is true whether we focus on the number of studies funded or the total amount of funding devoted to these areas of research.

In contrast, relatively few studies funded by DoD and other entities focus on preventing reattempts among those who have previously attempted suicide or the reduction in access to lethal means, and these were also areas with relatively low amounts of funding. Interestingly, although it was an area of low overall spending, DoD's highest level of *mean funding per study* was for studies of the prevention of reattempts.

When MOMRP categories are used, we see that the most studies by far are being conducted on *who* is at risk of dying by suicide (i.e., epidemiology and/or basic science/neurological mechanisms). This is the case both overall and for studies funded by DoD specifically. There are also a large number of studies focusing on treatment and prevention training and education. Similarly, the most funding by far is being spent on epidemiology and/or basic science/neurological mechanisms and treatment, with a moderate amount of spending on prevention education and training, as well as assessment. Among DoD studies, mean funding per study was highest for studies of treatment, epidemiology and basic science, and, surprisingly postvention, despite the low level of overall funding going to the latter research area. Indeed, relatively few studies are examining either postvention or recovery and return to duty, and there is very little spending in these areas as well. While these areas were not high research funding priorities for DoD, it is notable that federal government agencies, such as NIH, did not fund a single study in either of these areas, suggesting that if DoD does value research in these areas, it will likely have to fund it. Indeed, recovery and return to duty may be particularly central to DoD's mission (despite the relatively low levels of funding for research in this area), but this topic may not be not viewed as a key area of research for other funders.

It is important to note the limitations of our abstraction process and analysis. First, the analysis does not provide a comprehensive summary of all suicide prevention data in that it focuses on recent studies that are relevant to military personnel and excludes studies prior to 2005, those of young children, and those of individuals with serious mental illness. In addi-

tion, many relevant studies were broad in their focus, examining issues beyond suicide prevention, and it was not possible to determine the proportion of funds that went specifically to suicide prevention research. Thus, all the funding analyses necessarily lack some precision and may overestimate spending on suicide prevention research. Finally, many studies fell under more than one category of NAASP or MOMRP research. It is not possible to determine the amount of money spent on research goals in each specific category, so the funds are often counted in multiple categories. Thus, funding estimates for research categories lack precision and are likely overestimates of how much funding is being spent on a given type of research. Appendix B presents the results under an alternative system of allocating funds uniformly across these categories. The only noticeable difference is that overall spending for enhanced continuity of care ranks relatively higher when totals are allocated to each category, and the relative ranking of this category is lower when funds are dispersed equally across categories, signifying that funding in this category is often allocated as part of research studies that cut across multiple categories. Otherwise, the general themes and conclusions presented here are consistent across methods.

These results regarding research priorities should be interpreted with the caveat that they do not include the major Army STARRS study, which devotes $65 million to examining 11 of 12 NAASP categories of suicide prevention research and all seven MOMRP categories. When we report that funding is low in an area, it does not take into account the fact that Army STARRS is likely conducting research in the area. However, it is impossible to determine the amount of Army STARRS funding that goes to each research priority. Furthermore, even if Army STARRS is examining a relevant topic, it may still be helpful for other research studies with different viewpoints to examine the same topic, because knowledge tends to be best accumulated by combining the results of numerous studies with differing approaches—a topic to which we return in Chapter Six.

Prioritizing Research Needs in the U.S. Department of Defense

In this chapter, we present DoD's needs for suicide prevention research as perceived by representatives who, because of their organizational affiliation, play a role in DoD's suicide prevention activities. To do so, we built on the aspirational research goals established by the NAASP and conducted an online consensus-building exercise. We ranked suicide prevention priorities across five domains: importance, cultural acceptability, effectiveness, cost, and future learning potential. Although a less-than-ideal participation rate limits the conclusions we can make, the process for ranking priorities enabled us to make sensible and strong conclusions, and the exercise could be replicated by DoD to boost participation.

Background

Underpinning any strategic research agenda is an overarching set of research objectives and goals, an understanding of the current state of knowledge, and insights from stakeholders about perceived priorities for additional investment. As part of its own efforts to articulate a national research agenda on suicide prevention, the NAASP Research Prioritization Task Force employed a three-part, web-based elicitation process to gather input from stakeholders. This process was designed to inform the selection of aspirational research goals using four rounds of data collection and decisionmaking through a process known as the Delphi method.

The task force solicited ideas about research goals from more than 700 survey participants. After additional rounds of data collection and iteration among survey participants, the task force identified the 12 most frequently mentioned goals. In additional rounds of the online survey, these goals were then ranked, rated, and discussed. The final results of the task force's stakeholder survey yielded a three-tiered list of aspirational goals to guide the creation of the national research agenda (see Table 3.1). This list served as the starting point for our own process of engaging stakeholders and collecting feedback on research priorities.

While the task force's process was open to DoD stakeholder participation, the data were not collected in a manner that allowed us to isolate the input and priorities of DoD stakeholders from those of other, non-DoD stakeholders. Therefore, we sought to replicate the approach used by the task force to identify specific priorities among DoD stakeholders. We employed the same procedures used by the task force, including identical online elicitation software and processes. We took these goals and asked stakeholders to consider their merits on five grounds:

1. *Overall importance.* In the absence of asking participants to rank the goals, we asked them to provide their opinions about the overall importance of each particular strategy

Table 3.1
Aspirational Goals Identified by NAASP Research
Prioritization Task Force

Tier	Goal
1	Prevention of reattempts
1	Enhanced continuity of care
1	Provider and gatekeeper training
1	Affordable, accessible, and effective care
2	Psychosocial interventions for those at risk
2	Risk and protective factor interactions
2	Stigma reduction
2	Population-based risk reduction/resilience-building
2	Prediction of imminent risk
3	Improved biological interventions
3	Reduction in access to lethal means
3	Population-based screening

in suicide prevention. The purpose was to help participants differentiate among the goals.

2. *Effectiveness.* Participants were asked to gauge how effective, according to their knowledge of existing research or experience, the particular strategy is for preventing suicide.

3. *Cultural acceptability.* One of the critical components of the success of any prevention strategy is whether it will be considered culturally acceptable within a given population or setting. Therefore, participants were asked to provide feedback on the cultural acceptability of the particular strategy in a military setting.

4. *Cost.* A key factor in choosing among prevention strategies is the cost associated with its implementation. Some approaches are likely to be more costly than others. Thus, participants were asked to evaluate the cost associated with each strategy.

5. *Learning potential.* Participants were asked to consider the learning potential associated with each strategy. When it comes to strategies that have been tested quite a bit, there may be a limit to how much new information can be gleaned from further research; conversely, other strategies may have a large learning potential, either because little is known or because they are being applied differently than in prior studies.

Methods

RAND ExpertLens is an evidence-based process to develop consensus among a diverse set of participants (Dalal et al., 2011). It uses the Delphi method to gather numeric answers (e.g., rat-

ings) and discussion comments to facilitate consensus.[1] By combining numeric answers with discussion comments, RAND ExpertLens not only identifies areas of agreement in large and diverse groups, but it also allows researchers to understand where participants disagree and why their perspectives vary. The anonymity afforded by the online process further encourages participants to be honest in expressing their ideas and to evaluate other participants' comments based on their substance rather than the social status or interpersonal characteristics of participating individuals.

Creating Aspirational Goals

The first step in replicating this process for DoD was to review and adapt the 12 aspirational goals identified earlier in this report. The RAND team edited the 12 aspirational goals in an effort to make them more specific and applicable to the DoD community and setting. This involved adding specific action-oriented verbs to help participants understand what would be achieved if the goal were implemented. It should be noted that, in one case (risk and protective factor interactions), we did not provide a matching goal. Additionally, the original goal "provider and gatekeeper training" was broken into two goals: (1) ensure non–health professionals (i.e., noncommissioned officers, chaplains) who come into contact with suicidal individuals are trained to identify, care for, and refer persons at risk, and (2) train health care professionals to identify those at risk for suicide and to manage their treatment. The original aspirational goals and the adaptations that were used for the RAND ExpertLens elicitation process are presented in Table 3.2.

It is important to recognize the distinction between research and implementation priorities. These 12 aspirational goals could be considered both; however, the ultimate goal of this research was to elicit feedback relevant to the prioritization and allocation of the research portfolio, which is a subset of the overall suicide prevention portfolio. While policy and program officials may wish to prioritize activities that have the greatest potential to prevent suicides (e.g., those that have demonstrated effectiveness from prior research) among implementation priorities, research priorities may be set according to where there is the greatest learning potential or need for studies to facilitate adaptation to new populations or settings. Using the criteria employed by the NAASP allowed us to examine ratings along several dimensions to inform how stakeholders viewed each goal. Research and implementation goals are intrinsically linked because the ultimate goal is to create an effective suicide prevention strategy.

Selection of Stakeholder Participants

The RAND ExpertLens process is designed to gather insight and feedback from among a group of diverse stakeholders from different backgrounds and with different levels of expertise. Therefore, we sought to identify a group of participants that would cut across DoD organizations, service branches, and defense agencies. We worked with the sponsoring office to identify potential participants from across relevant DoD organizations. We also sought representation from each of the services and defense agencies, including individuals responsible for suicide prevention programming and oversight and for behavioral and psychological health program-

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[1] The Delphi method is a structured process for deriving expert consensus and was used in at least 1,386 published research studies between 2000 and 2004 (Landeta, 2006). It is the leading method used to develop health care quality indicators (Boulkedid et al., 2011) and research methodologies (Verhagen et al., 1998) and has recently been applied in the social sciences for technical forecasting (Landeta, 2006)

Table 3.2
DoD Aspirational Goals for RAND ExpertLens

NAASP Aspirational Goal	DoD Aspirational Goal	RAND Shorthand
Population-based risk reduction/ resilience-building	Implement population-based programs that reduce suicide risk factors and build resilience.	Risk reduction
Provider and gatekeeper training	Ensure non–health professionals (i.e., noncommissioned officers, chaplains) who come in contact with suicidal individuals are trained to identify, care for, and refer persons at risk.	Gatekeeper training
Provider and gatekeeper training	Train health care professionals to identify those at risk for suicide and to manage their treatment.	Provider training
Stigma reduction	Encourage service members and their families to be knowledgeable about and proactively seek treatment.	Help-seeking
Affordable, accessible, and effective care	Deliver high-quality treatments for mental illnesses (e.g., depression, PTSD) that are associated with suicide.	Quality care
Population-based screening	Conduct population-based screening to identify those at risk for suicide.	Screening
Reduction in access to lethal means	Reduce service members' access to the means that they might use to take their own lives.	Reduced access
Psychosocial interventions for those at risk	Improve psychosocial interventions used by clinicians (e.g., psychiatrists, psychologists, social workers) to identify and treat those at risk for suicide.	Psychosocial interventions
Improved biological interventions	Identify biological interventions clinicians could use to treat suicidal behavior.	Biological interventions
Prediction of imminent risk	Develop strategies to predict which individuals are at imminent risk of suicide.	Prediction
Enhanced continuity of care	Achieve continuity of care between providers, across installations, and with the civilian and VA systems.	Continuity of care
Prevention of reattempts	Implement strategies to prevent suicide reattempts.	Prevent reattempts
Risk and protective factor interactions	[Excluded because we could not equate it with an aspirational goal.]	

NOTE: Goals are worded verbatim from the RAND ExpertLens exercise. The goal "risk and protective factor interactions" was excluded because we could not equate it with a specific aspirational goal. RAND shorthand terms were not included in the RAND ExpertLens process but are included here for reference because we use these shorthand descriptions for the remainder of this chapter.

ming, service delivery, and family support programming and oversight. Potential subject-matter experts also included DoD intramural researchers working in the area of suicide prevention. It should be noted that we first identified the groups, offices, organizations, and specific positions that we wanted to include in our sample of experts; then, the sponsoring office identified the specific individuals who met those criteria as of April 2013. This process yielded a list of 104 DoD stakeholders representing the following offices:[2]

- Office of the Assistant Secretary of Defense for Health Affairs
- Office of the Assistant Secretary of Defense for Legislative Affairs
- Office of the Assistant Secretary of Defense for Reserve Affairs
- Office of the Assistant Secretary of Defense for Readiness and Force Management
- Office of the Deputy Assistant Secretary of Defense for Military Family and Community Policy
- DoD Office of the Inspector General
- U.S. Joint Chiefs of Staff
- U.S. Army (invitations were sent to representatives in offices related to manpower, the Army Surgeon General, family support, the Ready and Resilient Campaign, suicide prevention, Army STARRS, and Army Medical Research and Materiel Command)
- U.S. Navy (invitations were sent to representatives in offices related to manpower, the Navy Surgeon General, family support, suicide prevention, and naval health research)
- U.S. Air Force (invitations were sent to representatives in offices related to manpower, the Air Force Surgeon General, and family support)
- U.S. Marine Corps (invitations were sent to representatives in offices related to manpower and personnel and family support)
- Defense Suicide Prevention Office
- Defense Centers of Excellence for Psychological Health and Traumatic Brain Injury
- Defense Advanced Research Projects Agency
- Armed Forces Chaplains Board

Implementation of the DoD Stakeholder Elicitation Process

In preparation for the RAND ExpertLens process, we sent an introduction email to the 104 potential participants from across the identified DoD organizations. The email informed them of the objective of the RAND study, provided an overview of the process, and invited their participation in the RAND ExpertLens elicitation. The email also included a memo signed by Frederick Vollrath, Principal Deputy Assistant Secretary of Defense for Readiness and Force Management.[3] This memo explained the purpose of the online elicitation process and encouraged their participation. Participants then received official invitations from the RAND ExpertLens administrator to log into the RAND ExpertLens system. These emails provided specific instructions, and each potential participant was assigned a unique username and password. Reminder emails were sent to participants throughout the process to encourage participation and to remind them of the data collection windows. At the initiation of each wave of data collection, they received emails that included the URL for the ExpertLens portal

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[2] There were 24 participants.

[3] Vollrath was appointed Assistant Secretary of Defense for Readiness and Force Management in April 2013.

and login instructions (including username). The opportunity to participate in each wave was independent of participation in prior waves.

Implementing the RAND ExpertLens Process

The online expert panel process was intended to gather input from subject-matter experts and program officials from across DoD to identify research priorities that could inform the development of a unified, strategic research agenda on military suicide prevention. The expert panel process was administered online and involved three rounds of data collection over a period of approximately five weeks.

In round 1, participants were asked to answer a set of questions about research objectives and priorities for suicide prevention within DoD (see Table 3.2). Using a ten-point Likert scale, participants were asked to rate, based on their own perceptions and understanding, each goal according to five criteria: perceived importance, perceived effectiveness, cultural acceptance, cost, and learning potential. These questions and the corresponding scales are shown in Table 3.3.

At the end of round 1, we also gathered some basic demographic information about the participants, including branch of service, age group, gender, race, education level, profession (e.g., health care provider, researcher), and whether they had a friend or relative who had ever attempted or died by suicide.

In round 2, we presented participants with a summary of the group's responses from round 1. We then invited participants to comment on their own and their colleagues' responses

Table 3.3
Evaluation Criteria That ExpertLens Participants Were Asked to Employ for Aspirational Goals

Criterion 1: How important overall is pursuing this strategy in reducing the military suicide rate?									
Not important									Very important
1	2	3	4	5	6	7	8	9	10
Criterion 2: How effective is this goal in reducing suicide attempts?									
Not effective									Very effective
1	2	3	4	5	6	7	8	9	10
Criterion 3: How culturally acceptable in DoD are approaches that implement this strategy?									
Not culturally appropriate									Very culturally appropriate
1	2	3	4	5	6	7	8	9	10
Criterion 4: How expensive is it to implement this strategy?									
Not expensive									Very expensive
1	2	3	4	5	6	7	8	9	10
Criterion 5: How much could we learn in the next five years by funding research pursuant to this goal?									
Learn very little									Learn a lot
1	2	3	4	5	6	7	8	9	10

in an online discussion forum. This round afforded participants the opportunity to post their own discussion questions and to engage in an anonymous online discussion with other participants. Two RAND moderators prompted discussions and responded to comments to encourage further dialogue and help identify reasons for the variation observed in round 1.

Finally, in round 3, we provided participants with the opportunity to change their round 1 answers. At the end of round 3, we asked participants to complete a brief questionnaire about their experience with the RAND ExpertLens process.

Analysis

Upon completion of all three rounds of ExpertLens, the study team had two sources of ratings (from rounds 1 and 3) for each of the 12 aspirational research goal across each of the five domains. We used statistical analysis of these ratings to extract an *overall intrinsic score* for each strategy based on group opinion. This intrinsic score accounts for the "noisy" responses from each rater by weighing raters who exhibited higher precision in their responses more heavily than lower-precision raters, whom we assume had less expertise. More details about the approach can be found in the Appendix B.

Results

Participant Response

Of the 104 representatives invited to participate, 24 (23 percent) participated in round 1 of the elicitation process. Round 2 offered participants the opportunity to review the results from round 1 and interact with other participants in a dialogue about divergent perspectives. RAND staff prepopulated the discussion with two questions. By the end of the week, there were seven discussion threads on topics ranging from perceptions of the most important goal to concerns about the costs associated with the strategies in the current fiscal climate and queries asking why participants thought variation in responses existed where it did. There was at least one reply posted to each question. In total, 16 of the 24 round 1 participants logged into round 2, but only five posted comments or questions. Seventeen of those who participated in round 1 (70.8 percent) participated in round 3. Descriptive characteristics of these participants are provided in Table 3.4.

Although the overall number of participants was low, the panel consisted primarily of uniformed service members (versus DoD-employed civilians) affiliated with three service branches. (We had no representation from the Marine Corps or Coast Guard.) However, with respect to organizational affiliation, we had representatives from the Office of the Secretary of Defense; the Army, Navy, Air Force, and Marine Corps; and the Joint Chiefs of Staff. More than half of those who responded reported that they had a friend or relative who had attempted or died by suicide. Their reactions to participating in the consensus-building exercise are presented in Appendix C.

Ranking Across the Five Domains

We used the intrinsic scores generated through the elicitation process to rank each aspirational goal across each of the five domains. These rankings are provided in Table 3.5.

We observed variation across the five evaluation criteria in terms of participants' responses. That is, no one intervention strategy achieved the same rank across all criteria. However,

Table 3.4
Participant Demographics

Characteristic	N (total = 24)
Uniformed service members	19
Army	10
Navy	4
Air Force	4
Marine Corps	0
Coast Guard	0
Public health service	1
Organizational affiliation	
Office of the Secretary of Defense	4
Army	8
Navy	4
Air Force	1
Marine Corps	1
Defense agency (Defense Advanced Research Projects Agency, Defense Threat Reduction Agency)	0
Joint Chiefs of Staff	2
Race/ethnicity	
White	21
Nonwhite	3
Hispanic origin	1
Gender (male)	14
Education level (more than 4 years of college)	21
Professional affiliation	
Health care provider	12
Researcher	3
Age	
18–24	0
24–44	4
45–64	18
65+	1
Had a friend or relative who attempted or died by suicide	13

NOTE: Totals do not sum due to missing data.

Table 3.5
RAND ExpertLens Ranking of Aspirational Goals by Intrinsic Score After Round 3

Rank	Importance	Effectiveness	Cultural Acceptance	Cost (lowest to highest)	Learning Potential
1	Provider training	Provider training	Gatekeeper training	Gatekeeper training	Quality care
2	Continuity of care	Help-seeking	Continuity of care	Reduced access	Continuity of care
3	Gatekeeper training	Quality care	Provider training	Help-seeking	Prediction
4	Help-seeking	Gatekeeper training	Prevent reattempts	Prevent reattempts	Gatekeeper training
5	Quality care	Continuity of care	Risk reduction	Risk reduction	Psychosocial interventions
6	Prediction	Prevent reattempts	Quality care	Prediction	Provider training
7	Prevent reattempts	Psychosocial interventions	Help-seeking	Provider training	Help-seeking
8	Risk reduction	Prediction	Psychosocial interventions	Continuity of care	Risk reduction
9	Psychosocial interventions	Reducing access	Biological interventions	Psychosocial interventions	Prevent reattempts
10	Reduced access	Risk reduction	Prediction	Biological interventions	Screening
11	Screening	Biological interventions	Screening	Quality care	Biological interventions
12	Biological interventions	Screening	Reduced access	Screening	Reduced access

some patterns did emerge. *Gatekeeper training* was ranked as one of the top four strategies across all domains (including the least expensive), whereas *screening* and *biological interventions* were both rated as being costly and at the bottom of the rankings in terms of importance, effectiveness, and learning potential. We provide an overview of other key findings across each category in the following sections.

Perceived Importance

DoD participants ranked *provider training* highest in terms of perceived importance, followed by ensuring *continuity of care*. Among our DoD participants, *biological interventions* were rated lowest as a prevention strategy for suicide.

Effectiveness

Similarly, in terms of effectiveness *provider training* was rated highest by DoD participants followed by *help-seeking* and *quality of care*. Thus, the top three strategies in terms of perceived effectiveness as rated by DoD participants involve improving the provision of or access to high-quality health care for those at risk. As with perceived importance, *biological interventions* and *screening* ranked lowest in terms of effectiveness.

Cultural Acceptability

Participants ranked *gatekeeper training* highest in terms of cultural acceptability in military settings. This is a widely used approach in DoD, so it is not surprising that DoD stakeholders would rank it highly according to this criterion. Interestingly, *quality of care* and *help-seeking* were ranked in the lower half in this category. *Restricting access to lethal means* was rated lowest among all the strategies in terms of cultural acceptability. This is also not surprising, given that there are significant challenges associated with restricting access to firearms among a population that requires weapons to perform its mission.

Cost

DoD participants rated *screening* and *quality of care* the highest in terms of cost to implement in suicide prevention. Interestingly, participants rated *gatekeeper training* at the bottom, despite the potential costs associated with training the entire force in gatekeeper approaches, which has been done on "stand-down" days.

Learning Potential

Quality of care and *continuity of care* were rated as having the highest potential to inform future suicide prevention activities. *Reducing access to lethal means* was rated as having the lowest learning potential, potentially because it has already been widely studied in other settings or because of the challenges identified in terms of the cultural acceptability of this strategy.

Additional Elicitation from RAND Experts

Because of the lower-than-anticipated participation in the RAND ExpertLens process, we sought to confirm responses in two domains: effectiveness and learning potential. We initiated a modified expert elicitation with seven RAND researchers, all of whom have conducted recent research on or related to military suicide prevention. Beyond gathering additional data that we could use to confirm the DoD responses, this process also allowed us to tap the subject-matter expertise of RAND staff who conduct research supported by DoD related to suicide prevention, psychological health, and resilience.

For this second elicitation, we used the same list of aspirational goals but asked RAND staff to evaluate each prevention strategy according to two criteria instead of five: effectiveness and learning value. The evaluation questions posed to the RAND experts were edited slightly to tap their specific understanding and knowledge of the existing evidence base and research literature related to suicide prevention. The wording for these questions is shown in Table 3.6.

Table 3.6
Evaluation Criteria Employed with RAND Experts

Criterion 1: How effective is this goal in reducing suicide attempts among those who receive the stated intervention strategy?									
Not effective									Very effective
1	2	3	4	5	6	7	8	9	10
Criterion 2: Given your current understanding of the research evidence, how important is it to invest in further research on this goal?									
Not important									Very important
1	2	3	4	5	6	7	8	9	10

The elicitation process for the RAND experts also employed three rounds of data collection, but it was implemented over email and in person rather than through the RAND ExpertLens software system. For the first round, RAND experts were provided with two documents: a compendium of research findings from the literature on suicide prevention (and access to a library of the original articles) and a rating form for the 12 goals. RAND experts were asked to review the research findings, complete the rating forms, and submit responses by email. Responses were the collated, tabulated, and presented to the group of RAND experts during an in-person/teleconference session connecting experts in different locations for review and discussion (round 2). We used the data collected from RAND experts on criterion 1 (effectiveness) to rank the research goals, where the goal with the highest "score" for effectiveness was considered the top priority. RAND experts were asked to discuss and refine the rankings of the goals based on each other's feedback (round 3).

Results

During the discussion, the group of RAND experts chose to exclude one goal—"implement strategies to prevent suicide reattempts"—from the ranking exercise because they believed it overlapped or was redundant with four other goals: psychosocial interventions, quality care, provider training, and biological interventions. Specifically, they felt that these other four strategies, if implemented properly, would be the strategies used to prevent individuals who had attempted suicide from attempting it again.

At the end of each discussion of rankings, the RAND experts were asked to confirm the group's final ranking/ordering (round 3). The results of the RAND expert rankings in terms of relative effectiveness and learning value/investment importance are presented in Table 3.7. In comparing the RAND expert rankings with those generated through the DoD RAND ExpertLens process, we observe significant differences in opinions with respect to perceived

Table 3.7
RAND Experts' Final Ranking of Perceived Effectiveness and Learning Potential

Aspirational Goal	Effectiveness		Learning Potential	
	ExpertLens Rank	RAND Rank	ExpertLens Rank	RAND Rank
Psychosocial interventions	7	1	5	7
Quality care	3	2	1	12
Reduced access	9	3	12	6
Screening	12	4	10	8
Provider training	1	5	6	11
Risk reduction	10	6	8	1
Gatekeeper training	4	7	4	2
Help-seeking	2	8	7	5
Continuity of care	5	9	2	10
Biological interventions	11	10	11	4
Prediction	8	11	3	9
Prevent reattempts	6	N/A	9	3

effectiveness and learning potential. RAND experts were more likely to rate strategies with more existing research as more effective than were the DoD stakeholders. For example, RAND experts rated *reduced access to lethal means* among the top three in terms of effective strategies for reducing or preventing suicide, but it was rated in the bottom third in terms of effectiveness by DoD participants.

In terms of perceived learning potential, there was some overlap in the rankings between DoD participants and RAND experts. For example, both ranked *prediction* strategies third. However, there was divergence at the two ends of the scale. DoD participants ranked *quality of care* at the top in terms of learning potential, whereas the RAND experts rated it at the bottom. In fact, many of the strategies ranked as having least learning potential by the RAND panel were ranked as such because the panel felt that significant research and efforts had already been devoted to these areas and that there is not much more to learn. (This was voiced emphatically for *enhancing continuity of care* within DoD.) Again, the RAND experts were instructed specifically to use the existing literature to guide their ratings, whereas the DoD rankings may be influenced by additional factors as well.

Later in this report, where we use these rankings as inputs, we rely on the RAND expert rankings because of their connection to the existing research base in an effort to reduce the noise that may be associated with other influences.

Conclusion

Organizations within DoD that implement suicide prevention strategies expect that the activities and interventions they choose to use will have at least a modest effect on the outcome of interest. To most effectively reduce the number and rate of completed suicides and suicide attempts, decisionmakers need to implement the strategies that have demonstrated efficacy and effectiveness. Those with the most efficacy or effectiveness are likely to be high priorities for implementation.[4] As outlined earlier and in other reports, not all strategies, interventions, or approaches to reducing and preventing suicide have been rigorously tested or evaluated, and there may not be an evidence base to inform decisionmakers about the value or utility of such approaches. And even those that have research support may not reach 100-percent effectiveness. Thus, research on suicide prevention and reduction strategies remains a critical need. However, the priorities and goals for such research may differ from those for suicide prevention implementation strategies. Instead, research goals may be oriented toward learning more about novel approaches or existing approaches that require adaptation to new settings or unique populations.

Decisionmakers can decide to use the rankings provided in this chapter to guide their own evaluation of research needs for military suicide prevention. Ideally, one would want to fund research for strategies that DoD stakeholders consider important, culturally acceptable, and cost-effective, in addition to those that are likely to be effective and that have high future

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[4]   As discussed in Chapter Six, *efficacy research* typically involves small-scale studies in which participants have to meet strict inclusion and exclusion criteria, thus making such participants generally quite different from the individuals in the overall community of interest. In *effectiveness research*, studies come out of the laboratory and into the real world with less stringent criteria for participation. Effectiveness studies help test whether research programs can be translated successfully into real-world settings and whether the programs have the components necessary to achieve such diffusion.

learning potential. According to these criteria, *gatekeeper training* stands out: Although not rated as currently very effective, it was ranked by DoD representatives as important, culturally acceptable, and least costly; the RAND panel also ranked it as having the second highest learning potential. Furthermore, prior research suggests that these types of trainings are widely used in DoD (Ramchand et al., 2011). *Provider training* and strategies for enhancing *continuity of care* appear promising in terms of their importance and effectiveness; however, the RAND panelists ranked these strategies as likely to yield low returns in future research, largely because they believed that there is not much more to learn about these approaches. Then again, although the RAND panel thought there was much to learn about potential biological approaches, it was ranked by DoD representatives as being unimportant, not culturally acceptable, and costly. It may also be helpful to aggregate these rankings systematically, which we do in Chapter Five.

The collection of perspectives and insights from relevant DoD stakeholders and RAND experts yielded important considerations for a strategic research agenda for DoD. The process is not without its limitations, however. Of primary concern is the low response rate from DoD stakeholders in the online RAND ExpertLens elicitation. Further, the results may be biased on the perspective of the respondents who did participate (the majority were "implementers" as opposed to "researchers"). Future efforts within DoD could use a process similar to that described here and augment it with incentives to encourage participation to ensure that the results represent a broader panel. Despite communicating the objective and nature of this independent elicitation process and the expressed goal of gathering individuals' subject-matter expertise (rather than official input as an office representative), we believe the low uptake rate may be associated with concerns about participating without having been tasked by leadership to do so. DoD leadership is ideally situated to confront this challenge.

Even with the low response rate, the results of the process still provide important insights from DoD stakeholders with respect to priorities and aspirational goals. They should not be interpreted as representative of all DoD organizations, branches of service, or defense agencies; rather, they should be viewed as helpful insight and input from professionals invested in DoD suicide prevention efforts. Each of the experts who participated is actively engaged in studies designed to assist and improve DoD's policies, strategies, resources, and interventions designed to reduce suicide and improve psychological health and resilience among uniformed service members and their families. Their perspectives should, in some way, influence how DoD spends its research funds.

Preliminary Gap Analysis

At this point, we have presented abstractions of all DoD and non-DoD research on suicide prevention (Chapter Two) and identified DoD research needs and priorities (Chapter Three). In this chapter, we examine whether current research funding aligns with DoD's research priorities.

Methods

We present two stacked bar charts for each of five domains: perceived importance, effectiveness, cultural acceptability, cost, and future learning potential. In each set, the first graph shows the number of studies funded for each aspirational research goal, separating those conducted within and outside DoD, with higher-ranked priorities at the top and lower-ranked priorities at the bottom. We then present the same information in the same manner for the amount of funding currently allocated to each research goal. This visualization allows us to see in a basic way whether current studies align with DoD's research priorities.

As described in Chapter Three (see Table 3.2), we modified the goals we used for the study abstraction to the ones we used for the RAND ExpertLens solicitation. To recap, the original NAASP goal "risk and protective factor interactions" was not included in the RAND ExpertLens process. Thus, the funding allocated to such studies is not included in our analysis. However, that exclusion did not limit our ability to conduct our analysis, which involved analyzing how those categories ranked by the experts are funded relative to one another. Chapter Two accounted for this funding in presenting the total amount funded.

In addition, the original NAASP goal "provider and gatekeeper training" was broken into two goals: (1) ensure that non–health professionals (i.e., noncommissioned officers, chaplains) who come into contact with suicidal individuals are trained to identify, care for, and refer persons at risk, and (2) train health care professionals to identify those at risk for suicide and to manage their treatment. To accommodate these changes, we reviewed the 23 studies originally identified as provider/gatekeeper studies (see Appendix A) to isolate those that were provider studies (number funded by DoD = 7; DoD funding = $19,389,657; number funded outside DoD = 9; non-DoD funding = $4,714,538) and those that were gatekeeper studies (number funded by DoD = 4; DoD funding = $13,664,667; number funded outside DoD = 6; non-DoD funding = $3,433,442). Of the 23 studies we reviewed, we identified three (two funded by DoD and one funded by a non-DoD entity) as both provider and gatekeeper studies, and these studies are included in both totals.

Results

Perceived Importance

The aspirational goals with the largest number of studies, both in aggregate and when examining DoD funding specifically, are studies on *quality of care* and *psychosocial interventions*, which DoD panelists ranked as fifth and ninth, respectively, in perceived importance (see Figure 4.1). There are fewer than 20 studies on provider training, which was ranked as the most important goal, and only ten on gatekeeper training, which was ranked as the third most important.

As was true for the number of studies, the largest amount of funding is being spent on studies of *quality care* (particularly by DoD) and *psychosocial interventions* (see Figure 4.2). However, there is also more than $40 million being spent on research focused on enhancing *continuity of care*, and DoD is contributing more than half of these funds. DoD panelists ranked this strategy as the second most important for suicide prevention.

Effectiveness

The two areas that the RAND experts ranked as currently most effective—*psychosocial interventions* and *quality care*—are the same goals with the largest number of studies (see Figure 4.3). However, the third most effective—*reduced access to lethal means*—had very little funding, both by DoD and in aggregate. It is also noteworthy that there were a significant number of studies on enhancing *continuity of care*, *biological interventions*, and *prediction of imminent risk*—areas that were ranked among the lowest according to their current evidence of effectiveness.

An examination of the amount of funding reveals both parallels and differences (see Figure 4.4). First, most funding is going to the two areas with the largest number of studies and that were ranked first and second in terms of effectiveness—*psychosocial interventions* and *quality care*—whereas the least amount of funding is currently dedicated to what was ranked the third most effective strategy: *reduced access to lethal means*. *Screening*, which was ranked as

Figure 4.1
Number of Studies, by Perceived Importance
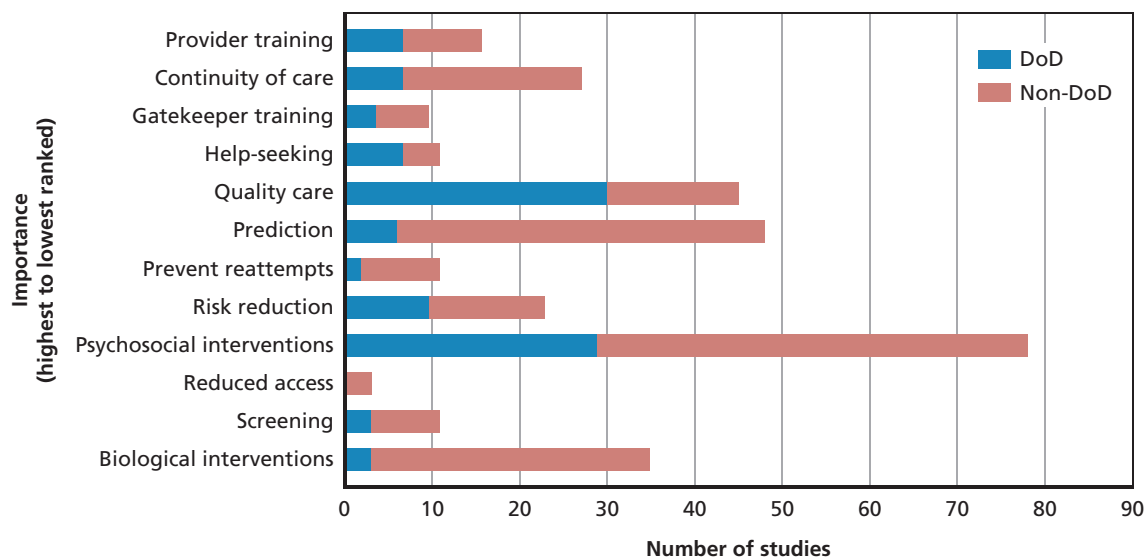
Figure 4.2
Amount of Funding, by Perceived Importance
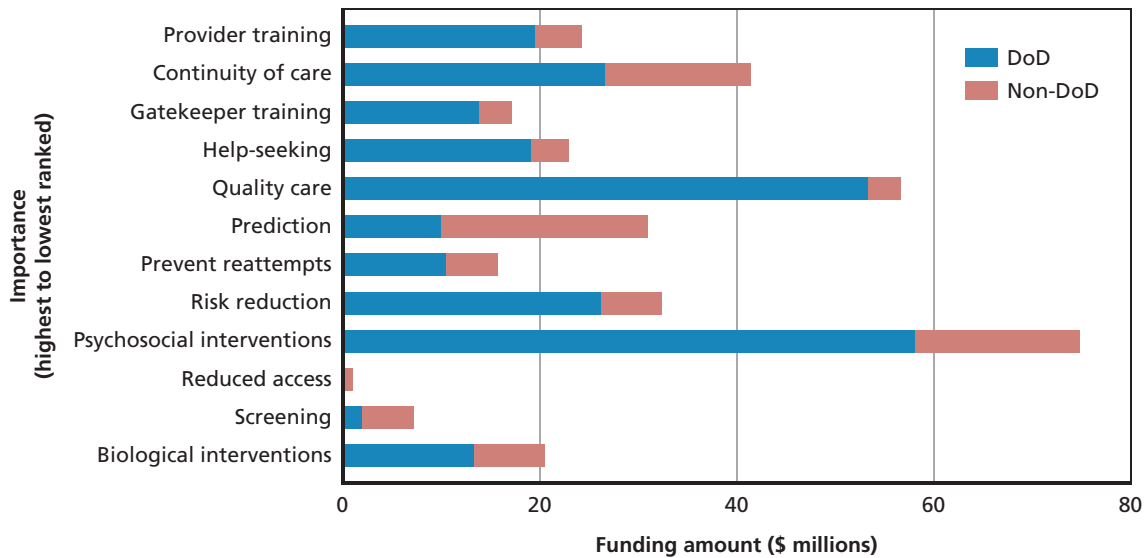
RAND *RR559-4.2*

Figure 4.3
Number of Studies, by Effectiveness
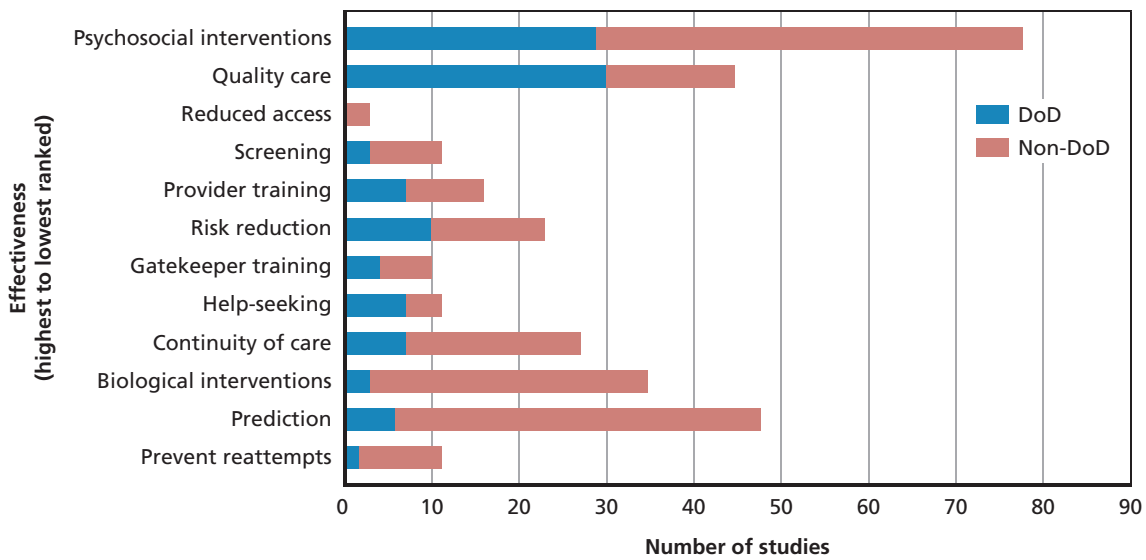
RAND *RR559-4.3*

fourth most effective, had similarly low levels of funding. The funding allocated to the rest of the goals generally correlated with their effectiveness rankings.

Cultural Acceptability

When plotted by ranking of cultural acceptability, the number of studies almost produces a bell-shaped curve, with the fewest studies on both the most and least culturally acceptable strategies and the most studies being funded in the categories that were ranked somewhere

Figure 4.4
Amount of Funding, by Effectiveness
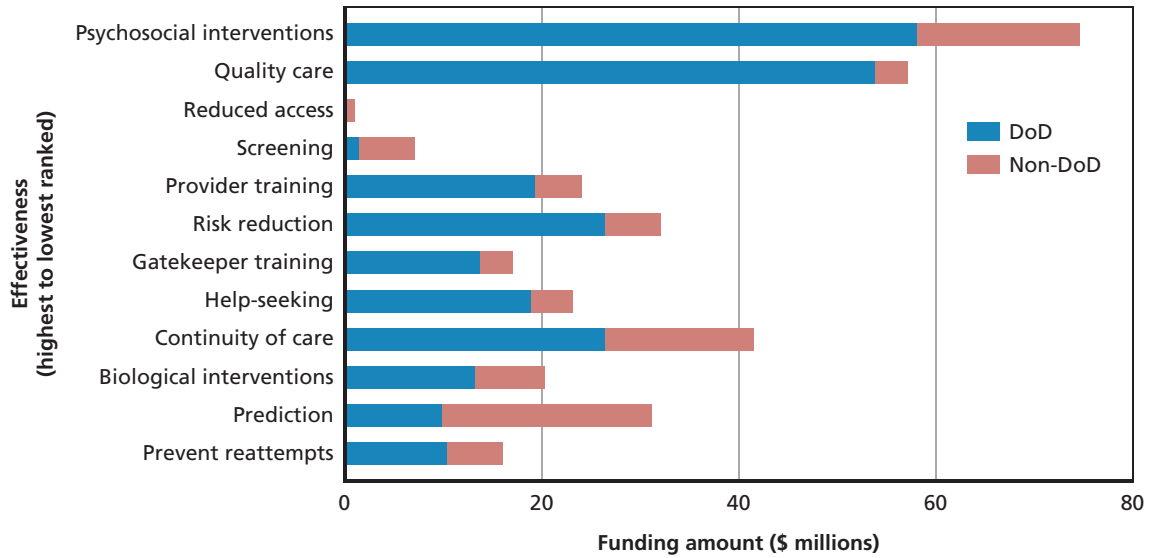
RAND *RR559-4.4*

in the middle (see Figure 4.5). The same pattern generally holds when examining the total amount funded by ranking of cultural acceptability (see Figure 4.6).

Cost

With *screening* and *psychosocial interventions* as outliers, the aggregate number of studies being conducted across the aspirational goals correlates with the cost of implementing the given strategy, with more studies being funded on strategies that were ranked as more costly to imple-

Figure 4.5
Number of Studies, by Cultural Acceptability
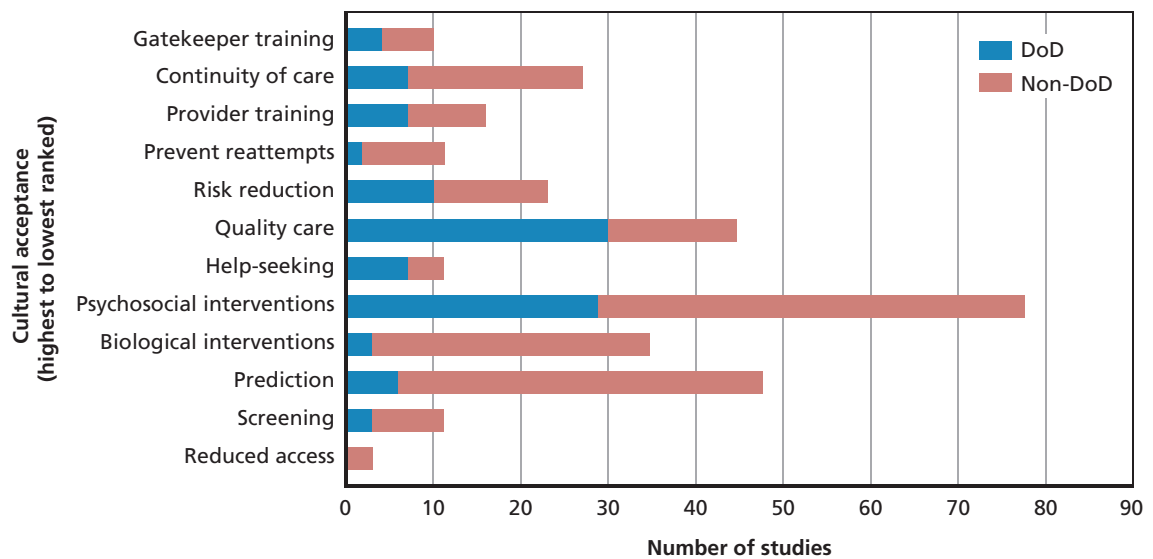
RAND *RR559-4.5*

Figure 4.6
Amount of Funding, by Cultural Acceptability
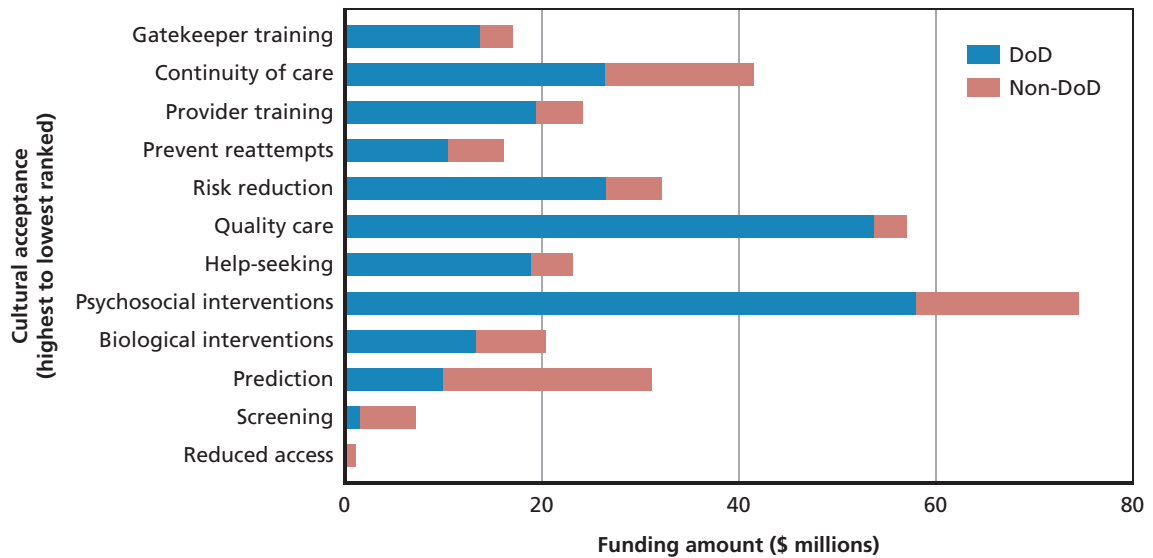
RAND *RR559-4.6*

ment (see Figure 4.7). Again, *screening* stands out as being ranked as the most costly to implement, but there are also few studies being funded on screening. While DoD funding patterns parallel the overall results, the category of *biological interventions* also stands out as an outlier, with very few DoD studies focused on this type of intervention; it was also ranked as the third most costly strategy to implement. Again, these same patterns are apparent when the amount being spent on research studies is ranked in order of the cost to implement the strategies (see Figure 4.8).

Figure 4.7
Number of Studies, by Cost to Implement
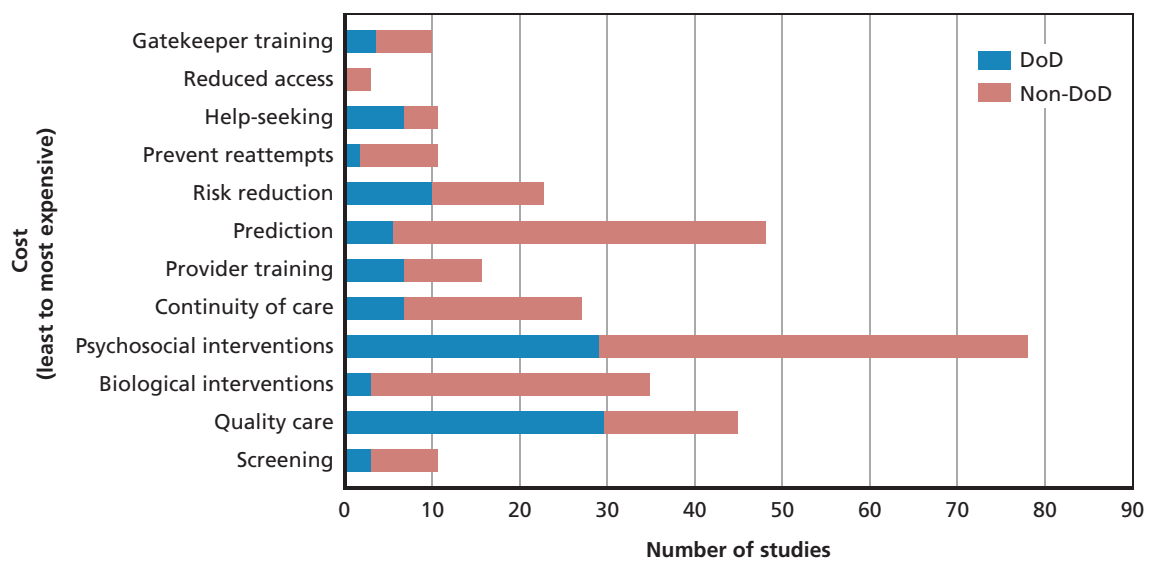
RAND *RR559-4.7*

Figure 4.8
Amount of Funding, by Cost to Implement
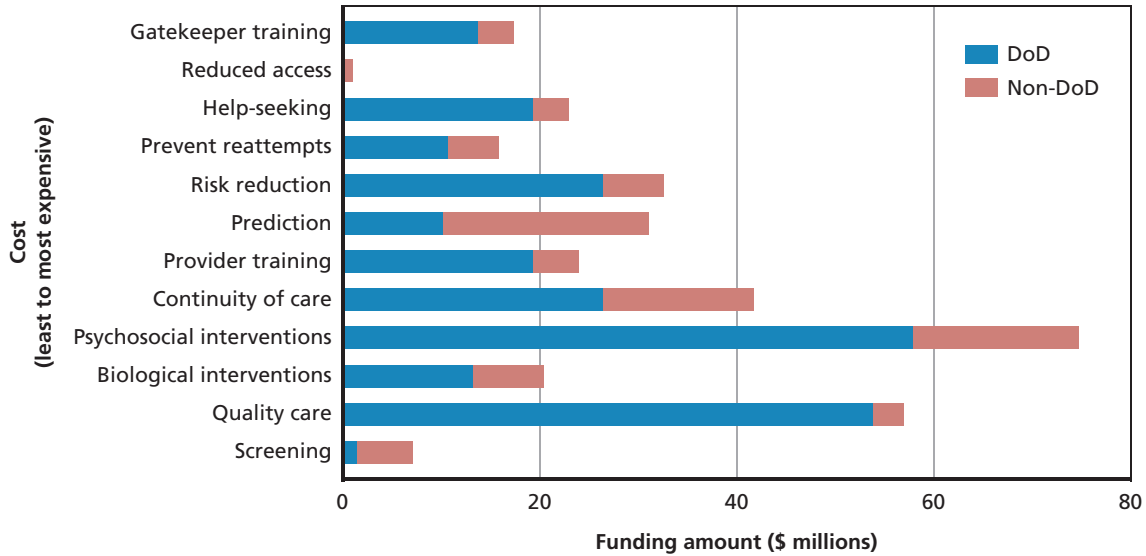
RAND *RR559-4.8*

Learning Potential

Finally, when ordered with respect to learning potential, according to the RAND experts, we see that the largest number of studies and the most research funding—both by DoD and in aggregate—address strategies ranked as having the lowest learning potential (see Figure 4.9). The exceptions are that there are few studies (with little funding) on *screening*, which was ranked eighth, and there is a relatively large number of studies but correspondingly little funding going toward *biological interventions*, which was ranked as having the fourth highest learning potential (see Figure 4.10). Recall that most studies in this area are funded by the AFSP.

Figure 4.9
Number of Studies, by Learning Potential
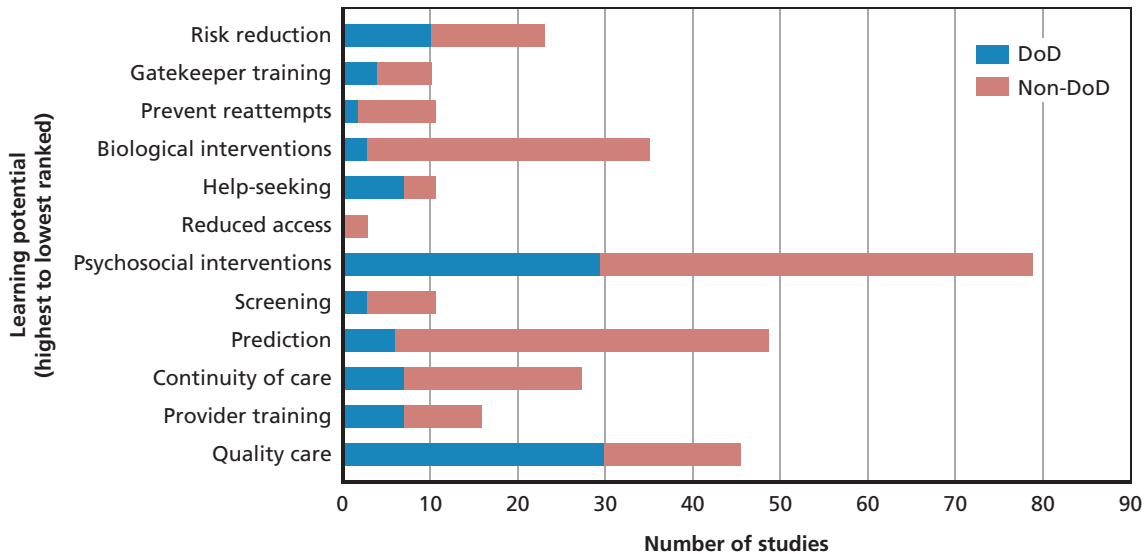
RAND *RR559-4.9*

Figure 4.10
Amount of Funding, by Learning Potential
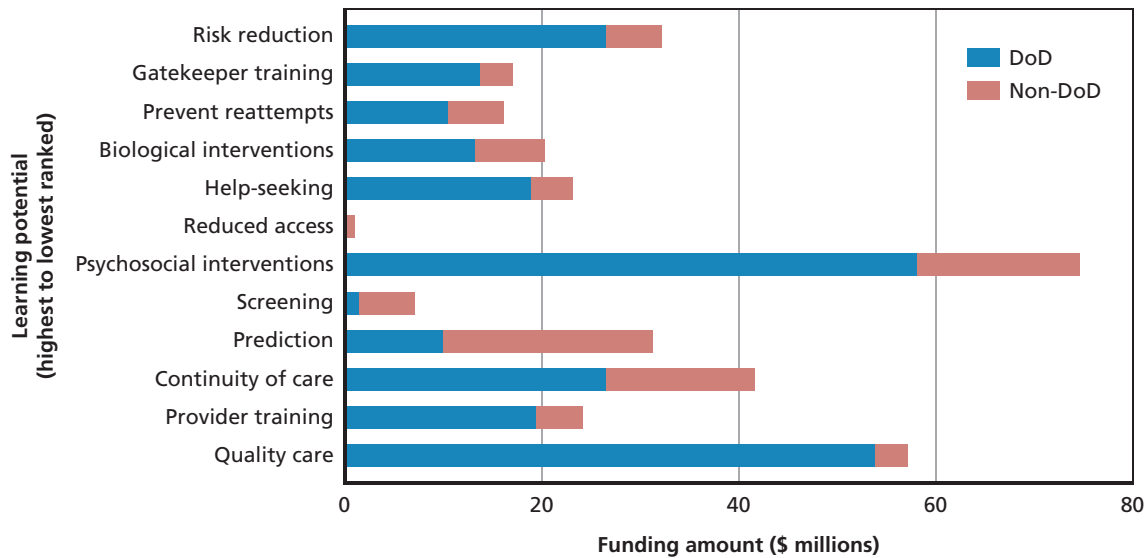
RAND *RR559-4.10*

Conclusion

We combined the data from Chapters Two and Three to produce a preliminary gap analysis examining whether current research on suicide prevention with relevance to military personnel aligns—in terms of both the number of ongoing studies and the amount of funds allocated—with DoD's research needs. We examined these needs across five domains: importance, effectiveness, cultural acceptability, cost, and learning potential. The results suggest that current studies and funding align best with the domains of effectiveness and cost. In other words, there are more studies and more funding going toward suicide prevention strategies that are already ranked as highly effective, as well as those ranked as the most costly to implement. However, there is no apparent relationship between what is being funded and what DoD representatives perceive as important. Furthermore, while there are few studies and little funding being allocated to strategies ranked as least culturally acceptable, there are also few studies and little funding allocated to strategies ranked as most culturally acceptable. Finally, there is an inverse relationship between the number of studies and amount of funding being devoted to strategies with the most learning potential, with more studies and funding going toward strategies ranked as having the lowest learning potential.

Modeling DoD's Suicide Prevention Research Priorities

In this chapter, we use data from both the RAND ExpertLens ranking with DoD and the RAND expert panel, described in Chapter Three, to provide a practical framework for prioritizing aspirational research goals to yield maximum impact in terms of reduced suicide attempts and cost. This framework accounts for differing population subgroups of military personnel who are affected by each research strategy. It models the effect and costs of interventions matched to these subgroups. In addition, we draw insights from the economics literature on research and development (R&D) portfolio optimization to provide guidance for decisionmakers about allocating DoD funds for research on military suicide prevention.

Background

The foundation for the analysis in this chapter comes from research conducted by the NAASP Research Prioritization Task Force (Pringle et al., 2013). In that work, the authors highlight a fundamental trade-off between the breadth (i.e., the size of the population affected) and depth (i.e., the effectiveness) of suicide interventions targeted at various subgroups. For illustrative purposes, the authors predefine three subgroups that vary in size (large, medium, and small). They then extract specific statistics for each subgroup, such as proportion with suicidal ideation, proportion with serious mental illness, and proportion that has attempted suicide. In the process, they note that the broadest subgroup possesses a relatively low rate of suicide attempts compared with a narrow subgroup. Incorporating additional targeting factors (i.e., further dividing subgroups) generally increases the intervention resources dedicated per person at the expense of narrowing the scope and excluding at-risk populations. Thus, the optimal prevention intervention espoused by the authors would balance the breadth and depth of interventions to maximize overall suicide prevention (i.e., the total number of suicides prevented).

Just as Pringle and colleagues (2013) focus on the targeted delivery of an intervention, in a similar fashion, research strategies can be characterized as affecting "universal," "selected," or "indicated" subgroups. For example, research on population risk reduction, gatekeeper training, stigma reduction, screening, and prediction *universally* affects the entire population, while research on provider training and continuity of care is more targeted and affects only *selected* subgroups at increased risk (i.e., those in contact with a health care provider). An *indicated* subgroup is one with a past history of mental illness or suicide attempts. In the methodology section, we explore in greater detail the assumptions made in determining the size of each subgroup of military personnel. Nevertheless, the same trade-off between breadth and depth

exists for prioritizing research strategies, because different subgroups display different degrees of suicide risk.

Methods

In this section, we model the impact of the full implementation of interventions that correspond to the research strategy for the appropriate subgroups. The goal is to rank prevention interventions with a metric that accounts for both the explicit benefits (suicides prevented) and the explicit costs (implementation costs).

Model Parameters

An ideal intervention would result in a large benefit for the least cost (i.e., a big "bang for the buck"). To formalize this concept, we developed a benefit-cost index based on parameters that may be unique to each research strategy:

- n = total population size.
- p = proportion (percentage) of total population affected by research strategy.
- s = suicide attempt rate for the subgroup, in terms of per-person risk per year (percentage).
- i = intervention effectiveness rate (percentage of suicide attempts averted).
- c = total cost of treatment for the subgroup.

The total population size (n) in this setting is the total active-duty military population of approximately 1.4 million people (Office of the Deputy Under Secretary of Defense for Military Community and Family Policy, 2012). As discussed earlier, each research strategy is assumed to affect a different proportion of the total population (p)—universal, selected, or indicated subgroups. The parameter p captures the idea of "breadth," but having a broad reach is not meaningful unless the subgroup affected is actually at risk of attempting suicide. The percentage of the subgroup at risk of attempting suicide (s) is expressed in terms of risk per person per year and represents the "depth" of the subgroup. Certain interventions may affect a small group of people who are at a very high risk of attempting suicide, while other interventions affect a large number people, each with a low risk. The product of the total population size (n), the proportion of the total population affected (p), and the suicide attempt rate (s) gives us the number of people attempting suicide each year. Multiplying the number of people attempting suicide by the intervention effectiveness rate (i) (i.e., the percentage of suicide attempts averted) gives us the explicit benefit from pursuing each research strategy and serves as the numerator for our index. The denominator consists of the total per-person cost of treatment, so the final bang-for-the-buck index is expressed in terms of suicides prevented per dollar spent.

For each research strategy, the following benefit-cost index can be calculated:

$$\text{index} = \frac{\text{suicides prevented}}{\text{cost}} = \frac{n \times p \times s \times i}{c}.$$

Parameterization of the Model

We used a combination of data gleaned from the RAND ExpertLens and RAND expert elicitation panels, as well as previous research, to assign values to the parameter for each data strategy.

Proportion of Military Population Affected

Table 5.1 shows the assumptions that directly underlie the values for the proportion of the military population affected (*p*) by each aspirational goal. For universal approaches (risk reduction, gatekeeper training, help-seeking, screening, reduced access to lethal means, and prediction modeling), we assume that the entire population of military personnel is affected. For health service delivery interventions not specifically focused on those with identified mental health problems, we assume that all those meeting symptom criteria of having a probable mental health problem are affected, regardless of whether they have a mental health diagnosis or are seeking mental health treatment, and we estimate that 25 percent of military personnel have a mental illness (Riddle et al., 2007). Finally, for interventions focused specifically on individuals with mental illness, we assume the median between those diagnosed with a mental illness (9 percent; Armed Forces Health Surveillance Center, 2012) and those with a mental illness, including those without having ever received a diagnosis, or 17 percent; for prevention of reattempts, we estimate that 2 percent of military personnel report attempting suicide in the past year (Bray et al., 2009).

Table 5.1
Proportion of Military Population Affected

Aspirational Goal	% of Force Affected	Basis for Proportion of Force Affected
Risk reduction	100	Assume all are affected
Gatekeeper training	100	Assume all are affected
Help-seeking	100	Assume all are affected
Screening	100	Assume all are affected
Reduced access	100	Assume all are affected
Prediction	100	Assume all are affected
Provider training	25	Assume all military personnel access care and those with mental illness are recognized
Continuity of care	25	Assume all military personnel access care and those with mental illness are recognized
Psychosocial interventions	17	Assume median of military personnel diagnosed with a mental illness (9%) and those meeting symptom criteria of having a probable mental illness, including those who may have never been diagnosed or in mental health treatment (25%)
Biological interventions	17	Assume median of military personnel diagnosed with a mental illness (9%) and those with a mental illness (25%)
Quality care	17	Assume median of military personnel diagnosed with a mental illness (9%) and those with a mental illness (25%)
Prevent reattempts	2	2 percent of active-duty personnel report having attempted suicide in the prior year

Proportion of Subgroup at Risk of Dying by Suicide

Table 5.2 shows our assumptions that directly underlie the values for the percentage of the subgroup (p) at risk of dying by suicide (s) in terms of per-person risk per year. Again, for universal approaches, we assume that individual risk is 0.02 percent (derived from the fact that the annual suicide rate in DoD has hovered around two per 10,000). For any interventions delivered to personnel with mental illness, we assume that the risk is 0.40 percent, based on previous research suggesting that the risk of suicide for those with mental health problems is 20 times that of the general population; for interventions targeting those who have attempted suicide, we assume that the risk is 0.90 percent, based on previous research suggesting that the risk of suicide among attempters is 40–50 times that of the general population (Harris and Barraclough, 1997).

Intervention Effectiveness

For our intervention effectiveness parameter, we did not feel confident in even making rough estimates from the literature. Instead, we use the results from the RAND expert panel. As described in Chapter Three, we convened an internal expert panel to rank the research strategies in terms of relative effectiveness (i.e., the percentage of suicide attempts in the subgroup that would be averted because of treatment). The second step involved assigning bounds to the final ranking (i.e., asking the experts to agree on actual percentage values for the least effective rate and for the most effective rate). We combined the rankings and the bounds to create

Table 5.2
Proportion of Subgroup at Risk of Attempting Suicide

Aspirational Goal	Risk per Person per Year (%)	Basis for per-Person Risk per Year
Risk reduction	0.02	Current risk in DoD (2 per 10,0000)
Gatekeeper training	0.02	Current risk in DoD (2 per 10,0000)
Help-seeking	0.02	Current risk in DoD (2 per 10,0000)
Screening	0.02	Current risk in DoD (2 per 10,0000)
Reduced access	0.02	Current risk in DoD (2 per 10,0000)
Prediction	0.02	Current risk in DoD (2 per 10,0000)
Psychosocial interventions	0.40	Risk of those with a mental health problem is 20 times greater (i.e., 0.02% × 20 = 0.40%)
Biological interventions	0.40	Risk of those with a mental health problem is 20 times greater (i.e., 0.02% × 20 = 0.40%)
Provider training	0.40	Risk of those with a mental health problem is 20 times greater (i.e., 0.02% × 20 = 0.40%)
Continuity of care	0.40	Risk of those with a mental health problem is 20 times greater (i.e., 0.02% × 20 = 0.40%)
Quality care	0.40	Risk of those with a mental health problem is 20 times greater (i.e., 0.02% × 20 = 0.40%)
Prevent reattempts	0.90	Risk of those with a prior suicide attempt is 40–50 times greater (i.e., 0.02% × 45 = 0.90%)

rough estimates for the values of the intervention effectiveness rate by assuming a simple linear interpolation for each research goal between the minimum and maximum ranking.[1] Recall, however, that the RAND expert panel did not rank the prevent reattempts goal because of the perceived overlap with other goals (specifically, psychosocial interventions, quality care, provider training, and biological interventions). Thus, for the effectiveness of interventions to prevent reattempts, we calculated the average across these four categories. The results are presented in Table 5.3.

Individual Cost of Interventions

What we provide for the per-person cost of an intervention is perhaps the strongest set of assumptions. Based on our assumptions, per-person costs range from $1 (our estimated cost of an anti-stigma campaign that encourages help-seeking) to $3,000 (our estimated cost of mental health treatment) per person. Our cost estimates and the basis for these estimates are provided in Table 5.4.[2]

Table 5.3
Intervention Effectiveness

Aspirational Goal	Effectiveness	
	Rank	Intervention Effectiveness (%)
Psychosocial interventions	1	55
Quality care	2	50
Reduced access	3	45
Screening	4	40
Prevent reattempts	NA	37.5
Provider training	5	35
Risk reduction	6	30
Gatekeeper training	7	25
Help-seeking	8	20
Continuity of care	9	15
Biological interventions	10	10
Prediction	11	5

NOTE: We did not rank efforts to prevent reattempts because of perceived overlap with other goals. Instead, we averaged the assumed effectiveness for psychosocial interventions, quality care, provider training, and biological interventions.

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[1]   A more sophisticated transformation of rankings to values would have required either more data points or more assumptions about the shape of the distribution of the effectiveness rates for each strategy. Given the uncertainty, linear interpolation is perhaps the most neutral method for generating the desired data elements.

[2]   The Defense Suicide Prevention Office has informed RAND that it has a rigorous effort under way to estimate the costs associated with these types of interventions. When this effort is complete, the data could be used to parameterize the model in place of the parameters used here.

Table 5.4
Per-Person Cost

Aspirational Goal	Per-Person Cost	Basis for Per-Person Cost
Help-seeking	$1	Expenditure on anti-stigma marketing campaigns in England 2009–2011 was $1,129,667 divided by total force (Evans-Lacko et al., 2013)
Provider training	$15	Per-provider cost of $115 for the Suicide Prevention Resource Center's workshop "Assessing and Managing Suicide Risk: Core Competencies for Mental Health Professionals," multiplied by 183,542 mental health professionals (119,180 active-duty, 42,315 civilian, 802 foreign national civilian, and 21,245 reserve) divided by total force (DMDC, 2012)
Gatekeeper training	$30	Cost for QPR (Question, Persuade and Refer) Institute's online, two-hour training (Louisiana Spirit Suicide Prevention Summit Meeting Planning Committee, 2006)
Reduced access	$50	Average of the following mean restriction options: • Trigger lock: $15 • Plastic/fiberglass gun case: $25 • Strong box/metal gun case: $100 • Gun safe: $125 • Locking steel gun cabinet: $400
Risk reduction	$90	Army expenditure of $125 million to develop Comprehensive Soldier and Family Fitness program, divided by total force (Murphy, 2011)
Screening	$200	Cost of a school-based mental health screening program, which ranged from $149 to $234 per student (Chatterji et al., 2004)
Prediction	$200	No basis to estimate; assume equivalent to screening
Continuity of care	$1,000	Per-patient cost of hospital-based team home care when implemented in the VA in 1985 (Hughes et al., 1992)
Biological interventions	$3,000	Evidence-based treatment for comorbid PTSD and major depression = $2,989.13 (Eibner et al., 2008; Foa, Davidson, and Frances, 1999)
Prevent reattempts	$3,000	Evidence-based treatment for comorbid PTSD and major depression = $2,989.13 (Eibner et al., 2008; Foa, Davidson, and Frances, 1999)
Psychosocial interventions	$3,000	Evidence-based treatment for comorbid PTSD and major depression = $2,989.13 (Eibner et al., 2008; Foa, Davidson, and Frances, 1999)
Quality care	$3,000	Evidence-based treatment for comorbid PTSD and major depression = $2,989.13 (Eibner et al., 2008; Foa, Davidson, and Frances, 1999)

Analysis

For each aspirational goal, we first calculated the benefit-cost index. We can use this information to rank aspirational research goals in a way that accounts for effectiveness and cost and compare it to the rankings of "importance" derived from the RAND ExpertLens panel. We next took the index value rankings and plotted them against the cultural acceptability rankings, allowing us to highlight certain strategies that look very promising based on the explicit benefit-cost index but that carry high implicit implementation costs (i.e., ranked low with respect to cultural acceptability) and that, as a consequence, would need to be discounted. Finally, we drew on recent insights from the economics literature on R&D portfolio choice and learning value to incorporate both the benefit-cost index and future learning potential, shedding further insight on optimizing a suicide prevention research portfolio.

Results

Suicides Prevented per Cost

The intent of benefit-cost ratio analysis is to break down the problem of prioritizing research goals into discrete factors. Decisions about which goals to pursue must take into account all four factors: the size of the subgroup, the subgroup's suicide risk, the intervention effectiveness rate, and the cost of treating the subgroup. Upon calculating the benefit-cost index for each research strategy, we arrive at a ranking of strategies to yield a maximum impact in terms of reduced morbidity (suicide attempts), given the cost of implementation. These results are presented in Table 5.5 and ranged from a high of 93.3 for *provider training* to a low of 0.05 for *prediction*.

Suicides Prevented per Cost Relative to Overall Importance

As part of the RAND ExpertLens protocol, we asked participants about the "overall importance" of a certain strategy in lowering the suicide rate of military personnel. Table 5.6 displays rankings from this question relative to the benefit-cost index. In both cases, *provider training* ranked first; other similarities are that *help-seeking* and *gatekeeper training* both ranked toward the top of the list, while *screening* and *biological therapies* ranked toward the bottom. Major differences between the approaches are that *reduced access* ranked toward the top of the benefit-cost index but toward the bottom with respect to perceived overall importance, and *continuity of care* ranked second most important for suicide prevention but fairly low in the benefit-cost index.

Table 5.5
Suicides Prevented per Cost Index

Aspirational Goal	Suicides Prevented per Cost Index Value
Provider training	93.30
Help-seeking	49.60
Reduced access	1.80
Gatekeeper training	1.67
Prevent reattempts	1.13
Psychosocial interventions	0.73
Risk reduction	0.67
Quality care	0.67
Continuity of care	0.60
Screening	0.40
Biological interventions	0.13
Prediction	0.05

Table 5.6
Benefit-Cost Index and Overall Importance Rankings

Benefit-Cost Index	"Overall" Importance from RAND ExpertLens Panel
1. Provider training	1. Provider training
2. Help-seeking	2. Continuity of care
3. Reduced access	3. Gatekeeper training
4. Gatekeeper training	4. Help-seeking
5. Prevent reattempts	5. Quality care
6. Psychosocial interventions	6. Prediction
7. Risk reduction	7. Prevent reattempts
8. Quality care	8. Risk reduction
9. Continuity of care	9. Psychosocial interventions
10. Screening	10. Reduced access
11. Biological interventions	11. Screening
12. Prediction	12. Biological interventions

Benefit-Cost Index Relative to Cultural Acceptability

Figure 5.1 shows the trade-offs between the benefit-cost index and cultural acceptability, as measured by participants in the ExpertLens panel. As mentioned earlier, this trade-off space highlights certain strategies that look very promising based on the explicit benefit-cost index but carry high implicit implementation costs and, as a consequence, would need to be discounted (bottom right corner, e.g., *reducing access to lethal means*). Conversely, strategies with a lower benefit-cost index but high levels of cultural acceptability might be prioritized higher. Strategies in the upper right portion of the figure represent research strategies with the most promise in terms of suicides prevented per cost and are most culturally acceptable: *provider training* and *gatekeeper training. Prediction*, *screening*, and *biological interventions* rank low with respect to their benefit-cost index and cultural acceptability. While *continuity of care* ranks highly with respect to cultural acceptability, it has a relatively modest benefit-cost index.

Benefit-Cost Index Relative to Learning Value

So far, we have only discussed prioritizing research strategies via rankings based on benefit-cost indexes. While these rankings inform the relative returns on investment from funding suicide research in 11 different areas, the question remains: Given a total research budget, what is the optimal allocation to each of these research goals in an R&D portfolio?

To begin to answer this question, we drew on recent insights from the economics research on R&D portfolio choice and learning value (Guo, 2012). A standard portfolio choice problem consists of investors allocating funds across traditional financial assets, such as stocks and bonds, with uncertain rates of return. In a dynamic environment, in which investments are made over multiple periods of time, investors learn about the rate of return of various assets and rebalance their portfolios to incorporate this new knowledge. One way to conceptualize this learning process is to compare investing in a new company with investing in an established

Figure 5.1
Trade-Offs Between Benefit-Cost Index and Cultural Acceptability
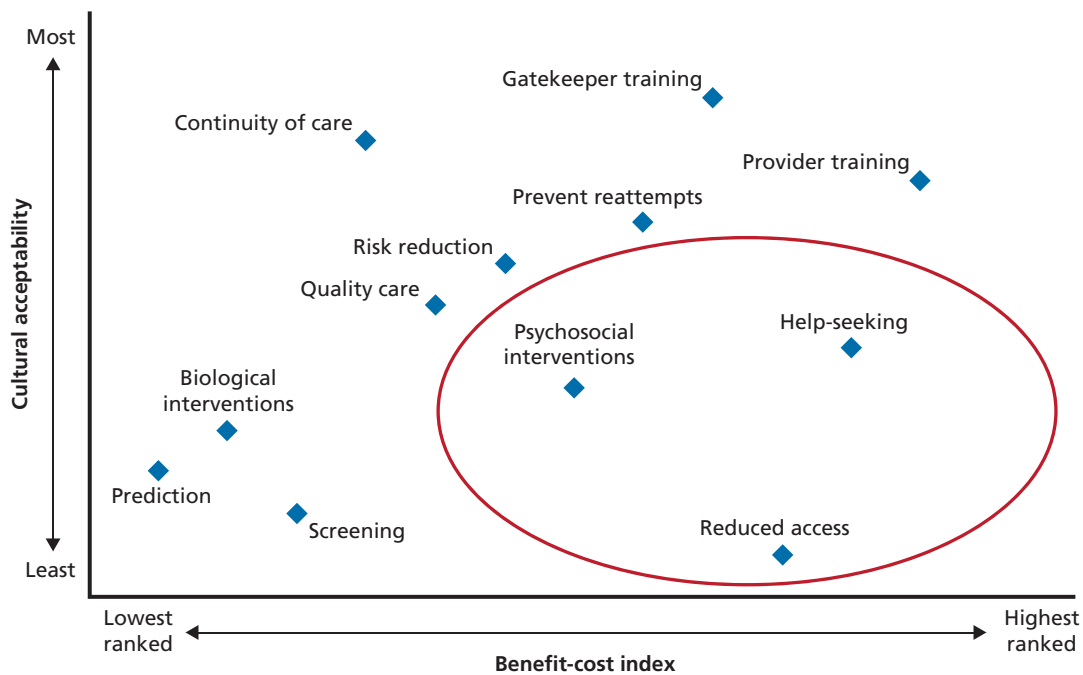
RAND *RR559-5.1*

company. An investor buying stock in a new company faces a high degree of risk (i.e., high uncertainty about the rate of return). Over time, as the company becomes more established, investors are able to observe multiple rounds of performance and earnings, diminishing the level of uncertainty. This is the value of learning about the return of an uncertain asset.

Investment in research differs fundamentally from investment in stocks, bonds, and other traditional assets. This is because, with traditional assets, the predominant assumption is that learning occurs *passively* over time at a given rate. One learns by reading the newspaper and observing the market. In other words, the rate of learning is decoupled from the investment decision. Investment in research is especially unique in that learning about the returns occurs *actively* (i.e., the more you invest in research, the more you learn). At an extreme, if no investment is made, one is never able to learn the rate of return from a research investment. The inevitable conclusion from this reasoning is that, in the case of funding research investments, which differs from funding traditional financial investments, the value of learning should be incorporated into the allocation decision process. Thus, although a primary return from investing in suicide prevention research can be measured using a benefit-cost index, a secondary return on investment is the value of learning, which should also be taken into account and will vary across research goals.

Because there are no historical data on the uncertainty of returns in suicide research, we relied on expert elicitation from the internal RAND panel (described in Chapter Three) to characterize learning value. For each strategy, the panel provided guidance on assigning three possible learning values to each research strategy: high learning value (greatest uncertainty), medium learning value, and low learning value (least uncertainty). Figure 5.2 shows how

Figure 5.2
Benefit-Cost Index Relative to Future Learning Potential
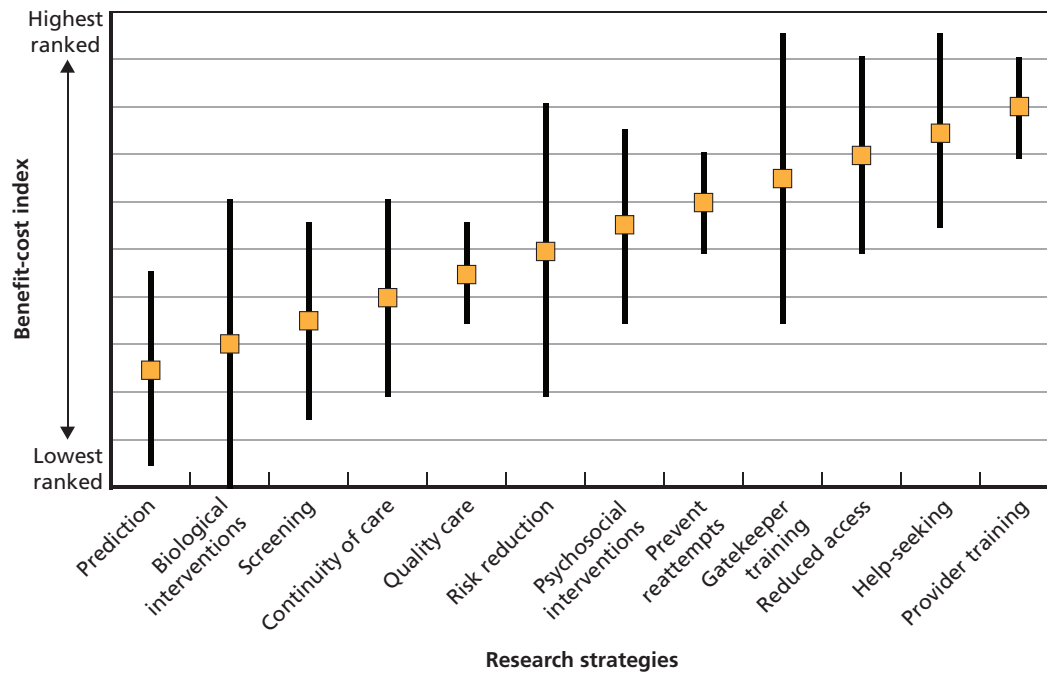
learning value interacts with the primary metric for rate of return, the benefit-cost index. The 11 research strategies are ranked in terms of their rate of return (benefit-cost index) along the vertical axis, and the length of individual error bars reflects the learning value according to the return on investment.

This illustrative graph is meant to convey an important lesson: Uncertainty about the returns on investment precludes us from establishing an exact ("true") order with respect to learning potential.[3] Although we may be confident that highly ranked strategies generally have greater returns than lower ranked strategies, we are less confident in the order of immediately adjacent rankings. In fact, learning value is especially important when choosing between two investments that are closely ranked. Rankings may change with continued investment as more information is collected. For example, consider two research strategies, both of which are initially expected to have the same rate of return (suicides prevented per cost). Strategy A has higher learning value (greater uncertainty represented with a long error bar), and strategy B has less learning value. Investment in each strategy results in further learning about the return on investment, which reduces the uncertainty associated with each strategy.

We depict this dynamic in Figure 5.3. The narrowing difference between the dashed line and the solid line represents the resolving of uncertainty. Two strategies, formerly tied in the rankings, now show differentiation, with strategy A now having a higher rate of return than strategy B. We could imagine that, after a great deal of investment in each, the distributions would narrow enough for the true rankings to be identified. In the process, the research port-

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[3]   Figure 5.2 is illustrative in the sense that we do not assign specific values to the level of uncertainty; we merely depict the relative differences in uncertainty across the strategies.

Figure 5.3
Relationship Between Further Investment and Degree of Uncertainty in
Two Research Strategies
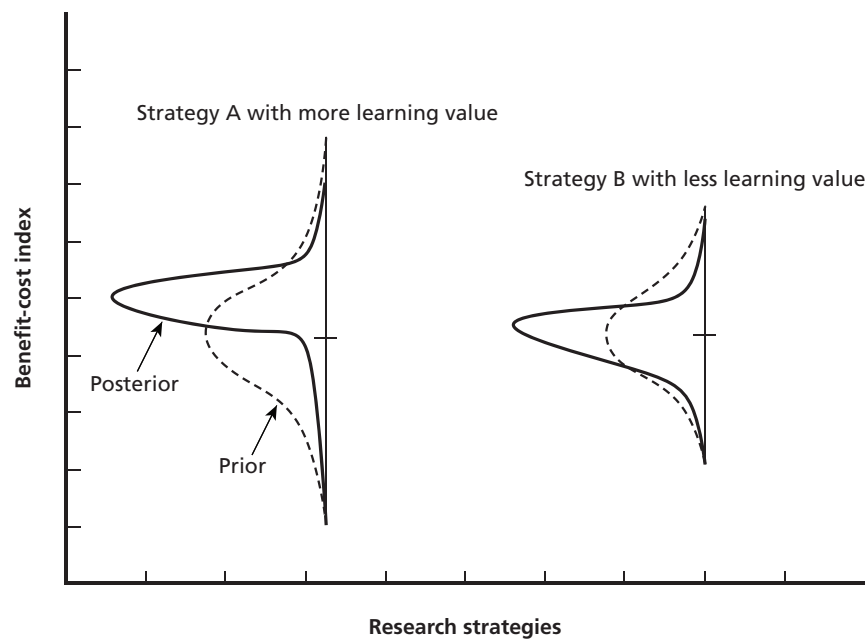
folio manager would be able to rebalance the portfolio to take advantage of new information about the rankings.

Returning to Figure 5.2, we are now confronted with 12 strategies with various perceived learning values. Although *provider training* ranked first in terms of suicides prevented per cost, research in this field is perceived to be mature and thus has a small learning value. *Help-seeking* ranked slightly lower but has a greater learning value. Because it has a greater learning value (i.e., greater uncertainty), it is possible the maximum potential return for *help-seeking* is greater than the maximum potential return for *provider training*. In our illustration, this is represented by the top of the error bar for *help-seeking*, which is higher than the top of the error bar for *provider training*. *Gatekeeper training*, which also has a high level of learning value, similarly offers a high maximum potential return. *Population risk-reduction* is another strategy with a high learning value, and its error bar overlaps those of several adjacent strategies with lower levels of learning value.

In the end, an optimal portfolio allocation would dedicate the most resources not only to the strategies with the highest number of suicides prevented per cost but also to the strategies with the highest learning values. Finally, it is important to remember that, over time, learning from investments decreases uncertainty about the returns, effectively decreasing the length of the error bars. At a certain point, we can imagine that the error bars will shrink until they no longer overlap. Eventually, a small subset of research strategies will emerge as "winners" in terms of our metric, but this will occur only *after* research investors have sunk funds into each strategy.

Funding and Study Allocation Relative to the Benefit-Cost Index

Similar to our analyses across the domains of importance, effectiveness, cultural acceptability, cost, and future learning potential in Chapter Four, we plotted how the current number of research studies (Figure 5.4) and funding levels (Figure 5.5) inside and outside DoD relate to the benefit-cost index we constructed for each aspirational goal. Here, we see that the top five ranked by our index—*provider training, help-seeking, reduced access to lethal means, gatekeeper*

Figure 5.4
Number of Studies, by Benefit-Cost Index
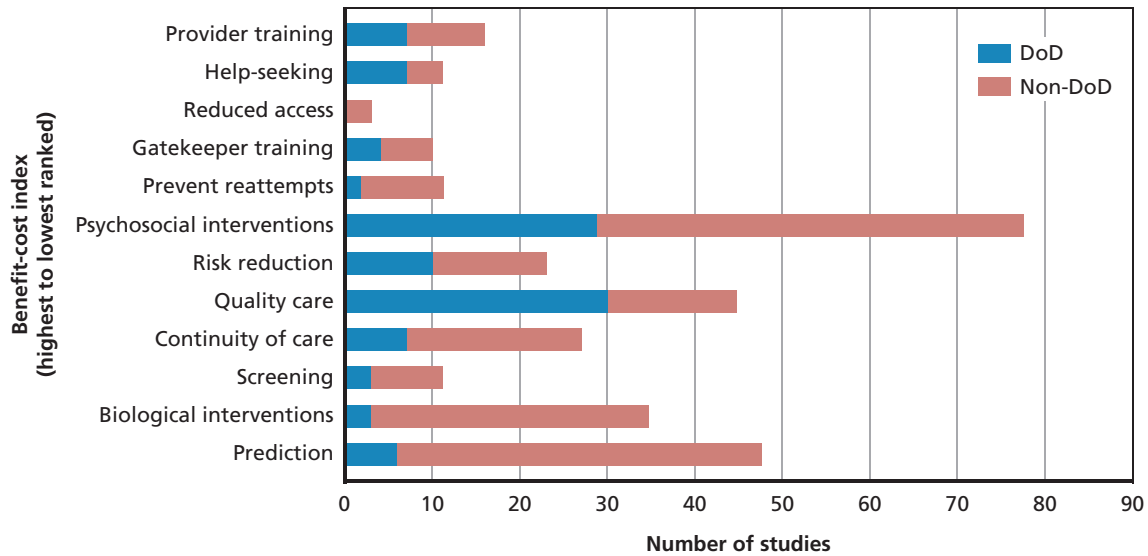
Figure 5.5
Amount of Funding, by Benefit-Cost Index
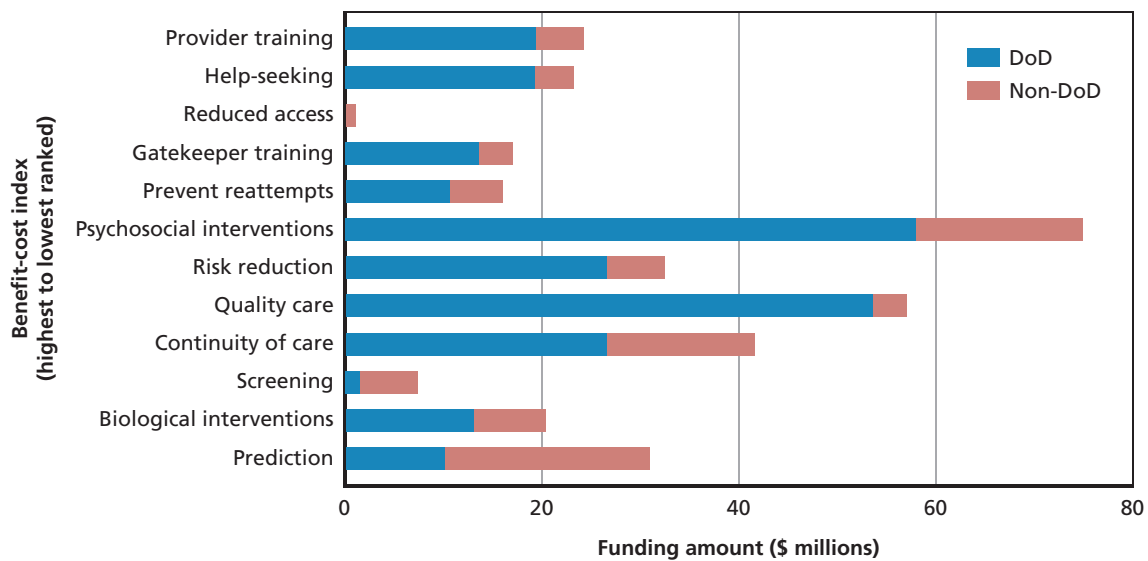
training, and *preventing reattempts*—each have the fewest number of studies and lowest level of funding.

Sensitivity Analysis

We review our sensitivity analysis here, but Appendix E provides a more detailed discussion. The index value calculated relies on parameters, and each may have error associated with it. Based on the formula, it is straightforward to infer how a percentage error or percentage change in the parameters will affect the index. Any change in the numerator will induce an equal change in the index. For example, a 5-percent individual error in any of the four variables (n, p, s, or i) or a 5-percent combined error in the variables in the numerator will translate to a 5-percent error in the index. Because cost is in the denominator, a percentage error in the denominator requires taking the inverse.

We estimated the relative margin of error associated with each index value and the extent to which this error would change a goal's ordinal ranking relative to the goal ranked below it. These percentage leads are presented in Table 5.7. For example, the difference between *provider training* and *help-seeking* is 47 percent. Thus, our estimates for *both goals* could be inaccurate, but the *provider training* index would have to be 47 percent too high, the *help-seeking* index would have to be 47 percent too low, or both would have to vary to a proportional degree for the ordinal rankings to change. For certain goals (*reduced access*, *psychosocial interventions*, *risk reduction*, and *quality care*), the relative margins are close, so a small change (< 15 percent) would affect the rankings. For example, if the *risk reduction* index decreased by more than 1 percent, it would fall behind *quality care* in the rankings.

This analysis suggests that we would generally expect the highest- and lowest-ranked research goals to maintain their rankings, given reasonable errors in the assumptions underlying their indexes. However, several of the midranked goals have indexes that are relatively close

Table 5.7
Percentage Change in the Benefit-Cost Index

Aspirational Goal	Benefit-Cost Index	% "Lead" Over Next Lower
Provider training	93.333	47
Help-seeking	49.558	96
Reduced access	1.800	7
Gatekeeper training	1.667	33
Prevent reattempts	1.125	35
Psychosocial interventions	0.733	8
Risk reduction	0.672	1
Quality care	0.667	10
Continuity of care	0.600	33
Screening	0.400	67
Biological interventions	0.133	63
Prediction	0.050	—

together, and we could see reordered rankings in the middle given a different set of parameter assumptions.

Conclusion

In this chapter, we integrated findings from both expert panels and, applying certain assumptions, created an index that takes into account not only the explicit benefit (i.e., the number of suicides prevented) but also the explicit cost of implementing an intervention. By doing so, we were able to rank each aspirational research goal with respect to a metric of suicides prevented. Furthermore, we paired each goal's benefit-cost index with its cultural acceptability, which will inevitably discount certain strategies that may appear effective but that are not likely to gain traction in a military environment. Certain strategies, such as *help-seeking*, *reduced access*, and *psychosocial interventions*, rank well but have low cultural acceptability. A policymaker may either discount such strategies or work on making them more culturally acceptable. Finally, we refined the concept of "benefit" by characterizing the implicit learning value of pursuing a research program, augmenting the explicit benefits. *Gatekeeper training* and *risk-reduction* are two midranked strategies that may have high maximum potentials due to their learning value.

Determining the proper investment model is especially complicated because of the inherent lack of traditional data sets to support the empirical analysis of research outcomes. We recognize that there are many unknowns; our methodology, combined with expert elicitation, is designed to organize the unknowns into a more manageable problem. Our primary goal was to provide and populate a metric in a field lacking such a metric and to do so transparently. While the exact composition of the performance index and the assumptions made to parameterize the model may be debated, we welcome this criticism. Others can modify the model or change the parameterization with their own assumptions to see how the results change. We believe that this process, combined with our expert elicitation, provides a solid ground on which to make strategic recommendations to inform the development of a comprehensive research program for suicide prevention in DoD.

A takeaway is that investment in research is not a one-time, static process: It will be repeated over many periods, and, in each period, more results will be observed and beliefs about the return on investment will be updated. The recurring process of investment, learning from the investment, and updating the investment strategy in fact deemphasizes the importance of coming to a consensus about initial parameters and emphasizes the importance of adapting investment allocations according to lessons learned along the way. Only over successive periods of investment will we ultimately identify the research strategies that are highly productive and those that will are dead ends.

Translating Research into Practice

The ultimate objective of any suicide prevention research study is to provide empirically supported information that can be used to improve or inform suicide prevention strategies. Unfortunately, there is a research-practice gap in disseminating research conducted in academic settings to individuals who may actually benefit from learning about the research (Lamb, Greenlick, and McCarty, 1998). When researchers finish collecting data for a research study, they typically write up the results and submit an article for publication in a peer-reviewed journal. Researchers also attend local, national, or global conferences, where they speak with others in their field about their research findings and learn about others' research findings. Dissemination vehicles include formal talks or presentations, training sessions, poster presentations, or informal talks during networking activities. However, because academic conferences and peer-reviewed journals are the primary tools used to disseminate research findings to others, the diffusion of this research into actual practice can be hindered for several reasons. First, many articles in journals are not freely available to the public. Second, conferences are often advertised only to academics or those who subscribe to specific mailing lists; they are also expensive and typically require travel. Finally, those most likely to use the findings in actual practice (i.e., clinicians, line leaders, and providers in the field) typically do not attend academic conferences and do not generally read journals, partly because of perceptions that such research is esoteric and not easily integrated into practice (Carlton, 2012; Sobell, 1996). For example, researchers may share results about a promising suicide intervention in the literature or at conferences, but line leaders and providers who work closely with service members and may benefit from learning about the intervention do not receive the information presented at the conferences or do not know where to find published research.

Organizations must go beyond current dissemination practices and develop theoretically and empirically sound methods for diffusing research into practice. This chapter provides an overview of evidence-informed strategies for disseminating research into practice, with the goal of helping DoD adopt a process to promote such diffusion in the area of suicide prevention. We first describe the methods we used to evaluate how successful dissemination occurs. From this process, we identified ten recommendations to effectively diffuse research into practice. We describe the components of effective diffusion, review how current practices may be problematic or ineffective, and suggest how these ten components may help overcome current barriers. Finally, for each of the ten components, we present a case study to demonstrate what effective translation of research looks like in a real-world setting. While we highlight those that may be specific to suicide prevention, we took a more general approach in identifying these cases, drawing from several disciplines.

Literature Review Strategy

We began by looking through the research literature in areas including but not limited to suicide prevention to identify successful strategies that may be relevant to suicide prevention in DoD. We looked at research across areas of behavioral health, medicine, criminal justice, education, occupational safety, and sociology to help identify strategies to facilitate the diffusion of research into practice. We conducted a systematic literature search using the MEDLINE and EBSCOhost databases, as well as Google Scholar, for studies related to "translating research into practice" or "diffusion of research." We selected articles and reports published within the prior ten years (2002–2012) but also included classic work identified from the reference sections of these articles. The search yielded approximately 80 unique articles and reports that were relevant to the targeted topic.

Although we used this literature search to identify case studies, we augmented this information by holding discussions with experts at RAND in the areas of education, substance abuse, occupational safety, criminal justice, behavioral health, and health care to locate case studies of research programs that have been successfully implemented into practice. We summarize these case studies later in this chapter and highlight the components of effective diffusion supported in the theoretical and empirical literature on putting research into practice.

A Note on Terminology

Although we searched the literature across disciplines, much of the relevant research focuses on health care topics. As such, we use the term *providers* loosely; providers may include, for example, installation leaders who want to implement new suicide prevention trainings in their commands. We also refer often to *adopters* or *adopters on the ground*—descriptions that encompass leaders, providers, and other individuals who are actually involved in implementing a research program on an installation or within an organization at a particular site. Finally, we use the terms *program*, *intervention*, and *innovation* interchangeably to highlight how these components are applicable to an array of practices.

The Ten Components

The research literature supports ten components that organizations and institutions can use to effectively diffuse research into practice (see Table 6.1). We elected to not use the phrase *necessary components*, because not all ten components may be required in all instances. That is, not every research study or collection of studies will require all ten, and it will be important to consider why or why not each of these ten components is addressed when attempting to diffuse research findings into practice. The components are presented in a proposed sequential order and not in order of importance. These components will likely not follow a specific order in real-world implementation; thus, they should be understood as a guide and not a strict chronological structure. They can be thought of as encompassing three broad areas, with components that (1) demonstrate that the program is needed, could be successful at a particular site, and is rooted in scientific evidence; (2) relate to infrastructure, such as internal leadership and financial support for the program; and (3) relate to garnering support and dissemination at the ground level.

Table 6.1
Ten Components Recommended to Effectively Diffuse Research into Practice

Category	Component
Program is needed, could be successful, and is rooted in scientific evidence	1. Evidence of an identified need
	2. Evidence of research quality
	3. Evidence of real-world effectiveness
Supportive infrastructure	4. Leadership buy-in and support from key stakeholders
	5. Funding or other institutional support
Ground-level support and dissemination	6. Collaboration with credible sponsors
	7. Provision of incentives or development of policies
	8. Peer network supportive of adoption
	9. Dissemination materials
	10. Expectation of a cultural shift

We describe each of the components in turn. For each, we first provide the theoretical and empirical support for the strategy, followed by one or two case studies that exemplify how the specific component was used (along with others) to effectively integrate research findings into routine practice. Some of the methodologies and designs of these case studies may apply specifically to the military's strategy; however, the case studies are intended to describe the *process* of diffusion and demonstrate the successful translation of research into practice.

1. Evidence of an Identified Need

The first step in effectively translating research into practice involves establishing a need for an innovation. One of the primary models guiding the diffusion of innovation suggests five key factors that increase the likelihood that an innovation will be adopted (Rogers, 2003). The first is *relative advantage*, which refers to perceptions that the innovation meets a particular need or will be significantly better than current practice. In other words, a program seeking adoption must be perceived as novel and necessary to improve upon current practice.

Individuals and systems adopting the program may need to understand that what is currently being practiced may be ineffective, unhelpful, or even harmful. There may be general consensus that the current practice is not working, but it may also be that individuals need to first be convinced that a need exists. One important way to demonstrate a need for a new program is to collect and present data to senior leaders, decisionmakers, and those expected to adopt the program to demonstrate evidence that the current practice is not helpful, is lacking, or could be improved. This process can begin the discussion that a change needs to be made as gaps in the current practice are highlighted and the needs of the organization are assessed (Hempel et al., 2012). Because providers and line leaders may be frustrated because current practices are ineffective in helping individuals with a particular problem, demonstrating the relative advantage of a new program may also encourage adoption by those on the ground.

After implementing the new program, collecting data on its impact can help provide empirical evidence of effectiveness, increase credibility, and retain organizational support. Data from an adopted program, as opposed to data on programs not already adopted, may

be more convincing for senior leaders, because they can see how well the program they have invested in is working (Barth, 2004; Bradley et al., 2004). Continuous evaluation of the program is necessary to ensure that senior leaders and providers remain aware of the effectiveness of the program after the trial period. Boxes 6.1 and 6.2 present two case studies that illustrate this first component: employee assistance programs (EAPs) and the Fleetwood Project.

2. Evidence of Research Quality

A plan for effective diffusion begins with an understanding of how to identify quality research. Prior to implementing a program, it is essential to understand how the program or intervention

Box 6.1
Case Study: Employee Assistance Programs

Identified Need	Employers were increasingly recognizing that alcohol-use problems were affecting employees' work performance (Roman and Blum, 2002). It was believed that alcohol-use problems were leading to reduced work productivity through missed work days and inefficient output.
Innovation	EAPs are employer-sponsored programs that provide assessment, counseling support, and referrals for additional resources to employees and members of their households. While EAPs began in the 1970s to help identify and reduce substance abuse among employees, they have expanded to provide workers with services for mental health concerns, stress, health care concerns, financial and legal concerns, work relationship issues, and family relationship issues. EAPs are typically free to employees, are included in standard benefits packages, and refer individuals to outside providers who can assist them in a limited number of sessions.
Research Support	EAPs reduce work loss in 60 percent of cases, with an average gain in work productivity of 43 percent (Attridge, 2001, 2002).
Key Materials	The Center for Prevention and Health Services published *An Employer's Guide to Employee Assistance Programs* to help employers understand the value and cost-effectiveness of providing their employees with EAPs. The publication presents research findings on EAPs to help employers make informed decisions about implementing these programs. The center's EAP Workgroup helped employers understand that EAPs represent a first-line response to providing prevention, triage, and short-term problem-resolution services. Surveys demonstrate the cost-effectiveness of these programs, highlighting that the initial costs associated with establishing EAPs outweigh the long-term costs associated with the problems that they prevent (Marsh USA and Mercer Health and Benefits, 2008; Watson Wyatt Worldwide, 2007).
Status of Diffusion	An estimated 76 percent of large companies representing more than 14 million employees provide an EAP as part of the standard benefit package (Hartwell et al., 1996). The majority (81 percent) of EAPs are external (i.e., located outside the workplace), and about 17 percent of companies have an internal EAP. The majority of employers with EAPs see their utility (Rothermel et al., 2008).
Key Components of Diffusion	**Evidence of an identified need:** Poor work productivity because of substance abuse by workers, need for substance-abuse treatment for employees, and documented improvements in work productivity **Evidence of effectiveness:** Recognized benefits of targeting substance-use problems to reduce the costs associated with poor job performance **Dissemination materials:** Educated employers about EAPs through training, published guide for employers with accessible research findings, convened EAP Workgroup

Box 6.2
Case Study: The Fleetwood Project

Identified Need	There was a need to reduce inappropriate medication use, undertreatment of common diseases, and adverse drug events among patients in nursing homes (Harms and Garrand, 1998). External pharmacists and prescribing clinicians at the facilities typically did not inform each other of patients' treatment or drug regimen, which could lead to complications.
Innovation	The Fleetwood Project is a model of long-term pharmacy care used in nursing homes in Wisconsin and North Carolina (Daschner et al., 2000; Lapane et al., 2011). It identifies nursing home residents at the highest risk for preventable adverse drug events and combines these assessments with formalized pharmaceutical care planning (e.g., establishing a drug regimen) and direct communication between the consultant pharmacist and the prescribing clinician. It recognizes that pharmacists have specialized training and may be able to contribute to a patient's care, rather than simply filling a prescription as ordered by a clinician. Dispensing pharmacists and consulting pharmacists who typically did not communicate with each other were required to collaborate.
Research Support	The Fleetwood Project has helped increase the quality of drug-related care, decrease mortality rates, and significantly save costs. More specifically, the program has increased the number of patients who experience optimal therapeutic outcomes by 43 percent and saved $3.6 billion annually in costs from avoided medication-related problems (Bootman, Harrison, and Cox, 1997).
Key Materials	The program has a toolkit available online and serves as a model for other nursing homes. The program has also developed the Web-Based Pharmaceutical Care Software to facilitate the exchange of information between internal and external pharmacists.
Status of Diffusion	The program is being evaluated for effectiveness in 26 nursing facilities in North Carolina. The Commonwealth Fund and the Retirement Research Foundation funded the project, with grants totaling more than $750,000.
Key Components of Diffusion	**Evidence of an identified need:** Identified a clear purpose for implementing a drug review process and improving care, which fulfilled an established need and helped attract substantial financial and administrative resources, including a staff specifically to disseminate the program **Evidence of research quality:** Model tested in Wisconsin and North Carolina nursing homes **Leadership buy-in and support from key stakeholders:** Strong senior leadership championing the approach and senior leaders at each facility helping to reengineer the nursing home pharmacies **Funding or other institutional support:** Dedicated funding for program staff **Peer network supportive of adoption:** Presence of clinical champion to support staff, reduce resistance from peers, and work with other clinicians to promote buy-in; provided trainings **Collaboration with credible sponsors:** Collaborative approach across disciplines as pharmacists and nursing home staff were trained to enhance communication skills and increase their knowledge of technologically advanced approaches to share data among providers **Innovative and creative approaches:** Used technology to expedite communication between pharmacists and nursing home staff **Expectation of a cultural shift:** Changed status quo but helped target an established need

is supported by research. There are both nonprofit and government-supported entities whose responsibilities include reviewing the research evidence for different programs and practices, some of which exclusively focus on suicide prevention and some of which focus on suicide prevention in addition to other areas. Here, we profile a sampling of these organizations.

SAMHSA's National Registry of Evidence-Based Programs and Practices

 SAMHSA's online National Registry of Evidence-Based Programs and Practices offers descriptions of 291 mental health and substance abuse interventions and the resources that support them (see SAMHSA, 2014). The quality of the research evidence supporting each intervention is rated by independent reviewers for the reliability of the measures, the validity of the measures, intervention fidelity, missing data and attrition, potential confounding variables, and the appropriateness of the analysis. Independent reviewers also assess the intervention's readiness for dissemination based on the availability of implementation materials, training and support resources, and quality assurance procedures. Costs of the program and contact information are also provided. The registry can be accessed at http://www.nrepp.samhsa.gov.

The Suicide Prevention Resource Center's Best Practices Registry

The Suicide Prevention Resource Center's Best Practices Registry is based on National Registry of Evidence-Based Programs and Practices suicide-focused interventions. It provides a list of evidence-based programs, along with guidelines and protocols based on expert/consensus statements from the field. The registry can be accessed at http://www.sprc.org/bpr.

The Cochrane Collaboration

The Cochrane Collaboration offers reviews of empirically supported interventions and practices in the health care field. The collaboration's online library offers research summaries, full-text reviews, journal articles on controlled trials, and podcasts (see Cochrane Collaboration, 2012). Its reviews are specifically targeted toward policymakers, practitioners, and consumers and are intended to provide objective evidence on treatments in a particular area of health care. The collection, along with user guides for practitioners, can be accessed at http://www.cochrane.org/information-practitioners.

U.S. Preventive Services Task Force

The AHRQ-supported U.S. Preventive Services Task Force is a group of nationally recognized experts in the field of clinical preventive services. The task force makes recommendations about preventive services based on the research evidence on such topics as health care screening, counseling services, and preventive medications. The group has created fact sheets, videos, slide presentations, and reports to assist providers and clinicians in making evidence-informed decisions in their practices (see AHRQ, 2012). An overview of available resources can be found at http://www.ahrq.gov/professionals/clinicians-providers/guidelines-recommendations/uspstf.

VA Quality Enhancement Research Initiative (QUERI)

The VA Quality Enhancement Research Initiative is focused on using research evidence to improve clinical practice for veterans (see U.S. Department of Veterans Affairs, Quality Enhancement Research Initiative, 2014). The initiative focuses efforts addressing ten high-risk or high-prevalence conditions, such as diabetes, mental health, and substance-use disorders. QUERI's online *Guide for Implementing Evidence-Based Clinical Practice and Conducting Implementation Research* outlines methods and resources for putting research into practice.

These guidelines are tailored specifically toward clinical interventions and screenings for the ten high-risk or high-prevalence conditions among veterans. For more information about QUERI, see http://www.queri.research.va.gov.

Assessing Research Quality

There are a number of factors that should be considered when assessing the quality of research. In Appendix F, we provide a brief summary of the types of research domains, research approaches, and research findings. However, studies that use randomized controlled trials (RCTs) are the gold standard for quality research (Lohr, 2004) and warrant specialized discussion here. The organizations identified in this section use these standards when evaluating research evidence in a particular area.

RCTs are intervention studies in which one group typically receives an intervention (e.g., counseling, medication) and a control group receives something besides the tested intervention (e.g., usual care, placebo treatment, assessments only). RCTs that are of particularly high quality should clearly answer the following questions:[1]

1. *Study population.* Who is being studied? Why is it important to study this particular group? Is the sample included in the study representative of the targeted population? Identifying the study population is essential to understanding how the findings can be generalized to populations that may be similar to, or different from, the study sample.
2. *Randomization.* Are participants assigned randomly to experimental and control conditions and not based on any other factors? Efforts should be made to ensure that randomization was not compromised (e.g., that participants in the control condition did not "cross over" to the intervention group) and to verify that there were no differences in demographics or important outcome data between the groups at baseline.
3. *Blinding.* Are participants, providers, data coders, and other study staff blind to participants' assigned condition? Ensuring that the individuals involved in the study are blind to patients' conditions adds an extra layer of control to reduce confounding influences or expectations.
4. *Replicability.* Is the intervention described in detail so that replication studies are possible? Have researchers in others laboratories been able to find similar effects? Good RCTs are able to demonstrate replicability across different samples and across different research teams.
5. *Intervention fidelity.* What measures did the researchers take to ensure that the intervention was delivered consistently across providers? The use of manuals, supervision, and fidelity checks can ensure standardization of the intervention among providers.
6. *Reliability and validity of outcome measures.* Did the researchers utilize measures that have established reliability and validity with the target population in prior work? If established measures with research support exist, it is better if researchers use them to facilitate comparability across studies. It is also important to ensure that the study uses validated and "real-world" measures to examine outcomes. When possible, self-reports should be corroborated by independent and objective measures (e.g., tests of blood alcohol level to corroborate self-reported alcohol use).

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[1] This list is adapted from Coalition for Evidence-Based Policy, 2003, and West et al., 2002.

7. *Appropriateness of statistical analyses.* Was the analytic plan appropriate and accurate? Good results rely on up-to-date scientific analyses that provide meaningful statistics that can be compared across studies. Statistical effects should be reported whenever the research suggests a difference between the intervention and control groups. The generally accepted level of statistical significance is 0.05, which means that there is a one in 20 probability that the differences observed between intervention and control outcomes were by chance. These effects should be reported in real-world terms, and both significant and nonsignificant findings related to a priori hypotheses should be reported.

8. *Follow-up assessment of outcomes.* Did the researchers examine the lasting effects of the intervention? How long were the follow-up periods? Long-term outcomes (e.g., two to three years after the intervention) are preferred over immediate outcomes or short-term outcomes (e.g., one-month post-intervention assessment).

9. *Attrition.* How many participants were lost at follow-up? How were missing data handled in statistical analyses? The percentage of participants lost over time should be low and checked to determine whether dropout was the result of the intervention (e.g., whether participants dropped out because the intervention was causing too much distress). Outcomes should be evaluated even for those who do not complete the experimental intervention, when available.

10. *Limitations.* What confounders exist that may also explain the findings? How might these factors affect the results? No research study is flawless, and researchers should indicate the limitations of their study so that they can be addressed in future work.

In sum, being able to recognize quality research is essential so that untested (or potentially harmful) programs are not widely disseminated. There are several nonprofit and government supported entities that review the research for programs in a particular area of interest and make recommendations for the use of empirically supported programs in practice. Given the research-practice gap, it is essential to find low-cost or free, accessible methods to disseminate findings from empirically based research to inform those on the ground who are looking to adopt a new program.

Box 6.3 presents a case study illustrating this second component: dialectical behavior therapy.

3. Evidence of Effectiveness

An innovation can go from a highly controlled laboratory environment that does not mimic real-world settings (efficacy research) to real-world settings for individuals in the general population (effectiveness research). *Efficacy research* typically involves small-scale studies in which participants have to meet strict inclusion and exclusion criteria, making such participants generally quite different from individuals in the overall community of interest. The expectation is that the observed effects will translate to the general population, but this is not always tested. In *effectiveness research*, studies come out of the laboratory and into the real world with less stringent criteria for participation. It is effectiveness studies that provide the richest information about potential treatment effects for the general population. Effectiveness studies help test whether research programs can be translated successfully to real-world settings and whether the programs have the components necessary to achieve such diffusion. Effectiveness research is akin to what Rogers (2003) refers to as "trialability," or how much the new practice can be "trialed" or tested out before the final decision about whether to standardize the practice.

Box 6.3
Case Study: Dialectical Behavior Therapy

Identified Need	Borderline personality disorder (BPD) is a psychiatric disorder marked by an attempt to control strong emotions with self-harm behaviors (e.g., cutting) or suicide attempts. The severity and number of symptoms in BPD patients makes the disorder particularly difficult to treat through standard cognitive behavioral therapy.
Innovation	Marsha Linehan at the University of Washington in Seattle developed dialectical behavior therapy (DBT), an empirically based, manual-guided treatment for individuals with BPD. Linehan began modifying cognitive behavioral strategies in a structured way to treat these patients. She used these modified cognitive behavioral strategies in conjunction with mindfulness techniques with her most difficult patients and noted that they began to improve. In 1993, she published her strategies in a manual intended as a guide for other therapists (Linehan, 1993). This initial study was followed by a series of RCTs to empirically examine the effects of DBT on BPD patients.
Research Support	Between 1991 and 2011, Linehan and her colleagues designed and implemented more than 15 RCTs by recruiting patients who were seeking therapy for BPD, substance abuse, trauma, or suicidal behaviors into small research studies that tested DBT against a treatment as usual (e.g., cognitive behavioral therapy) or a waitlist control condition in which participants waited for a period of time before receiving care. Effectiveness trials emerged later. For example, DBT was tested with patients hospitalized for suicide attempts (Bohus et al., 2004).
Key Materials	To promote DBT beyond journal readers, Linehan created a center on the University of Washington campus to train therapists and develop research on DBT. She attended local and national conferences and created a website to collect DBT research and clinical resources, announce training opportunities for therapists, and provide interested patients with therapy options. Multiple manuals for providers and patient workbooks have since been published.
Status of Diffusion	DBT is now the standard treatment for patients with BPD or suicidal behaviors in the United States and has gained popularity in several European countries, Canada, Australia, New Zealand, and China. DBT has had widespread exposure and been implemented outside the University of Washington clinic (e.g., in hospitals, crisis services, forensic units; Swenson, 2000).
Key Components of Diffusion	**Evidence of research quality:** Published RCTs in top-tier journals, disseminated research findings via public website, conferences, and trainings; strong empirical support for an area with no prior research **Evidence of an identified need:** Fit a need for providers who were "burned out" by difficult patients, appealed to providers from multiple theoretical backgrounds; standardized, manualized, and made accessible to providers at all levels; lack of other promising empirical treatments for BPD patients **Evidence of real-world effectiveness:** Implementation outside the research environment in communities; reimbursement from managed-care companies **Leadership buy-in and support from key stakeholders:** Managed-care companies reimburse for DBT if there is a BPD diagnosis; support from multiple institutions **Funding or other institutional support:** Endorsement of the therapy by several state departments of mental health **Peer network supportive of adoption:** Supportive community of DBT therapists to assist with difficult patients **Provision of incentives or development of policies:** Manualized structure to treat a disorder that many clinicians are admittedly inept at treating **Dissemination materials:** Publication of a DBT manual and workbook for patients, trainings by the developers, and online resources **Expectations of a cultural shift:** Blends many different types of theoretical orientations, which allows providers with diverse training backgrounds to find something familiar in the practice

Having the ability to easily pilot-test a new practice may affect the degree to which the guideline is followed in the future.

Unfortunately, programs that are complex and highly standardized for the research setting may be difficult to implement in real-world settings (Glasgow, Lichtenstein, and Marcus, 2003). Many efficacy studies are not tested for effectiveness in the population or fail to show similar effects when tested for effectiveness. Also, some providers or those expected to adopt the new program may hold the belief that research studies have limited real-world generalizability and may express uncertainty or disinterest in a new approach (Pagoto et al., 2007; Riley et al., 2007; Stewart, Stirman, and Chambless, 2012). Developing trainings to help these providers understand the importance of effectiveness research may assist with adoption.

Box 6.4 presents one case study that illustrates this third component: the Provonost Checklist.

4. Leadership Buy-In and Support from Key Stakeholders

Strong support at the senior management level within an organization adopting the research strategy is important for several reasons:[2]

1. *Leaders can provide financial support and help manage changes among personnel in adopting evidence-based practices.* Adoption of a new program may involve deviating from current practices. Leaders can facilitate the changes necessary at a particular site (e.g., hiring new staff, providing training) and can generate or advocate for financial support.
2. *Leaders can model engagement with research practices.* Through early adoption of practices by leadership, later-stage adopters of an innovation can observe the changes made within an organization and see how the program may work.
3. *Leaders can establish incentives for attending discussions or trainings to hear about novel research-based approaches.* Adopters on the ground can be encouraged and incentivized (e.g., with financial incentives, training certificates, freedom from duties for time spent) to learn about empirically supported approaches implemented both inside and outside the organization.
4. *Leaders can develop kickoff meetings, bulletins, fact sheets, and meetings that increase involvement in evidence-based care.* Leadership can promote awareness of the new practices through dissemination strategies aimed at increasing the visibility of the innovation to facilitate speedy adoption.
5. *Leaders can spread the word to others (i.e., within their organization or externally) who are interested in new programs.* Leaders can hold formal and informal discussions to promote awareness of a new program, both with adopters on the ground within their organization and with leaders at similar organizations.
6. *Leaders can create a network of supportive individuals, both inside and outside their organization, with similar interests.* Leaders and adopters on the ground can work collaboratively to support each other during the implementation of a new program. Leaders at similar organizations who have adopted the program can share what has worked and what has not worked at their site.

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[2]   This list is adapted from Bradley et al., 2004; Owen et al., 2006; Oxman et al., 1995; Rogers, 2003; and Yuan et al., 2010.

Box 6.4
Case Study: The Pronovost Checklist

Identified Need	Each year, central venous catheters given to patients in intensive care units (ICUs) are estimated to cause 80,000 bloodstream infections and up to 28,000 deaths.
Innovation	An anesthesiologist at Johns Hopkins University named Peter Pronovost developed a five-step checklist to minimize infections contracted by patients in hospitals who received a central venous catheter. The simple checklist reminded health care providers to (1) wash their hands prior to performing the procedure, (2) clean the patient's skin, (3) put sterile drapes over the patient, (4) wear sterile gloves and equipment, and (5) put a sterile dressing over the catheter site.
Research Support	Pronovost and colleagues pilot-tested the checklist in 2004 in one surgical ICU at Johns Hopkins Hospital and found its use virtually eliminated catheter-related bloodstream infections among patients there (Berenholtz et al., 2004). This efficacy study then led to two large-scale effectiveness studies in which the checklist was tested in 108 hospitals in Michigan (Pronovost et al., 2006). Thus, use of the checklist expanded beyond a single site to widespread practice and evaluation. Researchers found that rates of infection were reduced by 66 percent during the time the checklist was used in the hospitals. A follow-up study in Rhode Island found that infection rates fell by 74 percent across the state's 23 ICUs over a period of two and a half years (Lashoher and Pronovost, 2010). Researchers estimated that the checklist helped reduce hospital stays by a cumulative 608 days and saved approximately $2 million in health care costs.
Key Materials	A checklist posted in many hospitals in ICUs and surgical operating rooms.
Status of Diffusion	The checklist approach has now been widely adopted at many hospitals throughout the country.
Key Components of Diffusion	**Evidence of real-world effectiveness:** Evidence of quality research preceding effectiveness studies; efficacy study at single site used to support wider implementation across several sites in effectiveness studies **Evidence of an identified need:** Simplicity of implementation (i.e., checklist format); demonstration of cost savings and saving of lives **Leadership buy-in and support from key stakeholders:** Leadership support from DHHS **Collaboration with credible sponsors:** Partnerships with medical departments, hospitals, and other organizations **Provision of incentives or development of policies:** Ease of implementation in hospital settings; standardizes an approach providers already use **Peer network supportive of adoption:** Training and buy-in from providers; peer support and accountability (e.g., nurses can remind doctors to follow the checklist during procedures)

7. *Leaders can demonstrate the need for an innovation by presenting data or supporting attendance at conferences by adopters on the ground.* Leaders can work with researchers to demonstrate the need for an innovation to other leaders, policymakers, and adopters on the ground.

8. *Senior leadership can help increase coordination and synchronization among departments, disciplines, and organizations.* Because effective diffusion necessitates joint efforts among individuals and systems, leaders can help develop and manage the relationships needed for successful adoption.

The role of senior management is crucial in successfully adopting research into an organization's structure (Bradley et al., 2004; Yuan et al., 2010). Leaders are uniquely positioned to help facilitate the adoption of a program by supporting adopters on the ground prior to, during, and after the implementation phases. Successful case studies documenting reorganization within large health care systems attribute strong leadership to the successful implementation of change (Lukas et al., 2007). In sharing ideas across organizations, leaders can generate novel strategies for the diffusion of research findings among adopters. Cross-organization collaboration can also inform leaders about what may actually work on the ground.

Specific to the military population, the Air Force Suicide Prevention Program has demonstrated effectiveness in reducing the relative risk of suicide among service members exposed to a program with strong leadership support (Knox, Litts, et al., 2003). Leadership support included continued encouragement of senior leaders to promote protective factors for reduced suicide risk and urging personnel in need of help to seek resources early on. Utilizing many of the components outlined in this chapter, including continuous evaluation after implementation of a new program, the program has demonstrated effectiveness in reducing suicide risk in the Air Force since its implementation (Knox, Pflanz, et al., 2010).

Box 6.5 presents one case study that illustrates this fourth component: Project HOPE, Hawaii's Opportunity Probation with Enforcement.

5. Funding or Other Institutional Support

Any program needs some degree of funding to be successful in practice (Greenhalgh et al., 2004). Here, we address the various types of necessary funding.

Continued Research and Evaluation

The third component outlined in this chapter concerns the logical final step after a series of efficacy studies: developing an effectiveness study. These studies can be costly and require a large amount of resources. Thus, most studies supported by efficacy research do not get implemented into practice (Glasgow, Lichtenstein, and Marcus, 2003). Funding agencies can offer additional opportunities or incentives for effectiveness research, which may increase the number of effectiveness study trials on specific topics of interest. For example, Datillio, Edwards, and Fishman (2010) describe a mixed-methods paradigm that involves a series of parallel studies within a broader research project (see Appendix F for further details). These studies include RCTs complemented by project implementation and qualitative data collection, followed by systematic case studies once the project has been implemented. Having targeted funding opportunities that build in an effectiveness component may encourage more research of this type.

Funding agencies can also offer specific funding to evaluate preexisting programs that may have little empirical support. Thus, it is becoming increasingly important for funding mechanisms to promote effectiveness research (or research that can applied to real-world populations) so that findings can be applicable on a broader and more generalizable scale (Bradley et al., 2004; Yuan et al., 2010).

Incentivizing Adoption

Funding specified to help organizations adopt research-based programs could be made available. For example, SAMHSA offers discretionary funding accompanied by technical support to promote the adoption of evidence-based practices (Gotham, 2006). Another example is

Box 6.5
Case Study: Project HOPE, Hawaii's Opportunity Probation with Enforcement

Identified Need	Like many other states, Hawaii was experiencing a problem with its probation system. Convicted felons were failing to present for probation hearings and were declining to take mandatory drug tests. Despite this, the police, parole officers, and the courts were failing to take action against these infractions.
Innovation	In 2004, Circuit Judge Steven Alm garnered support from the police, local jail officials, parole officers, drug treatment professionals, prosecutors, and deference counsel to create Project HOPE (Hawaii's Opportunity Probation with Enforcement), which would provide "swift and certain" penalties for parolees violating the conditions of their parole. Felons were told at their initial hearings that probation would be more strictly enforced with penalties. It was hypothesized that certainty and swiftness would be more effective than severity. Project HOPE features (1) a focus on reducing drug use and missed appointments rather than imposing drug treatment on all felons, (2) reduced costs and less resource usage by having probationers appear in court only if a violation is detected and by mandating drug treatment only for repeated failed drug tests, (3) reduced costs to society by having probationers who are employed serve jail time on the weekends so they can continue their employment, and (4) reduced length of stay in prison and in treatment centers for first-time offenders so that those who need care the most can receive treatment in residential treatment centers.
Research Support	Project HOPE leaders teamed with researchers at the University of California, Los Angeles, and Pepperdine University to empirically evaluate the effects of the program. An RCT was conducted in Hawaii to examine reductions in drug use and missed appointments and to determine the cost-effectiveness of the program. The NIH funded the trial, which included nearly 500 men and women identified as being at risk for parole violations (e.g., methamphetamine users, sex offenders, domestic violence offenders). Two-thirds participated in Project HOPE, while the other one-third received probation as usual. After one year, compared with a control group, Project HOPE probationers were 55 percent less likely to be arrested for a new crime, 72 percent less likely to use drugs, 61 percent less likely to skip appointments, and 53 percent less likely to have their probation revoked. Project HOPE probationers also served less time in jail.
Key Materials	Project HOPE's studies are available online. The widespread adoption of policies at the state level can be applied to jurisdictions through written policies describing the approach.
Status of Diffusion	Today, more than 3,000 probationers (about 40 percent of convicted felons) in Hawaii participate in Project HOPE (Alm, 2010). Project HOPE is now being evaluated for long-term effectiveness (five years post-participation). Four other states have used Project HOPE: Oregon, Massachusetts, Texas, and Arkansas. The Research Triangle Institute has paired with Pennsylvania State University to continue evaluating further outcomes of the program.
Key Components of Diffusion	**Leadership buy-in and support from key stakeholders:** Strong senior leadership within the courts; support from senior leadership with courts and at the state level created a collaborative effort among the courts, probation officers, police, drug treatment centers, and researchers; successful judges/courts served as role models, and Hawaii serves as a role model for other state jurisdictions **Evidence of an identified need:** Fit the needs of an identified problem with the system in use **Evidence of research quality:** Strong empirical support; continued evaluation **Evidence of real-world effectiveness:** Studies in development in several states **Collaboration with credible sponsors:** Collaborative research effort; courts paired with university researchers and assessed outcomes and cost-effectiveness **Peer network supportive of adoption:** Buy-in from several jurisdictions

the Patient-Centered Outcomes Research Institute, an independent, nonprofit health research organization established in 2010 under the Patient Protection and Affordable Care Act. The institute's research agenda involves funding projects that seek to facilitate the use of research evidence to meet the needs of patients, caregivers, and health care professionals. Thus, effectiveness research is made a priority up front in funding announcements and preference is given to projects that attempt to make research knowledge available to patients and providers in a timely manner. This can involve sharing knowledge of research hypotheses and strategies with those on the ground at the initial phase of the research, rather than as an afterthought once the study is completed. This approach helps facilitate mutual decisionmaking between care providers and patients.

Additional forms of support are necessary for successful diffusion, including managed-care reimbursements to encourage broad-scale implementation across sites (e.g., Lashoher and Pronovost, 2010; Swenson, 2000). Reimbursing hospitals, clinics, and installations for using empirically supported programs can provide further incentives for organizations to learn about and adopt these programs. For example, managed-care companies support the use of DBT for hospital patients with BPD. This has been attributed as a major factor supporting the widespread adoption of DBT among providers.

Support Infrastructure

Programs need continued dedicated support to keep running. Support infrastructure is a key element of diffusion, such as money to support and incentivize staff, to keep program materials current and suitable for dissemination among targeted individuals, and to support the technology or media necessary to continue the program. It may be necessary to hire dedicated staff to run the program, and an approach that has been successful in helping new programs continue to meet their goals (see, e.g., Daschner et al., 2000; Lapane et al., 2011). Dedicated funding that is used for program needs only can also help ensure that there is adequate financial support to keep the program active. Leadership can help in obtaining and sustaining the resources needed.

Box 6.6 presents one case study that illustrates this fifth component: Project ALERT.

6. Collaboration with Credible Sponsors

The process of research diffusion is slowed when significant effort is required to coordinate across departments or disciplines within organizations (Bradley et al., 2004). Similarly, the adoption of research-based practices can be slowed if there is not already an established working relationship between the dissemination infrastructure and the adopting organizations (Bradley et al., 2004; Yuan et al., 2010).

It can be challenging to garner support from personnel and create cohesive care teams across multiple departments and disciplines. Thus, forming a coalition of credible sponsors is important for successful diffusion. Coalitions of federal, national, and state organizations have increased the credibility of practices and helped raise awareness of campaigns (Berwick, 2003; Berwick et al., 2006; Wachter and Pronovost, 2006). Programs that have successfully diffused research into practice have the breadth and geographic diversity of the partnering organizations that support them (Yuan et al., 2010). If "ownership" of a program is shared across many departments, commitment to the program across an organization can be increased. Indeed, improvement initiatives that actively engage staff in change decisions and involve staff at all organizational levels in developing goals are successful components of effective system-

Box 6.6
Case Study: Project ALERT

Identified Need	Middle school and high school are at-risk periods for the initiation of alcohol and other drug abuse. There have been multiple drug prevention programs for students at these grade levels but very few with any empirical support.
Innovation	Project ALERT was established in 1984 as a school-based alcohol and drug use prevention program for seventh- and eighth-grade students. It was developed with a focus on early prevention to provide knowledge about drugs' effects and to teach drug refusal skills (e.g., overcoming social pressure). Project ALERT trained teachers to deliver a multisession curriculum to students in their classrooms. The program has been endorsed by several agencies with their highest levels of support. For example, Project ALERT was endorsed by SAMHSA in 1999 as a "model program," and the U.S. Department of Education gave Project ALERT its "exemplary program" rating in 2001. The program also has a "proven effectiveness" rating from the Promising Practice Network on Children, Families and Communities.
Research Support	The program of research followed by the Project ALERT team is a model for diffusing a program using pilot-testing and efficacy studies, effectiveness studies, and continued evaluation (e.g.,Ellickson and Bell, 1990; Ellickson, Bell, and McGuigan, 1993; Ellickson, Tucker, and Klein, 2003; Tucker, Ellickson, and Klein, 2002). The program was pilot-tested using an efficacy study in the mid-1980s at 30 middle and junior high schools in California and Oregon. Compared with a control group, Project ALERT students used cigarettes and marijuana less frequently. Using findings from the efficacy study to design the program for diffusion, materials were standardized and tested for effectiveness beginning in 1995. More than 4,000 students in 55 middle schools in South Dakota participated in the program; compared with controls, the program demonstrated preventive effects on alcohol and drug use over two years.
Key Materials	Project ALERT researchers created a website that offers free, interactive training with videos, published materials (e.g., manuals, posters), and practice scenarios. Materials are also available in Spanish. The training is available to teachers and facilitators from a variety of backgrounds in diverse settings. The website offers training both prior to and after implementation of the program, with fidelity measures and feedback to support quality assurance.
Status of Diffusion	Project ALERT has become a well-known and well-diffused alcohol and drug prevention program used by more than 3,500 school districts in every state. More than 18,000 classroom teachers are trained to deliver the 14-lesson curriculum. Current research efforts include four- and five-year outcome studies of the program in several middle schools throughout the country, as well as an empirical study of the added benefit of implementing booster sessions for students once they are in high school.
Key Components of Diffusion	**Funding or other institutional support:** Endorsement by SAMHSA and the U.S. Department of Education; National Institute on Drug Abuse and foundation support; dedicated funding to sustain the program

Evidence of an identified need: Empirically supported prevention efforts needed for adolescents

Evidence of research quality: Strong program of research efficacy; continued evaluation

Evidence of real-world effectiveness: Implementation in more than 3,500 school districts throughout the country

Dissemination materials: Accessible, free online training and materials; fidelity checks |

wide change in the organizational structure (Lukas et al., 2007). Leadership can assist in this effort by promoting innovations while modeling and incentivizing successful collaboration between and within organizations. Establishing collaborations among an organization's leadership (including senior leaders and key stakeholders), researchers, and individuals on the ground creates a joint effort supporting an identified target (Bradley et al., 2004; Yuan et al., 2010).

Research institutions are uniquely positioned to understand how efficacy and effectiveness studies work, and partnering with academic researchers can help inform efforts on the ground. Accounting for the unique perspectives of providers, line leaders, and adopters is also essential to understanding how an innovation may be implemented into practice. Organizations, decisionmakers, and target audiences can all be involved in the development of efficacy studies in the planning stages. Researchers can also work with community partners to research ideas that are relevant to their organization. For example, providers in the field with military personnel can share their ideas with researchers about what they believe works based on anecdotal experience. This approach also helps study designers better understand the needs of the system they are working to improve (e.g., making sure to include enough ethnic minority participants in a sample to make the sample generalizable to the organization's demographics). Researchers can then design studies to identify why a particular approach may be efficacious and involve the community in all levels of the experimental design process. This can also help facilitate data collection and promote more enthusiasm for findings, because community members have an investment in the research.

Box 6.7 presents a case study that illustrates this sixth component: nail gun safety.

7. Provision of Incentives or Development of Policies

Providers are open to learning about findings from research studies and generally express positive opinions about research accomplishments (Cook, Biyanova, and Coyne, 2009; Stewart, Stirman, and Chambless, 2012), but they often do not learn about research strategies because of limited time, costly training, or a lack of opportunity (Pagoto, 2007; Riley et al., 2007). There are also limited resources and incentives for providers to learn about research. In addition to providers, nonclinical support staff and adopters on the ground (e.g., chaplains, substance abuse program counselors, transition assistance advisers, suicide prevention coordinators) may not have the expectation to publish or the continuing education requirements that would incentivize them to stay current on research and evaluation. In the military, front-line leaders and personnel working closely with service members may not have the time, flexibility, or interest to review journal articles and technical reports. Personnel who do not specialize in suicide prevention may not be fully aware of the latest developments in the suicide prevention field.

It is important that those who are interested in diffusing research studies into practice incentivize those on the ground to implement the targeted programs. This can be done by providing incentives and developing policies to ensure smooth transition of a research program into new settings. Here, we review some common types of incentives.

Continuing Education

Providers can be given more educational opportunities, such as a chance to attend conferences (or a requirement to do so). There could be financial incentives for learning about new research strategies, such as a gift card for providers who attend an on-site research talk that would typically be attended by researchers only. It may be helpful to have a data interpreter who can

Box 6.7
Case Study: Nail Gun Safety

Identified Need	Nail gun injuries account for about 40,000 emergency department visits each year, with 60 percent among construction workers. The rest of the injuries (40 percent) are among non–construction worker consumers (Center for Construction Research and Training, 2012).
Innovation	The National Institute for Occupational Safety and Health (NIOSH) has developed a policy program called Research 2 Practice, which sponsors research on several issues related to safety and health among workers. Research 2 Practice also helps disseminate practical findings about how to reduce risks. One of these issues is nail gun safety, which is a collaborative research and awareness effort fronted by the Center for Construction Research and Training.
Research Support	The Center for Construction Research and Training designed a series of multiyear studies in a collaborative research effort with Duke University researchers, carpenters in St. Louis, and regional homebuilders associations to determine the extent of nail gun injuries and the safest type of nail gun. The researchers asked more than 2,000 construction workers to complete a written questionnaire about the nail guns they used. They then conducted in-depth interviews with a subsample of 500 of workers who had reported a nail gun injury. Study participants also received training on the safe use of nail guns. Findings from the studies revealed that sequential-trigger nail guns (i.e., on which the nose of the gun must be pushed in before trigger can be pulled) were safer than contact-tip nail guns (i.e., those that fire when the trigger is squeezed and the tip touches something, also known as "bump nailers"). The researchers found that the risk of injury was double for contact-tip nail guns, with a 55-percent reduction in the risk of injury when using sequential-trigger nail guns. Construction workers and employees selling nail guns were unaware of these risks and were not properly trained in nail gun safety (Lipscomb et al., 2011).
Key Materials	Study findings and the dissemination efforts of Research 2 Practice led to the creation of several fact sheets on nail gun safety (Center for Construction Research and Training, 2012), guidance documents (e.g., *Nail Gun Safety: A Guide for Construction Contractors*, published by the NIOSH and the Occupational Safety and Health Administration [2011]), and an interactive website with safety tools and guidelines.
Status of Diffusion	A nail gun safety website has had more than 250,000 unique visits since 2011. Trainings were developed to reduce the risk of injury among construction workers and employees selling nail guns.
Key Components of Diffusion	**Collaboration with credible sponsors:** Commitment from a multiyear initiative from academic researchers, labor, and management; guidelines generated for guidance documents incorporated feedback from research participants (including those who had suffered an injury) and experts **Evidence of research quality:** Researchers continue to conduct research and share their findings with key government agencies, insurance companies, and consumers to spread the message about nail gun safety **Evidence of an identified need:** Nail gun injuries were sending more than 40,000 people to emergency departments each year **Evidence of real-world effectiveness:** Evaluation of knowledge and awareness of nail gun safety **Leadership buy-in and support from key stakeholders:** Leaders at NIOSH headed the effort **Funding or other institutional support:** Sponsors interested in funding the program **Peer network supportive of adoption:** Training for construction workers and store employees in nail gun safety **Dissemination materials:** Fact sheets, interactive website, guidance documents

serve as a point person between a research setting (e.g., the university) and the practice setting (e.g., the university-affiliated hospital) who can summarize efficacy and effectiveness research findings on a regular basis through briefings, presentations, or easy-to-follow emailed summaries.

Incentivizing Adoption

As discussed in connection with the fifth component earlier in this chapter, funders can contribute to diffusion efforts by funding projects that seek to facilitate the use of research evidence in practice (effectiveness research). Effectiveness research can be specified up front in funding announcements, with priority given to projects that incorporate transferring information obtained from the research study (e.g., what is effective and for whom) to patients and providers.

Guidelines

If providers determine that guidelines for care are too complex, they are typically less likely to follow them (Davis and Taylor-Vaisey, 1997; Francke et al., 2008; Lomas, 1993). There is a greater chance that a guideline will be carried out when it is easily understood, straightforward, and relatively simple implement (Rogers, 2003; Yuan et al., 2010). However, this can prove difficult when creating guidelines for use by multidisciplinary groups, which may have varying levels of expertise and knowledge.

In the health care field, clinical practice guidelines (CPGs) have been created to help bridge the gap between research and practice. CPGs can be seen as facilitators of policy changes because they were first created after system-wide policy changes were met with resistance from providers. CPGs are based on systematic literature reviews and recommendations by experts and are intended to guide practitioners through a series of decisions when implementing a treatment plan (Anderson et al., 2002; Field and Lohr, 1990). CPG implementation is followed by dissemination, which is a multistage process that involves making practitioners aware of guidelines and tracking whether they are followed. It is no surprise that providers cannot follow a clinical practice guideline if they are not aware of its existence, even after widespread dissemination (Cabana et al., 1999).

An example of a CPG is the *VA/DoD Clinical Practice Guideline for Assessment and Management of Patients at Risk for Suicide* (VA and DoD, 2013), which outlines a series of steps clinicians can take if a patient expresses suicidal ideation or meets a specific threshold for recommended care on a self-reported measure of behavior. It focuses on standardizing practices across the VA and DoD to help improve patient outcomes while providing evidence-based recommendations to help providers make decisions about how to assess and treat patients at risk for suicide.

In sum, given time constraints and varying levels of interest in research findings, it may be necessary to provide more incentives and educational opportunities for those on the ground who are expected to adopt a new program. CPGs bridge the gap between research and practice and help with adoption after policy-level changes occur within an organization.

Box 6.8 presents one case study that illustrates this seventh component: evidence-based practices for PTSD in the Veterans Health Administration (VHA).

Box 6.8
Case Study: Evidence-Based Practices for PTSD in the Veterans Health Administration

Identified Need	Increasing numbers of veterans were seeking care for PTSD through the VHA. The VHA was not utilizing the available empirically supported interventions for PTSD treatment. The standard of care was lengthy, costly, and not evaluated for effective outcomes.
Innovation	DoD partnered with the VHA to implement a large-scale rollout of two cognitive behavioral treatments for PTSD with the greatest degree of research-supported efficacy (prolonged exposure and cognitive processing therapy; Karlin et al., 2010). The effort to train thousands of providers, provide consultations, and evaluate outcomes was made possible by the VA/DoD CPG for PTSD (VA and DoD, 2010), which stated that the interventions are always indicated and appropriate when treating veterans for PTSD.
Research Support	The VHA effectively rolled out the therapies (Karlin et al., 2010) and more than 4,000 VA and DoD mental health staff have been trained (Chard et al., 2012). There is a large research base supporting both prolonged exposure and cognitive processing therapy with civilian and veteran samples.
Key Materials	Trainers and resources are available in VA settings, including a point person for each region who trains providers in the approaches and training other providers in the system. Regular consultation is offered, including conference calls with intervention developers, and providers are given incentives for participating in the trainings (e.g., becoming a certified cognitive processing therapy provider, which can help with job opportunities in the future).
Status of Diffusion	With the aid of leadership and increased funding for positions such as evidence-based psychotherapy coordinators and a PTSD mentoring program, the VHA is now a leader in effective PTSD treatment and a model for PTSD care throughout the country.
Key Components of Diffusion	**Provision of incentives or development of policies:** Incentives offered throughout dissemination process; VHA-wide policy change to offer prolonged exposure or cognitive processing therapy for all PTSD cases; CPGs accompanied by trainings, consultations, and mentorship **Evidence of an identified need:** Diagnoses of PTSD among service members returning from Iraq and Afghanistan; recognized need for empirically based interventions **Evidence of research quality:** Rollout of two interventions cited as efficacious in multiple research studies with civilians and veterans **Leadership buy-in and support from key stakeholders:** Leadership at both the federal and local levels mandated training in prolonged exposure and cognitive processing therapy; consultation opportunities **Funding or other institutional support:** Dedicated funding for trainers, mentors, and point person on site **Collaboration with credible sponsors:** VA-DoD partnership **Peer network supportive of adoption:** Decentralized training in which trainees become trainers, promoting widespread diffusion; supervisors train interns and practicum students

8. Peer Network Supportive of Adoption

The importance of peers in disseminating research findings cannot be overestimated. Health care providers learn about innovations through informal channels and sometimes cannot even identify where they first learned about a new practice (Miller et al., 2006; Rosen, 2000). They also typically guide their treatment decisions based on experience or consultation with others. Studies have documented that health care providers are generally more comfortable with infor-

mation they receive from colleagues than what they find in research articles or books (Cohen, 2007; Cohen, Sargent, and Sechrest, 1986; Morrow-Bradley and Elliott, 1986), and they use patient information rather than research to inform treatment plans (Dattilio, Edwards, and Fishman, 2010; Stewart and Chambless, 2007; Stewart, Stirman, and Chambless, 2012). Rogers (2003) refers to "observability": the extent to which the benefits of a new practice can be observed by others.

Although providers are interested in learning about innovative research strategies, they generally rely on their peers for information about research-informed practices (Cook, Biyanova, and Coyne, 2009; Stewart, Stirman, and Chambless, 2012). Consultation with credible peers may be an important avenue for the diffusion of research into practice (Tan, 2002). It is likely that similar practices exist among non–health care providers who may be key players in diffusing research (i.e., installation leaders, chaplains, or even noncommissioned officers).

Providers and those on the ground who are implementing the research into practice are perhaps the most important targets of diffusion efforts. Thus, it is essential to understand how diffusion occurs through peer networks among these individuals. Many times, it takes a few early adopters of an innovation to champion diffusion (Rogers, 2003), because these individuals promote the practice, model for others, and reinforce successful adoption for their peers.

As research programs are diffused into practice, the process of adoption typically follows an S-shaped curve (Rogers, 2003). Diffusion typically begins at a relatively flat rate, with a few innovative providers and opinion leaders in the early adoption phases. The curve turns upward with a steep incline as the early majority adopts the innovation. The S-curve begins to level out and will plateau as skeptical late adopters eventually adopt the innovation. The pattern reveals that it is important for leaders and a small group of providers to adopt the innovation in the beginning stages, to be seen adopting the innovation by peers, and, in turn, to influence the eventual adoption of the practice over time. Rogers (2003) has identified five categories of innovation adopters (see Table 6.2).

Table 6.2
Rogers' Categories of Innovation Adopters

Adopter Type	Description
Innovators	Venturesome individuals who tend to be the earliest adopters. These individuals tend to be the ones pushing for change and have the financial resources and connections to institute change. They have the ability understand the complexity of a new idea and to cope with the uncertainty that may accompany it. These individuals require a shorter adoption period than those in any other category.
Early adopters	Opinion leaders who try out an innovation in a careful manner. These individuals are respected by their peers, and they become a source of modeling and advice for those in the later stages of adoption.
Early majority	Those who interact frequently with peers but who may not hold positions of opinion leaders within a system. These individuals are an important link between early and late adopters. They deliberate before adopting an innovation but seldom take the lead in adoption.
Late majority	Individuals who are typically skeptical, who may require some convincing or pressure to adopt an innovation. This may come in the form of peer pressure or economic necessity. Most of the uncertainty about an innovation's potential effectiveness must be resolved before these individuals adopt the program.
Laggards	Those who possess no opinion leadership and are slow to adopt an innovation. They are resistant to change and suspicious of innovations that depart from traditional or past ways of doing things. They typically will adopt an innovation only if it becomes mainstream or a new tradition.

The importance of peers is also evident at an organizational level, where social pressure between organizations can promote adoption. If one organization or installation is implementing a program or innovation with research support and receiving accolades, funding, or attention for doing so, there is social pressure for another organization to adopt the model (Yuan et al., 2010). Thus, coordination between peer organizations can help with the diffusion process as organization leaders and providers share empirical findings with others. Discussions with senior leaders in these organizations can also facilitate this social pressure.

Formal Peer Involvement

The process of diffusion can follow a hierarchical structure initiated by senior leaders—discussed in connection with the fourth component, leadership buy-in and support from key stakeholders—and disseminated through formal channels (e.g., training). At the beginning of an initiative, centralized training is important for standardizing procedures, generating rapid implementation, and safeguarding training quality and adherence (Karlin et al., 2010). The next step to broader-scale implementation is decentralized training, in which trainees of the certified trainers become certified themselves and train others within an organization. Thus, in coordination with leadership support (the fourth component), they can diffuse knowledge of current research practices with the anticipation that others will share this knowledge with subordinates and peers throughout the system. A hierarchical structure of research dissemination through peer networks may facilitate the diffusion process. It can also help move the program toward decentralized training. One of the most successful national suicide prevention programs for youth, Sources of Strength, trained peer leaders to disseminate materials about suicide prevention and recognize signs to refer friends who may need adult assistance with mental health concerns (Wyman et al., 2010). Peer leaders helped change the culture on campuses by changing students' perceptions that adults at the school would be able to help them if they were considering suicide. Peer leaders also helped increase the acceptability of seeking help from adults if needed.

Informal Peer Involvement

The Bass Forecasting Model (Mahajan, 2002) suggests that new ideas are more likely to get adopted when there is face-to-face contact with peers. That is, while ideas can be spread through mass media campaigns, real change occurs only when individuals can put an identity to the source of the information, particularly when peer sources are credible, local, and consistent in their messages (Perlick et al., 2011). For example, peers can play an important role in stigma reduction, which is an area of major concern related to military suicide. Best-practice suggestions for social marketing campaigns aimed at strategic stigma change (Corrigan, 2011) state that contact with peers is fundamental to public stigma change and that peer contact needs to be targeted, credible, continuous, and local (e.g., face to face). These factors can help disseminate messages about mental illness with an eye toward cultural change. (See the case study on In Our Own Voice in Box 6.9 for an illustration of this process.)

Adoption generally also occurs through informal channels in which peers interact and discuss programmatic changes with each other. Leaders and providers on the ground may be as important as administrative leaders in this regard (Barth and Sherlock, 2003), because they may better understand the culture of personnel working with service members and the day-to-day responsibilities that may hinder time and effort needed to learn about new research

Box 6.9
Case Study: In Our Own Voice (National Alliance on Mental Illness)

Identified Need	Public stigma around individuals with mental illness is well known.
Innovation	The National Alliance on Mental Illness developed a program in 1995 through a grant from the Lilly Foundation to combat stigma related to mental illness. In Our Own Voice is a brief (60-minute) live presentation with videos presented by two trained alliance members with mental illness. The presentation focuses on educating the community about individuals with mental illness and how these individuals can lead productive lives as they recover and cope (NAMI, 2011).
Research Support	Controlled and noncontrolled evaluation studies have demonstrated that the program reduced stigma attitudes and increased knowledge about mental illness among undergraduate and graduate students (Rusch et al., 2008; Wood and Wahl, 2006). It has also been shown to be more effective than clinician-delivered interventions in reducing stigma among family caretakers of individuals with mental illness (Perlick et al., 2011).
Key Materials	Free videos, trainings, and available and accessible presentations promote engagement among students, family members, and community members.
Status of Diffusion	Since its inception, the program has reached over 275,000 people and reports that it currently reaches over 50,000 people per year (NAMI, 2011, p. 6). It is available free of charge and can be delivered in a variety of settings, from family homes to elementary schools and university medical school classes.
Key Components of Diffusion	**Peer network supportive of adoption:** Utilization of peers during free presentations to educate communities and families; targeted, credible, continuous, and local contact with peers **Evidence of an identified need:** Stigma about mental illness is pervasive **Evidence of research quality:** Controlled research studies indicate that attitudes can change after presentations **Funding or other institutional support:** Grant support and donations; endorsed by SAMHSA's National Registry of Evidence-Based Programs and Practices **Dissemination materials:** Free of charge, available and accessible, brief (one hour)

approaches. Discussions between individuals at all levels in the hierarchy can help inform the adoption process and troubleshoot problems that may hinder successful adoption.

Box 6.9 presents one case study that illustrates this eighth component: In Our Own Voice, a program developed by the National Alliance on Mental Illness.

9. Dissemination Materials

Dissemination materials can be used to educate providers, line leaders, and those on the ground about current and innovative research findings that can help inform their practices. These materials can also assist with efforts to diffuse research into practice. Websites, brochures, pamphlets, and marketing campaigns can help translate "jargon-y" academic research findings into layman's terms for individuals who may not typically read empirical articles in journals. Providers on the ground are open and willing to learn about findings from research studies if they are presented in a less esoteric manner (Cook, Biyanova, and Coyne, 2009; Stewart, Stirman, and Chambless, 2012). Successful campaigns have developed practical implementation tools (e.g., toolkits, newsletters, success stories) and support (e.g., webinars, conference calls,

trainings) to assist providers in implementing new practices (Yuan et al., 2010). These tools help address what Rogers (2003) refers to as "simplicity": the ease of use or the perception that a new practice is easy to understand and implement.

Toolkits

Dissemination materials can include established toolkits to assist those interested in implementing a new program at their site. Several examples of successful toolkits are available and can help guide the successful adoption of an innovation or evaluation of an already established program. These toolkits are designed for researchers seeking to diffuse an innovation, as well as organizations seeking to adopt one; examples are provided in Table 6.3.

Media

It is also important to highlight programs' media exposure that can be considered "dissemination material." This is particularly relevant for military suicide research, for which there is some research support indicating that portrayals of suicide in news reports, film, web content, and interactive training materials can increase the risk of suicide contagion (Hoge and Castro, 2012; Pirkis and Nordentoft, 2011). By extension, it is critically important that media portrayals of innovative programs be carefully planned. Because the recent exposure of service member deaths by suicide has prompted more research and attention to this highly important area, it is essential to recognize that many programs will receive media coverage that may not be empirically based. That is, a new program may appear attractive because it attempts to solve a difficult problem; however, until there is quality research supporting the innovation, caution must be taken prior to adoption. On the flip side, media exposure of an empirically supported

Table 6.3
Examples of Toolkits to Promote Dissemination of Research Findings

Toolkits for Researchers	Toolkits for Organizations
AHRQ has developed a research dissemination plan tool for researchers to use when designing research studies (Carpenter et al., 2005). The tool begins with a question about what the final dissemination product will look like, who is intended to benefit, and how to help targeted organizations or providers implement the practice. It includes open-ended questions to help researchers make a plan for dissemination in the early stages of research design.	The national dissemination plan developed by the VA's Mental Health Quality Enhancement Research Initiative (Smith et al., 2008) is designed to disseminate and spread information about evidence-based collaborative care for depression in primary care settings. The plan outlines several approaches to effectively disseminate collaborative care for depression in the VA, such as collecting data, documenting activities, evaluating goals and flexibility, identifying barriers and facilitators to the process of adoption and unintended consequences, and soliciting perspectives from stakeholders and providers to prepare for dissemination.
Getting To Outcomes™: Promoting Accountability Through Methods and Tools for Planning, Implementation, and Evaluation is a toolkit to assist established programs in evaluating their goals and outcomes (Chinman, Imm, and Wandersman, 2004). Such a toolkit may be particularly important when programs are ingrained into organizations but lack empirical support. The toolkit contains worksheets and materials to guide the evaluation of outcomes by (1) recognizing needs, goals, and desired outcomes; (2) identifying the best-practice approaches to meet these goals; (3) assessing the program's fit and the organizational capacity needed for implementation; and (4) conducting initial and continuous evaluation.	AHRQ's *Preventing Falls in Hospitals: A Toolkit for Improving Quality of Care* is a toolkit for preventing falls in the hospital (AHRQ, 2013; this toolkit is described in more detail in Box 6.10). It provides many important recommendations for translating research into practice (Hempel et al., 2012).

program can help promote the importance of evidence-based care among the general public. Training for program representatives on how to speak to the media about new findings can help the general public, policymakers, and others outside academic research settings better understand the state of the research field in a particular area and why research-informed programs are the best method for addressing a problem.

Technology

As technology becomes more advanced, research findings are becoming more accessible to nonacademics. Many journal articles are freely available online, as are many empirically validated training manuals and assessment measures. Computer-based training programs can be made accessible to providers, as can briefings, podcasts, or video announcements. It is no longer a requirement to attend meetings or presentations in person, because more and more professional conferences stream research talks online.

CPGs (discussed in connection with the seventh component, provision of incentives or development of policies) can also incorporate new technology to help with dissemination. An example of a computer-delivered CPG is outlined by Weingardt and Villafranca (2005). The program follows the structure recommended by the *VA/DoD Clinical Practice Guideline for Management of Substance Use Disorders* (VA and DoD, 2009) to train practitioners in treating alcohol-withdrawal syndrome using a decision tree. The course follows a case example and instructs viewers in an interactive and engaging manner how to provide adequate care for the patient. The training is brief and interactive, and it contains just enough information "to get the job done." Nursing staff rated the program as easy to use, useful, and appropriate for their needs.

In sum, dissemination materials can assist with the diffusion of innovations. Successful programs utilize websites, brochures, pamphlets, and marketing campaigns, among other approaches. Careful attention should be paid to the media portrayal of new practices developed to address highly publicized issues. Toolkits are available to assist with dissemination planning.

Box 6.10 presents a case study that illustrates this ninth component: AHRQ's *Preventing Falls in Hospitals Toolkit.*

10. Expectation of a Cultural Shift

Rogers (2003) refers to "compatibility," or how well a new practice fits with the potential adopter's current experience, values, and goals. Individuals exist within a social system consisting of other individuals, groups, organizations, and subsystems, with a common goal of solving a particular problem with the innovation. These individuals may have different goals, expectations, values, or beliefs related to an innovation, which can delay adoption.

Adopters on the ground are more likely to adopt a new program if it matches their current experiences, values, and goals, and it will be important to demonstrate this fit. Research, programs, and campaigns designed with an adopting organization's goals in mind may be better poised for successful adoption (Yuan et al., 2010).

Nonetheless, it is important to understand that the natural process of adoption takes time. Innovations are adopted according to a *time* dimension informed by (1) the process by which an innovation passes from first knowledge/awareness to actual adoption, (2) the relative time frame of the adoption (e.g., early or late adoption, as addressed in our discussion of the eighth component), and (3) the rate of adoption and number of members in a system who adopt the innovation within a given period (Rogers, 2003).

Box 6.10
Case Study: Preventing Falls in Hospitals Toolkit

Identified Need	Between 700,000 and 1 million patients fall in hospitals each year, leading to injuries and increased health care costs. However, many hospitals do not have standard practices in place for fall prevention.
Innovation	In a joint effort by the RAND Corporation, Boston University's School of Public Health, and the ECRI Institute, researchers developed an online toolkit for hospitals to develop, implement, and sustain a fall prevention program (AHRQ, 2013). The toolkit's recommendations were generated from a systematic review of the available literature and, where lacking or limited, expert opinion about best practices for hospital fall prevention.
Research Support	The toolkit is based on a systematic literature review and expert opinion consensus; however, it was released only recently and evidence supporting its utility is not yet available.
Key Materials	The toolkit contains a bibliography and citations throughout that direct the reader to literature supporting each of the recommendations (Hempel et al., 2012). Six questions guide the consumer through a series of recommendations and step-by-step processes for fall prevention programs: (1) Are you ready for this change? (2) How will you manage change? (3) Which fall prevention practices do you want to use? (4) How do you implement best practices in your organization? (5) How do you measure fall rates and fall prevention practices? and (6) How do you sustain an effective fall prevention program? The toolkit was released only recently; thus, evidence supporting its utility in facilitating the implementation of programs has not yet been evaluated.
Status of Diffusion	The toolkit is offered online and free of charge. Provider training will help evaluate the program.
Key Components of Diffusion	**Dissemination materials:** Development of an online toolkit for creating programs; discussion of several other key components of diffusion to overcome difficulties and assist with program implementation **Evidence of an identified need:** A program was needed to prevent accidental, preventable falls in hospitals; demonstrated a need for the program to leaders, stakeholders, and staff; continued evaluation and modification if necessary **Collaboration with credible sponsors:** Collaboration among researchers, universities, and hospitals **Peer network supportive of adoption:** Implementation team; peer support and advocacy of the program; encouraged continued enthusiasm and support for program **Provision of incentives or development of policies:** Provider training and incorporation of feedback to improve program **Expectation of a cultural shift:** Understanding of cultural change process; balanced with other priorities for the population

One should anticipate resistance to cultural changes when providers and adopters on the ground are expected to implement a new program: Habits of providers are hard to break. While it is recommended that practitioners modify their old beliefs that certain approaches are the only ones that work (Carlton, 2012), this is particularly difficult because providers base many of their decisions on previous experience with patients rather than on research, especially in the absence of research evidence to the contrary (Dattilio, Edwards, and Fishman, 2010; Stewart and Chambless, 2007; Stewart, Stirman, and Chambless, 2012). If providers are more

open to the possibility that something else may work better—in addition to or opposed to their standard approach—research findings may inform practical work more clearly.

It is also important to recognize that no approach—whether evidence-based or not—will work all the time with every person or in every situation. However, evidence-based practices have been given a level of scientific rigor not accorded to anecdotal experiences with patients. There is a traditional belief that clinicians resist adapting beyond their training; however, research indicates that providers are relatively open to trying new evidence-based approaches (Dattilio, Edwards, and Fishman, 2010; Stewart, Stirman, and Chambless, 2012). Still, when programs appeal to a variety of theoretical orientations or backgrounds and fit an identified need, an innovation may be particularly welcomed (e.g., Swenson, 2000).

In addition, a key principle of diffusion is *reinvention* (Charters and Pellegrin, 1973; Rogers, 2003), and organizations should recognize that innovations evolve over time to meet the needs of a population. Challenges are expected when attempting to adopt a research practice, and programs can prepare for those challenges ahead of time. Part of reinvention is involving key players in the diffusion process and incorporating feedback to improve or modify the innovation. By making adopters users in the process of redevelopment, the innovation is more likely to be adopted, accepted, and transmitted among peers. For example, videogame companies typically receive feedback from players on the game's design; the process can lead to more investment in the innovation and a sense of ownership, which, in turn, may translate to successful diffusion.

The cultural change accompanying new program adoption will likely vary greatly depending on the topic area, organization, individual personalities, and timing of the implementation. Following the other nine components of effective research diffusion will help overcome this barrier to change, but it should still be anticipated and planned for accordingly. For example, understanding that there will be a late majority and laggards during the adoption process (Rogers, 2003) can help leadership and stakeholders encourage participation in the new program by providing incentives and peer support throughout the transition process. In addition, providing training and demonstrating a need to those on the ground may also assist with expediting the adoption process.

New practices can not only affect provider culture, but they can also alter the values and beliefs of the organization (Bradley et al., 2004). This can involve viewing program recipients in a different way and treating them in a different manner. It could also include recruiting volunteers. Staff members may have to think about their roles differently and work as a team across disciplines. Again, patience will be crucial during this time. Providing training and continued support to staff (e.g., through peer supervision and on-site resources) have been successful approaches in facilitating the continued adoption of new programs among resistant providers (e.g., Harms and Garrard, 1998; Karlin et al., 2010; Swenson, 2000).

Box 6.11 presents one case study that illustrates this tenth component: the 100,000 Lives Campaign.

Conclusion

In this chapter, we outlined ten components for successfully adopting research programs in practice. The first three components we identified focus on *demonstrating* that the program is needed, has the potential to be successful at a particular site, and is rooted in scientific evi-

Box 6.11
Case Study: The 100,000 Lives Campaign

Identified Need	Deaths in hospitals can be prevented by improvements in safety and the effectiveness of health care approaches.
Innovation	The 100,000 Lives Campaign is a national initiative aimed at preventing 100,000 hospital deaths (Berwick et al., 2006). It utilizes a series of evidence-based practices to improve health care provision in more than 3,000 hospitals nationwide. The recommendations by the original 100,000 Lives Campaign were already in practice (through not standardized) and were promoted by federal or joint commission initiatives at adoption, facilitating the seamless adoption of these strategies into practice. The practices selected were supported by empirical evidence, which increased their credibility among providers and senior leadership. The campaigns set up voluntary field offices to provide support and measures of quality improvement at the hospital sites. The campaign also collected data on performance from a majority of the sites.
Research Support	The program has documented 122,300 lives saved (Wachter and Pronovost, 2006), and 93 percent of staff in participating hospitals are aware of interventions, with 58 percent of improvements in care attributable to campaign (Sinkowitz-Cochran et al., 2012).
Key Materials	The offices provided implementation tools and support to participating sites. For example, they hosted conference calls with sites in rural settings with more specialized needs.
Status of Diffusion	The follow-up to this initiative was the 5 Million Lives Campaign, which added an additional series of evidence-based practices and enrolled an additional 1,000 hospitals nationally.
Key Components of Diffusion	**Expectation of a cultural shift:** Helped overcome this barrier with easy-to-adopt practices and little system redesign; field offices for support and measurement of quality improvement **Evidence of an identified need:** Target to prevent hospital deaths; continued program performance evaluation **Leadership buy-in and support from key stakeholders:** Gained support of hospitals' boards of directors, which helped roll out the program and garner support from hospital staff **Funding or other institutional support:** Endorsement by federal, state, and national organizations **Provision of incentives or development of policies:** Practices utilized by the campaign were observable and able to be pilot-tested via a trial-and-error approach. **Peer network supportive of adoption:** "Social pressure" for hospitals to take part (organization-level peer support)

dence. Successful diffusion begins with (1) *establishing evidence of an identified need*. This can be accomplished by collecting data to demonstrate to organizational leaders and adopters on the ground that the innovation has a relative advantage over an existing program. The next two components relate to examining the supporting evidence for a new program. Ensuring that the program has (2) *evidence of research quality* and (3) *evidence of real-world effectiveness* can help inform leadership decisions about which programs to adopt. There are also methods to continually evaluate established programs, and there is a need to continually examine whether a new program is meeting an organization's needs.

After these first essential components, components related to having internal leadership and financial support for a program are warranted. These components include (4) *leadership buy-in and support from key stakeholders*, which can ensure that programs are championed and commissioned by individuals in a position to execute a change within an organization. Having strong leadership support is essential to the other nine components because adoption is a lengthy process that can be met with resistance. Most programs cannot exist without some form of (5) *funding or other institutional support* for the program's start-up, hiring staff, and the infrastructure necessary to keep a program running on a day-to-day basis.

The remaining components deal primarily with the process of garnering support and disseminating the new program on the ground level (i.e., with those individuals involved in actual implementation of the program). This can begin with (6) *collaboration with credible sponsors*, in which research programs can be designed with the target audiences involved at the development stage. This also includes collaborations across organizations and, within organizations, across departments and disciplines to promote innovation. When implementing a new program into a system that contains individuals who may be complacent with the current approach or who are now expected to perform additional or different duties, the (7) *provision of incentives or development of policies* can be helpful in promoting the widespread diffusion of the program. Incentives can come in many forms, such as money, praise, or educational opportunities. It is also important that the new program fit within the structure of the organization—that it is easily adopted and straightforward. Having clear guidelines and trainings for adopters is important here. The role of (8) *peer networks supportive of adoption* also cannot be overestimated, because individuals learn about new practices from their peers. Having peers champion a new idea and support each other in the adoption process is a key component of diffusion. Providing adopters on the ground with (9) *dissemination materials* can facilitate the process of diffusion by marketing and promoting ideas. Step-by-step toolkits or guidelines can assist in this effort. Finally, when a new program is adopted, there should be (10) *the expectation of a cultural shift* that takes time and will require the continued support of new program adopters. Awareness of and preparation for resistance and delays can help leaders be flexible in meeting the needs of their organization while supporting those charged with implementing the new program.

Recommendations for a Research Strategy

DoD is one of the largest funders of research related to suicide prevention in the United States. DoD currently funds 62 studies, accounting for close to $200 million. However, current funding priorities do not reflect the department's research needs. Research funding is overwhelmingly allocated to enhance prevention strategies that already are considered effective; those considered most important, most appropriate for the military context, and in areas in which the field has the most to learn receive relatively little. Furthermore, when studies are completed and new evidence emerges about a promising practice, DoD, like other organizations, suffers from a research-to-practice gap. Strategies are needed to ensure that the most promising results, from studies funded by DoD and outside DoD, can be thoughtfully integrated into the department's operating procedures so that state-of-the-art techniques are in place to prevent the further loss of lives to suicide.

In light of these issues, we offer a series of ten recommendations. The first is an overarching recommendation, and the remaining nine are spread across three general categories: (1) areas in which DoD should prioritize research funding; (2) processes DoD should adopt or enhance to more efficiently allocate research funding; and (3) processes DoD should adopt or enhance to ensure that evidence-supported suicide prevention strategies are integrated into current operations.

Overarching Recommendation

1. Leadership is needed to provide strategic guidance for implementing a unified research strategy.

There are at least six funding streams in DoD for research on suicide prevention, each managed by a different office, and there are likely more defense entities that have funded this research in the past and plan to do so in the future. The success of a strategic and unified DoD research strategy will depend on those who oversee these funding streams to collaborate with each other and work synergistically, ensuring that the right research is being funded and that research findings are being disseminated to appropriate audiences. Leadership is also needed to enact and be accountable for the remaining nine recommendations presented here, from creating, housing, and managing a directory of ongoing research studies to reevaluating research priorities in light of new and novel findings. Ensuring that these objectives are accomplished will require that an individual or a single, specific office is designated as the lead entity to direct and oversee the suicide prevention research portfolio.

In choosing where these responsibilities are housed, the Secretary of Defense should consider which entities are in the best position to supply the necessary leadership and oversight. The responsibilities of this individual or office would include providing senior oversight of the suicide prevention research portfolio, ensuring accountability across organizations and entities involved with funding and implementing the research, ensuring strategic coordination among all stakeholders within DoD, and making decisions about which research funding should be prioritized and what interventions should be disseminated into practice. The designated individual or office will need to have the appropriate level of authority to ensure coordination across service components and defense agencies, but also at a level high enough within DoD to command the attention of these entities. This may be a role for the Office of the Under Secretary of Defense for Personnel and Readiness, which houses the Suicide Prevention Office and the Personnel Risk Reduction Office (under the supervision of the Military Deputy) and the Office of the Assistant Secretary of Defense for Health Affairs. However, it should be noted that the Army is currently the lead funding agency for research on suicide prevention, with U.S. Army Medical Research and Materiel Command managing 82 percent of DoD's funding for suicide prevention in addition to the significant investment for Army STARRS. Thus, a case may be made for the Army to have a significant leadership or authority role as an executive agent for the department. Nonetheless, having a single point of authority and responsibility will serve to foster the further integration and unification of DoD suicide prevention research activities.

Priorities for Research Funding

2. Eliciting the opinions of relevant stakeholders can inform the development of DoD's research priorities.

We had experts rank suicide prevention strategies across five domains, including cultural acceptability and future learning potential; we also calculated a suicides-prevented index for each strategy. By these metrics, two strategies stand out. The first is *ensuring that non–health professionals (i.e., noncommissioned officers, chaplains) who come in contact with suicidal individuals are trained to identify, care for, and refer persons at risk*, which currently accounts for 5 percent of spending on suicide prevention research in DoD. This strategy's high level of cultural acceptability is likely because such gatekeeper training is the primary suicide prevention strategy used in the Army, Marine Corps, and Navy. The second is *implementing population-based programs that reduce suicide risk factors and build resilience (i.e., risk reduction)*, which currently accounts for 10 percent of DoD's suicide prevention research spending. While prediction, screening, and biological interventions are all deemed as having low cultural acceptability and low benefit-cost index values, they have moderate levels of future learning potential. This suggests that these strategies should not be abandoned.

We believe that the domains we used to rank research priorities are relevant, but they are certainly not exhaustive. Criteria other than cost, cultural acceptability, and future learning potential may be important to consider when prioritizing suicide prevention research. This does not make the results of the current study futile; the method that we employed is replicable, so DoD could conceivably elicit feedback on alternative domains and rank research goals across new criteria.

That said, as important as it is to choose the relevant domains, it is equally important to interpret the rankings that result. For example, a strategy that is not deemed culturally accept-

able according to our criteria or that *currently* has a low suicides-prevented-per-cost value could translate into significant long-term returns. The implication is that portfolio managers should ensure that strategies with both short- and long-term expected returns have adequate research attention. Similarly, our criteria for future learning potential suggest that if two assets have the same benefit-cost index, the portfolio manager should invest more in the one with the higher learning value, because there is value to resolving uncertainty. The striking conclusion here—to actually invest more in uncertain assets—should not be viewed as a contradiction to traditional portfolio theory. Traditional portfolio theory assumes that investment actions cannot influence the amount of uncertainty and thus encourages diversification to decrease the level of uncertainty. With a research portfolio, the portfolio manager is equipped with the additional option of decreasing uncertainty by actively learning from the investment, thus achieving the same goal.

3. Research investment is needed to prioritize strategies with low suicides-prevented-per-cost values; policy changes are needed to make already high suicides-prevented-per-cost strategies more culturally acceptable.

As mentioned earlier, strategies that we estimate as having low suicides-prevented-per-cost values do so either because they are costly to implement or because current evidence does not suggest that they are effective. However, as we have mentioned previously, continued research investment in these areas is useful and necessary to create new approaches or to modify existing approaches that can make them both less costly and more effective.

However, there are strategies that are already thought to be effective but that are not deemed culturally acceptable in the military context, in particular (1) encouraging service members and their families to be knowledgeable about and proactively seek treatment (*stigma reduction*), (2) reducing service members' access to the means by which they might take their own lives (*reduced access*); and (3) improving psychosocial interventions used by clinicians (e.g., psychiatrists, psychologists, social workers) to identify and treat those at risk for suicide (*psychosocial interventions*). It is through policy change and awareness campaigns that the culture of the military can change to ensure that these promising suicide prevention strategies can achieve their full potential in preventing suicide among service members. Research and evaluation studies should accompany any such changes so that their value or impact on suicide rates can be investigated.

4. Funding agencies in DoD should make a proactive effort to fund effectiveness research, in which interventions that prior research (funded by DoD or another entity) has deemed efficacious are evaluated for their effectiveness in the military context.

There are a number of research studies related to suicide prevention that have some degree of efficacy. However, how these approaches may work in DoD is unknown. It would be appropriate for DoD to examine existing approaches with evidence of efficacy and sponsor effectiveness trials to determine how the approach might work in the military and what adaptations may be needed to maximize benefits. Effectiveness studies test whether research programs can be translated successfully into real-world settings like DoD and whether the programs have the components necessary to achieve such diffusion. Ensuring that such studies are part of a research strategy will help facilitate the diffusion of research into practice.

One example of a study that could benefit from effectiveness research in DoD is the "caring letters" trial, originally conducted in 1976. In that study, a randomly selected group of suicide attempters who had refused treatment were sent outreach letters from program staff

over a four-year period; after the first two years of the study, those sent these letters were less likely to die by suicide than a control group (Motto and Bostrom, 2001). In 2011, MOMRP funded David Luxton's study of the feasibility of applying this approach to patients seen at a military treatment facility. (See Appendix A for details.) This feasibility study found that the approach could be successfully implemented in that setting; however, the authors reiterated the need for an RCT to evaluate whether those who receive these messages are ultimately less likely to die by suicide.

Processes to Enhance and More Efficiently Allocate Research Funding

5. DoD should have a central repository to track the research it is funding on suicide prevention.

The discussion of current research in Chapter Two provides a "snapshot" of suicide prevention research at a single point in time. New studies are being funded routinely, and the information in Chapter Two is already dated. While a comprehensive database of funding levels and trends would be valuable, it would need to be updated somewhat regularly with up-to-date information (i.e., annually). In creating the catalog of current research, the RAND study team found identifying DHHS- and AFSP-funded research to be relatively easy, as both agencies have updated, publicly accessible databases on their studies. In contrast, analyzing current trends in suicide prevention research is more complicated because there is no central repository for DoD suicide prevention research and because online databases are lacking in the VA. We recommend that a central repository be developed and automatically updated over time, so that it is more efficient to take a snapshot of what kind of suicide prevention research is being conducted. To the extent that DoD agencies are pursuing such databases, efforts to keep them up to date should be sustained, as should efforts to make them compatible with other federal databases (e.g., in DHHS). Not only would such a repository benefit DoD, but it would also ensure that those responsible for funding research know what is already being funded and provide stakeholders outside DoD, such as in DHHS and AFSP, with ready access to this information.

6. The designated leadership agency in DoD (per recommendation 1) should continually reevaluate its research priorities in light of new research findings, new policies, and the adoption of new suicide prevention strategies.

We ranked aspirational goals according to five constructs: importance, effectiveness, cultural acceptability, cost, and future learning potential. The ranking of aspirational goals against these domains is dynamic and may change over time. Specifically, new research findings may shift how strategies rank with respect to efficacy and future learning potential; policy changes may shift the cultural acceptability of certain policies; and the implementation of new prevention strategies in DoD, such as prediction modeling, may heighten the importance of research in that area. For example, enhancing the confidentiality afforded to service members who seek behavioral health care may enhance the cultural acceptability of strategies like help-seeking, quality care, and both biological and psychosocial interventions. It is important to reevaluate the rankings over time, especially if these values will be used to parameterize the model we present in Chapter Four.

Processes to Close the Research-to-Practice Gap

7. DoD should encourage both formal and informal collaboration across DoD entities responsible for funding and implementing suicide prevention programs and strategies.

Suicide prevention strategies cut across a number of organizations and agencies within DoD. There is division in terms of occupation. For example, chaplains and noncommissioned officers play a critical role in gatekeeper training, and psychiatrists, psychologists, social workers, and other behavioral health care providers are critically important for ensuring quality care and continuity of care, as well as ultimately treating patients with psychological or biological interventions. In addition, there is further subdivision by service. The leadership, peer networks, and organizational structure of each of these groups varies, and the process of implementing research into practice will inevitably differ for each. As such, it is critical that both formal and informal relationships are established or enhanced to promote the diffusion of research into practice.

As an example, consider the MSRC study, "Usability and Utility of a Virtual Hope Box (VHB) for Reducing Suicidal Ideation" (see Gutierrez and Bush, 2012). Hope boxes are common strategies used by behavioral health care providers and are physical representations of the patient's reasons for living. Thus, patients can refer to these items during times of hopelessness and despair. Bush is creating and testing a virtual hope box application that patients can download on their smartphones. To diffuse this technology into routine clinical care, behavioral health care providers who treat military personnel must know that the application exists and trust that it works; patients would also have to trust the security of the content delivered. This would mean establishing relationships both with leaders of each service's behavioral health teams and, potentially, with individual behavioral health care providers at different installations or military treatment facilities. Similarly, commands would have to be engaged, know that the mobile device is a component of the service member's treatment, and make the appropriate allowances. Collaborations between these entities early on in the process of diffusion will be critical for the success of any innovation.

8. Agencies that fund suicide prevention research and those responsible for implementing suicide prevention programs should keep abreast of new research, bearing in mind the quality of different studies. Efficiencies may be gained by creating a centralized clearinghouse for this purpose, perhaps capitalizing on existing sources.

There are more than 200 ongoing studies related to suicide prevention, of which fewer than half are being conducted in DoD. It is important to monitor the results of these studies while considering the quality of each. It is through monitoring these studies' results that research can inform the suicide prevention strategies that DoD chooses to adopt. DoD may consider establishing its own process for monitoring study results or may rely on resources that already exist. In particular, as referenced in Chapter Five, SAMHSA's National Registry of Evidence-Based Programs and Practices (SAMHSA, 2014) and the Suicide Prevention Resource Center's Best Practices Registry (Suicide Prevention Resource Center, undated) offer descriptions of different strategies, how they have been evaluated, and the quality of these evaluations. DoD could use this information to ensure that the programs it advocates and implements reflect the state of the art.

9. Agencies and organizations within DoD should be encouraged to adopt evidence-based technologies. Such encouragement may include funding, materials, and technical assistance.

Services, agencies, and organizations within DoD may decide to try to implement a research-informed strategy for suicide prevention; alternatively, DoD may encourage the services, agencies, or organizations to implement a specific research-informed strategy. Either way, it should foster such adoption and can do so by providing real support to the agencies responsible for implementation. This can mean providing funding to cover some of the costs associated with implementing the strategy, dissemination materials to encourage the adoption of the new approach, or even technical assistance to help organizations implement and adapt the approach in their unique settings.

10. Both leadership buy-in and peer engagement are key in promoting new technologies.

Leadership involvement is critically important in disseminating research into practice. In fact, one of the evidence-based practices for suicide prevention, listed in both SAMHSA's National Registry of Evidence-Based Programs and Practices and the Suicide Prevention Resource Center's Best Practices Registry, is the Air Force's Suicide Prevention Program. The first tenet of the program is "leadership involvement," which involves the release of messages related to suicide prevention every three to six months from the Chief of Staff of the Air Force. As stated in Air Force Pamphlet 44-160: "It is encouraging that Air Force leaders, even at the Squadron level, continue to see suicide prevention as important. Sending regular messages over the past four years from the Chief of Staff of the Air Force is one reason for this sustained interest" (U.S. Air Force, 2001, p. 11).

However, perhaps as important as leadership involvement is the involvement of peers. To effectively involve peers in disseminating new research-based interventions, DoD would benefit from a strategy that identifies the group responsible for administering the intervention, discerns how leadership will be involved in promoting the intervention, and engages peers in dissemination efforts. This may occur formally; for example, a selected number of personnel are taught about the intervention and then train their peers in how to apply it. However, it may also be strategic for peer involvement to occur informally so that personnel can observe their peers using a new approach and see that it works. Either strategy will most likely involve partnering with services, organizations, and leaders to identify innovators and early adopters who will be most receptive to using a new prevention strategy.

Conclusion

The final recommendation of the congressionally mandated Task Force on the Prevention of Suicide by Members of the Armed Forces was for DoD to "create a unified, strategic, and comprehensive DoD plan for research in military suicide prevention ensuring that DoD's military suicide prevention research portfolio is thoughtfully planned to cover topics in prevention, intervention, and postvention" (U.S. Department of Defense Task Force on the Prevention of Suicide by Members of the Armed Forces, 2010, p. ES-18). In light of a surprising lack of research on effective suicide prevention strategies to date, task force members understood that if DoD is to make progress in reducing suicide, research must be a fundamental component of its strategy. The data presented in this report and the recommendations we draw from our

analysis represent the ways in which DoD can continue to support research that can ultimately be incorporated into operating procedures and, ideally, reduce the burden of suicide on military personnel.

Ongoing Studies of Relevance to Suicide Prevention Among Military Personnel

Tables A.1–A.5 present key information about ongoing studies with relevance to suicide prevention among military personnel. The studies are categorized by funder: Army STARRS, DoD, VA, DHHS, or AFSP.

Table A.1
The Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS)

Start–End	Funding ($)	Principal Investigator(s)	Researching Organizations	Participants	NAASP Category	MOMRP Category
08/09–09/14	65,000,000 Contributors: DoD: 50,000,000 NIMH: 15,000,000	Robert J. Ursano, M.D., of the Uniformed Services University of the Health Sciences Murray Stein, M.D., M.P.H., of the University of California, San Diego. Steven G. Heeringa, Ph.D., University of Michigan Ronald C. Kessler, Ph.D., Harvard Medical School NIMH scientists include Lisa J. Colpe, Ph.D., M.P.H. Michael Schoenbaum, Ph.D. NIMH and Army oversight and implementation leadership include Scott Ludtke, GS-15, Acting Army Executive Director, Army STARRS Kevin Quinn, Ph.D., NIMH Study Director, Army STARRS James Churchill, Ph.D., NIMH Program Officer, Army STARRS	NIMH Harvard Medical School University of Michigan Columbia University University of California, San Diego, Medical School U.S. Army Henry M. Jackson Foundation for the Advancement of Military Medicine	Army Active duty National Guard/reserves	Enhanced continuity of care Provider and gatekeeper training Affordable, accessible, and effective care Psychosocial interventions for those at risk Risk and protective factor interactions Stigma reduction Population-based risk reduction/resilience-building Prevention of reattempts Prediction of imminent risk Improved biological interventions Reduction in access to lethal means Population-based screening	Prevention, education, and training Early screening/intervention Assessment Treatment Recovery and return to duty Postvention Epidemiology and/or basic science/neurological mechanisms

Table A.2
DoD-Funded Suicide Prevention Studies

Funding Dept.	Start–End	Funding ($)	Title	Principal Investigator(s)	Researching Organization	Participants	NAASP Category	MOMRP Category
AFRL	09/12–09/13	325,000	*Resiliency and Personnel Well-Being and Suicide Risk*	Kerry L. Knox, Ph.D.	University of Rochester Medical Center	Air Force	Risk and protective factor interactions Population-based risk reduction/resilience-building	Prevention, education, and training Epidemiology and/or basic science/neurological mechanisms
AFRL	09/11–08/13	1,000,000	*New Technologies, Social Networks, Mental Health, and Suicide Prevention*	Laura Miller, Ph.D.	RAND Corporation	Air Force	Psychosocial interventions for those at risk Risk and protective factor interactions Population-based screening	Prevention, education, and training Epidemiology and/or basic science/neurological mechanisms
AFRL	2007–ongoing	9,000,000	*Pre-Service Emotional Adjustment and In-Service Suicide Attempts*	Kristin Schneider, Ph.D.	Defense Advanced Research Projects Agency	Air Force	Risk and protective factor interactions Population-based risk reduction/resilience-building	Postvention Epidemiology and/or basic science/neurological mechanisms
CDMRP	2011–2012	200,000	*Stigma Data Analysis*	Crosby Hipes, Ph.D.	New York University	Army	Stigma reduction	Prevention, education, and training Epidemiology and/or basic science/neurological mechanisms
CDMRP	2008–2012	271,547	*Deployment, PTSD Symptoms, and Comorbid Mental Health Conditions in the Active Force and Reserve Components*	Laurel Hourani, Ph.D., M.P.H	Research Triangle Institute	Active-duty National Guard/reserves	Psychosocial interventions for those at risk Risk and protective factor interactions	Prevention, education, and training Early screening/intervention Epidemiology and/or basic science/neurological mechanisms

Table A.2—Continued

Funding Dept.	Start–End	Funding ($)	Title	Principal Investigator(s)	Researching Organization	Participants	NAASP Category	MOMRP Category
CDMRP	09/08–01/11	352,167	*Mental Health and Resilience: Soldiers' Perceptions about Psychotherapy, Medication, and Barriers to Care in the United States Military*	Steven Southwick, M.D.	Yale University	Active duty	Affordable, accessible, and effective care Risk and protective factor interactions Stigma reduction	Prevention, education, and training Epidemiology and/or basic science/neurological mechanisms
CDMRP	09/10–04/13	354,287	*Transcranial Magnetic Stimulation: Effect of TMS vs. Sham on Suicidality*	Mark S. George, M.D.	Medical University of South Carolina	Veterans	Improved biological interventions	Treatment Epidemiology and/or basic science/neurological mechanisms
CDMRP	2010–2013	375,675	*Do Undetected or Untreated Sleep Disorders Predict PTSD Psychotherapy Outcomes?*	Patricia L Haynes, Ph.D.	Biomedical Research Foundation of Southern Arizona	Veterans	Risk and protective factor interactions Prediction of imminent risk	Early screening/intervention Epidemiology and/or basic science/neurological mechanisms
CDMRP	04/09–01/13	519,608	*Combat, Sexual Assault, and Post-Traumatic Stress in OIF/OEF Military Women*	Anne G. Sadler, R.N., Ph.D.	VA Medical Center, Iowa City	Active duty	Population-based screening	Prevention, education, and training
CDMRP	08/09–09/12	636,732	*PTSD Trajectory, Comorbidity, and Utilization of Mental Health Services Among National Guard Soldiers*	Robert J. Ursano, M.D.	Henry M. Jackson Foundation	National Guard/reserves	Affordable, accessible, and effective care Psychosocial interventions for those at risk Risk and protective factor interactions Stigma reduction	Prevention, education, and training Assessment Treatment

Funding Dept.	Start–End	Funding ($)	Title	Principal Investigator(s)	Researching Organization	Participants	NAASP Category	MOMRP Category
CDMRP	03/09–06/13	765,029	*Reintegration: The Role of Spouse Telephone Battlemind*	Linda O. Nichols, Ph.D.	VA Medical Center, Memphis	Active duty Families	Provider and gatekeeper training Affordable, accessible, and effective care Population-based risk reduction/resilience-building	Prevention, education, and training Assessment Treatment Epidemiology and/or basic science/neurological mechanisms
CDMRP	2008–2011	780,638	*Dissemination of Evidence-Based CBT Intervention Components: Online Self-Administered Training for Providers Treating Military Deployment-Related PTSD*	Stephen Rao, Ph.D.	New England Research Institutes Cleveland Clinic Foundation	Veterans	Provider and gatekeeper training Affordable, accessible, and effective care Psychosocial interventions for those at risk	Assessment Treatment
CDMRP	09/08–10/11	835,270	*PTSD Trajectory, Comorbidity, and Utilization of Mental Health Services Among Reserves*	Sandro Galea, M.D., M.P.H., Dr.PH.	Columbia University	National Guard/reserves	Affordable, accessible, and effective care	Prevention, education, and training Epidemiology and/or basic science/neurological mechanisms
CDMRP	2008–2011	887,166	*Effectiveness of Cognitive Exposure and Skills Group Manualized Treatments in OIF/OEF Female Veterans*	Diane Castillo, Ph.D.	VA Medical Center, Albuquerque	Veterans	Affordable, accessible, and effective care Psychosocial interventions for those at risk	Treatment
CDMRP	2008–2009	920,000	*Titrating Optimal Delivery of Mindfulness-Based Training Interventions*	Amishi P. Jha, Ph.D.	University of Pennsylvania/University of Miami	Active duty	Provider and gatekeeper training Affordable, accessible, and effective care	Treatment Epidemiology and/or basic science/neurological mechanisms

Funding Dept.	Start–End	Funding ($)	Title	Principal Investigator(s)	Researching Organization	Participants	NAASP Category	MOMRP Category
CDMRP	09/12–08/15	1,087,300	*Adaptive Disclosure: A Combat-Specific PTSD Treatment*	Ariel Lang, Ph.D.	University of California, San Diego	Marines	Affordable, accessible, and effective care Psychosocial interventions for those at risk	Treatment Epidemiology and/or basic science/neurological mechanisms
CDMRP	2010	1,152,019	*Facilitating Soldier Receipt of Needed Mental Health Treatment*	Thomas W. Britt, Ph.D.	Clemson University	Active duty	Affordable, accessible, and effective care Provider and gatekeeper training	Prevention, education, and training
CDMRP	03/08–03/14	1,445,213	*Innovative Service Delivery for Secondary Prevention of PTSD in At-Risk OIF-OEF Service Men and Women*	Ron E. Acierno, Ph.D.	VA Medical Center, Charleston, South Carolina	Active duty	Affordable, accessible, and effective care Psychosocial interventions for those at risk	Treatment Epidemiology and/or basic science/neurological mechanisms
CDMRP	2011–2015	1,700,000	*Optimizing Delivery of Mindfulness-Based Military Training Interventions in Army Infantry Cohorts*	Amishi P. Jha, Ph.D.	University of Pennsylvania/University of Miami	Army	Provider and gatekeeper training	Prevention, education, and training Treatment
CDMRP	2007	1,725,303	*The Impact of Supported Employment Versus Standard Vocational Rehabilitation in Veterans With PTSD*	Dr. Lori L. Davis, M.D.	Tuscaloosa Research and Education Advancement	Veterans	Population-based risk reduction/resilience-building	Prevention, education, and training Epidemiology and/or basic science/neurological mechanisms
CDMRP	2007	2,018,015	*Homecoming Line: Telephone Support for Veterans*	Craig H. Rosen, M.D.	Stanford University	Veterans	Affordable, accessible, and effective care Psychosocial interventions for those at risk	Treatment

Table A.2—Continued

Funding Dept.	Start– End	Funding ($)	Title	Principal Investigator(s)	Researching Organization	Participants	NAASP Category	MOMRP Category
CDMRP	2009– 2011	2,070,446	*Telemental Health and Cognitive Processing Therapy for Female Combat Veterans with Military-Related PTSD*	Leslie Morland, Psy.D.	VA Research and Education Corporation of the Pacific	Veterans	Affordable, accessible, and effective care Psychosocial interventions for those at risk	Treatment Epidemiology and/or basic science/neurological mechanisms
CDMRP	2007	2,143,061	*Telemedicine for Improved Delivery of Psychosocial Treatments for Post-Traumatic Stress Disorder*	Steven R. Thorp, Ph.D.	Veterans Medical Research Foundation of San Diego	Veterans	Affordable, accessible, and effective care Psychosocial interventions for those at risk	Treatment Epidemiology and/or basic science/neurological mechanisms
CDMRP	2010	2,778,806	*PHIT for Duty, a Personal Health Intervention Tool for Psychological Health and Traumatic Brain Injury*	Paul N. Kizakevich, M.S.	Research Triangle Institute	Active duty Veterans	Affordable, accessible, and effective care Psychosocial interventions for those at risk	Treatment
CDMRP	08/07– 09/13	2,849,739	*Effectiveness of Telerehabilitation for OIF/OEF Returnees with Combat-Related Trauma*	Kris Siddharthan, Ph.D.	VA Medical Center, Orlando	Active duty Veterans	Affordable, accessible, and effective care Psychosocial interventions for those at risk	Treatment Epidemiology and/or basic science/neurological mechanisms
CDMRP	2007– 2014	3,770,255	*A Multisite, Randomized Clinical Trial of Virtual Reality and Prolonged Exposure Therapy for Active Duty Soldiers with PTSD*	Gregory Gahm, Ph.D.	National Center for Telehealth and Technology	Active duty	Enhanced continuity of care Affordable, accessible, and effective care Psychosocial interventions for those at risk Risk and protective factor interactions Population-based risk reduction/resilience-building	Prevention, education, and training Assessment Treatment Epidemiology and/or basic science/neurological mechanisms

Table A.2—Continued

Funding Dept.	Start–End	Funding ($)	Title	Principal Investigator(s)	Researching Organization	Participants	NAASP Category	MOMRP Category
CDMRP	2007–2011	4,204,171	*Telemental Health and Cognitive Processing Therapy for Rural Combat Veterans with PTSD*	Leslie A. Morland, Psy.D.	VA Research and Education Corporation of the Pacific	Veterans	Affordable, accessible, and effective care Psychosocial interventions for those at risk	Treatment
CDMRP	2010	5,130,000	*Trauma Management Therapy for OEF and OIF Combat Veterans*	Deborah C. Beidel, Ph.D.	University of Central Florida	Veterans	Enhanced continuity of care Provider and gatekeeper training Affordable, accessible, and effective care Psychosocial interventions for those at risk Risk and protective factor interactions	Prevention, education, and training Treatment Epidemiology and/or basic science/neurological mechanisms
CDMRP	2012	9,886,992	*Reduction in Suicide Risk: A Double-Blind, Placebo-Controlled Trial of Omega-3 Fatty Acid Supplementation among Military Veterans*	Bernadette P. Marriott, Ph.D.	Medical University of South Carolina	Veterans	Risk and protective factor interactions Stigma reduction Prevention of reattempts Improved biological interventions	Treatment Epidemiology and/or basic science/neurological mechanisms
DCoE	09/07–08/11	65,786	*Building Neurocognitive Resilience with Attention Training in a Military Cohort*	Amishi P. Jha, Ph.D.	University of Pennsylvania	Army	Population-based risk reduction/resilience-building	Prevention, education, and training Epidemiology and/or basic science/neurological mechanisms
DCoE	08/10–12/13	648,802	*Review of Suicide Prevention: Toolkit for Evaluating Suicide Prevention Programs and Postvention Programs and Policy*	Rajeev Ramchand, Ph.D.	RAND Corporation	Army Air Force Navy Marines	Enhanced continuity of care Affordable, accessible, and effective care Risk and protective factor interactions	Prevention, education, and training Postvention Epidemiology and/or basic science/neurological mechanisms

Funding Dept.	Start–End	Funding ($)	Title	Principal Investigator(s)	Researching Organization	Participants	NAASP Category	MOMRP Category
DCoE	09/12–03/14	1,000,000	*Stigma Reduction Efforts in the Department of Defense*	Joie Acosta, Ph.D.	RAND Corporation	Active duty	Stigma reduction	Prevention, education, and training
DCoE	09/12–03/14	1,000,000	*Availability and Efficacy of Military-Culture Appropriate Psychological Health Treatment for Geographically Distant Service Members and Their Families*	Ryan Brown, Ph.D., Grant Marshall, Ph.D.	RAND Corporation	Active duty National Guard/reserves Veterans Families	Affordable, accessible, and effective care	Prevention, education, and training
DCoE	08/10–09/14	4,095,985	*Innovative Practices for Supporting Psychological Health and TBI*	Carrie Farmer, Ph.D., Deborah Scharf, Ph.D., Robin Weinick, Ph.D.	RAND Corporation	Active duty	Enhanced continuity of care Affordable, accessible, and effective care Risk and protective factor interactions	Prevention, education, and training Epidemiology and/or basic science/neurological mechanisms
Dept. of the Navy	05/11–05/14	6,989,000	*Marine Resiliency Study*	Many	University of California, San Diego Naval Health Research Center U.S. Department of the Navy	Marines	Enhanced continuity of care Provider and gatekeeper training Affordable, accessible, and effective care Psychosocial interventions for those at risk Risk and protective factor interactions Stigma reduction Population-based risk reduction/resilience-building	Prevention, education, and training Early screening/intervention Assessment Treatment Epidemiology and/or basic science/neurological mechanisms

Funding Dept.	Start–End	Funding ($)	Title	Principal Investigator(s)	Researching Organization	Participants	NAASP Category	MOMRP Category
DoD	2001–2022	Ongoing funding	*The Millennium Cohort Study*	Nancy F. Crum-Cianflone, M.D., M.P.H.	Army Navy Air Force VA Many academic institutions	Air Force Army Navy Marines National Guard/reserves Veterans	Enhanced continuity of care Provider and gatekeeper training Affordable, accessible, and effective care Psychosocial interventions for those at risk Risk and protective factor interactions Stigma reduction Population-based risk reduction/resilience-building Prediction of imminent risk Improved biological interventions Reduction in access to lethal means Population-based screening	Prevention, education, and training Early screening/intervention Assessment Treatment Recovery and return to duty Postvention Epidemiology and/or basic science/neurological mechanisms
DoD	2007–2013	35,989,697	The STRONG STAR Multidisciplinary PTSD Research Consortium	Lt Col Alan L. Peterson, Ph.D., A.B.P.P. COL Stacey Young-McCaughan, Ph.D., R.N.	University of Texas, Austin Health Science Center at San Antonio	Active duty Veterans	Enhanced continuity of care Provider and gatekeeper training Affordable, accessible, and effective care Psychosocial interventions for those at risk Risk and protective factor interactions Stigma reduction Population-based risk reduction/resilience-building Prevention of reattempts Prediction of imminent risk Improved biological interventions Reduction in access to lethal means Population-based screening	Prevention, education, and training Early screening/intervention Assessment Treatment Recovery and return to duty Postvention Epidemiology and/or basic science/neurological mechanisms

Funding Dept.	Start–End	Funding ($)	Title	Principal Investigator(s)	Researching Organization	Participants	NAASP Category	MOMRP Category
MOMRP	N/A	Data missing	*Land Combat Study of an Army Infantry Division 2003–2009*	Paul Y. Kim, M.A.	Walter Reed Army Institute of Research	Army	Risk and protective factor interactions Population-based risk reduction/resilience-building	Prevention, education, and training Early screening/intervention Epidemiology and/or basic science/neurological mechanisms
MOMRP	09/12–09/14	Data missing	*Suicide Bereavement in Veterans and Military Families*	Julie Cerel, Ph.D.	University of Kentucky	Veterans Families	Psychosocial interventions for those at risk	Postvention
MOMRP	08/09–09/11	137,000	*Suicide in the Active Duty Army 2000–2009*	MAJ Owen T. Hill	U.S. Army Research Institute of Environmental Medicine	Army	Population-based screening	Prevention, education, and training Epidemiology and/or basic science/neurological mechanisms
MOMRP	09/11–04/13	218,000	*Posttraumatic Stress Disorder, Substance Abuse and Self Harm: Mediating Relationships with Respect to Combat Stress*	Valerie Stander, Ph.D.	Naval Health Research Center	Navy Marines	Provider and gatekeeper training Affordable, accessible, and effective care Psychosocial interventions for those at risk	Assessment Treatment
MOMRP	09/11–04/13	282,040	*Drug-Related Overdoses Among a Military Population*	Toby Cooper, Pharm.D., B.C.P.S., R.Ph.	Darnell Army Medical Center	Active duty National Guard/ reserves Veterans	Risk and protective factor interactions Population-based risk reduction/resilience-building	Prevention, education, and training Postvention
MOMRP	09/09–09/11	656,184	*Antidepressants and the Risk of Self-Harm and Unintentional Injury Among Younger Veterans*	Matthew Miller, M.D.	Harvard University	Veterans	Risk and protective factor interactions	Treatment Epidemiology and/or basic science/neurological mechanisms

Funding Dept.	Start–End	Funding ($)	Title	Principal Investigator(s)	Researching Organization	Participants	NAASP Category	MOMRP Category
MOMRP	09/09–09/12	753,159	*Optimizing Screening and Risk Assessment for Suicide Risk in the U.S. Military*	Thomas Joiner, Ph.D.	Florida State University	Army	Affordable, accessible, and effective care Risk and protective factor interactions	Early screening/intervention Assessment
MOMRP	08/09–09/13	1,173,408	*Blister Packaging Medication to Increase Treatment Adherence and Clinical Response: Impact on Suicide-Related Morbidity and Mortality*	Peter Gutierrez, Ph.D.	Denver VA Medical Center	Veterans Civilians	Psychosocial interventions for those at risk Risk and protective factor interactions	Treatment Epidemiology and/or basic science/neurological mechanisms
MOMRP	09/09–09/12	1,279,912	*High-Risk Suicidal Behavior in Veterans— Assessment of Predictors and Efficacy of Dialectical Behavior Therapy (DBT)*	Marianne Goodman, M.D.	VA Medical Center, New York	Veterans	Psychosocial interventions for those at risk Prediction of imminent risk	Early screening/intervention Treatment
MOMRP	07/11–08/13	1,800,000	*Development and Validation of a Theory-Based Screening Process for Suicide Risk*	Steven Vannoy, Ph.D., M.P.H.	University of Washington	Army	Risk and protective factor interactions Prediction of imminent risk	Assessment Epidemiology and/or basic science/neurological mechanisms
MOMRP	09/09–09/12	1,961,003	*The Association Between Suicide and OEF/OIF Deployment History*	Mark Reger, Ph.D.	National Center for Telehealth and Technology	Active duty National Guard/reserves Veterans	Risk and protective factor interactions	Prevention, education, and training Epidemiology and/or basic science/neurological mechanisms
MOMRP	09/09–09/12	1,967,035	*Brief Cognitive Behavioral Therapy for Military Populations*	David Rudd, Ph.D.	Texas Tech University	Active duty	Affordable, accessible, and effective care Psychosocial interventions for those at risk	Treatment

Funding Dept.	Start–End	Funding ($)	Title	Principal Investigator(s)	Researching Organization	Participants	NAASP Category	MOMRP Category
MOMRP	02/09–06/13	2,095,025	*Identification of At-Risk Interventions for Pre-Deployment Psychophysiologic Predictors of Postdeployment Mental Health Outcomes*	Jeffrey M. Pyne, Ph.D.	Biomedical Research Foundation, Little Rock, Arkansas	National Guard/ reserves	Psychosocial interventions for those at risk Risk and protective factor interactions Prediction of imminent risk	Early screening/intervention Epidemiology and/or basic science/neurological mechanisms
MOMRP	11/11–02/16	2,500,000	*Caring Letters for Military Suicide Prevention: A Randomized Controlled Trial*	David D Luxton, Ph.D.	National Center for Telehealth and Technology	Active duty National Guard/ reserves Veterans	Enhanced continuity of care Provider and gatekeeper training Affordable, accessible, and effective care Psychosocial interventions for those at risk	Prevention, education, and training
MOMRP	08/12–08/15	3,000,000	*Intranasal Delivery of Biodegradable Neuropeptide Nanoparticles*	Michael J. Kubek, Ph.D.	Indiana University School of Medicine	Civilians	Improved biological interventions	Treatment Epidemiology and/or basic science/neurological mechanisms
MOMRP	04/11–08/15	3,400,000	*A Randomized Clinical Trial of the Collaborative Assessment and Management of Suicidality vs. Enhanced Care as Usual for Suicidal Soldiers*	David A. Jobes, Ph.D.	Catholic University of America	Army	Enhanced continuity of care Population-based risk reduction/resilience-building Prediction of imminent risk	Assessment Treatment Epidemiology and/or basic science/neurological mechanisms
MOMRP– Uniformed Services University of the Health Sciences	08/12–08/15	663,741	*Pilot Trial of Inpatient Cognitive Therapy for the Prevention of Suicide in Military Personnel with Acute Stress Disorder or PTSD*	Marjan Holloway, Ph.D.	Uniformed Services University of the Health Sciences	Veterans	Psychosocial interventions for those at risk Prevention of reattempts	Treatment

Funding Dept.	Start–End	Funding ($)	Title	Principal Investigator(s)	Researching Organization	Participants	NAASP Category	MOMRP Category
MOMRP–Uniformed Services University of the Health Sciences	09/09–09/12	2,666,717	*A Brief Intervention to Reduce Suicide Risk in Military Service Members and Veterans—Study 2 (SAFEMIL)*	Marjan Holloway, Ph.D.	Uniformed Services University of the Health Sciences	Active duty Veterans	Psychosocial interventions for those at risk	Treatment
MOMRP–Uniformed Services University of the Health Sciences	08/09–09/14	6,000,000	*Post-Admission Cognitive Therapy (PACT) for the Inpatient Treatment of Military Personnel with Suicidal Behaviors: A Multi-Site RCT*	Marjan Holloway, Ph.D.	Uniformed Services University of the Health Sciences	Veterans	Psychosocial interventions for those at risk	Treatment
MOMRP–MSRC	N/A	Data missing	*Usability and Utility of a Virtual Hope Box (VHB) for Reducing Suicidal Ideation*	Nigel Bush, Ph.D.	National Center for Telehealth and Technology	Active duty Veterans	Affordable, accessible, and effective care Risk and protective factor interactions	Early screening/intervention Treatment Epidemiology and/or basic science/neurological mechanisms
MOMRP–MSRC	09/11–10/15	Data missing	*Military Continuity Project*	Katherine A. Comtois, Ph.D., M.P.H.	University of Washington	Marines	Affordable, accessible, and effective care Stigma reduction	Prevention, education, and training
MOMRP–MSRC	09/11–08/13	367,588	*Development and Evaluation of a Brief, Suicide Prevention Intervention Reducing Anxiety Sensitivity*	Norman Schmidt, Ph.D.	Florida State University	Veterans Civilians	Affordable, accessible, and effective care Psychosocial interventions for those at risk Risk and protective factor interactions	Prevention, education, and training Epidemiology and/or basic science/neurological mechanisms
MOMRP–MSRC	11/11–09/14	1,013,904	*Brief Interventions for Short-Term Suicide Risk Reduction in Military Populations*	Craig J. Bryan, Ph.D.	University of Utah, National Center for Veterans	Army	Psychosocial interventions for those at risk	Treatment

Table A.2—Continued

Funding Dept.	Start–End	Funding ($)	Title	Principal Investigator(s)	Researching Organization	Participants	NAASP Category	MOMRP Category
MOMRP–MSRC	09/09–09/12	1,173,408	*Toward a Gold Standard for Suicide Risk Assessment for Military Personnel*	Thomas Joiner, Ph.D., and Peter Gutierrez, Ph.D.	Denver VA Medical Center	Air Force Army Navy	Prediction of imminent risk	Assessment Epidemiology and/or basic science/neurological mechanisms
MOMRP–MSRC	09/11–08/13	1,182,369	*A Behavioral Sleep Intervention for the Prevention of Suicidal Behaviors in Military Veterans: A Randomized Controlled Trial*	Rebecca Bernert, Ph.D.	Stanford University	Veterans	Affordable, accessible, and effective care Risk and protective factor interactions	Treatment Epidemiology and/or basic science/neurological mechanisms
MOMRP–MSRC	01/12–01/14		*Window to Hope: Evaluating a Psychological Treatment for Hopelessness Among Veterans with Traumatic Brain Injury*	Lisa Brenner, Ph.D.	VA Rocky Mountain Network (Veterans Integrated Service Network 19)	Veterans	Psychosocial interventions for those at risk	Treatment Epidemiology and/or basic science/neurological mechanisms

Table A.3
VA-Funded Suicide Prevention Studies

Start–End	Funding ($)	Title	Principal Investigator(s)	Researching Organization	Participants	NAASP Category	MOMRP Category
04/10–04/11	92,777	*Pain and Suicidal Behaviors Among Veterans in Care in the VA*	Joseph Lucien Goulet, Ph.D., M.S.	VA Connecticut Healthcare System, West Haven Campus	Veterans	Psychosocial interventions for those at risk Risk and protective factor interactions Prediction of imminent risk	Assessment Epidemiology and/or basic science/ neurological mechanisms
01/12–12/12	86,950	*Stakeholder Perspectives on Improving Access to VHA's Suicide Prevention Services*	Monica Matthieu, Ph.D., M.S.W.	St. Louis VA Medical Center, John Cochran Division	Veterans	Enhanced continuity of care Population-based screening	Assessment
09/11–08/14	877,257	*Veteran Interactions with VA Primary Care Prior to Suicide*	Steven K. Dobscha, M.D.	Portland VA Medical Center	Veterans	Enhanced continuity of care Population-based risk reduction/ resilience-building Population-based screening	Prevention, education, and training
07/05–06/12	756,588	*Suicide Among Veterans: Using the VA Depression Registry to Inform Care*	Marcia T. Valenstein, M.D.	VA Ann Arbor Healthcare System	Veterans	Psychosocial interventions for those at risk Risk and protective factor interactions	Assessment Epidemiology and/or basic science/ neurological mechanisms
10/08–04/12	892,700	*Outcomes and Correlates of Suicidal Ideation in OEF/OIF Veterans*	Steven K. Dobscha, M.D.	Portland VA Medical Center	Veterans	Risk and protective factor interactions	Assessment Epidemiology and/or basic science/ neurological mechanisms
09/09–08/10	95,500	*Implementation and Refinement of the Suicide Classification System*	Lisa Brenner, Ph.D.	VA Rocky Mountain Network (Veterans Integrated Service Network 19)	Active duty Veterans	Population-based risk reduction/ resilience-building	Prevention, education, and training

Table A.3—Continued

Start–End	Funding ($)	Title	Principal Investigator(s)	Researching Organization	Participants	NAASP Category	MOMRP Category
2011–2013	69,025	*Brief CBT for Insomnia in VA Primary Care Patients With Depression and Insomnia to Reduce Suicide Risk*	Wilfred R. Pigeon, Ph.D.	VA Center of Excellence for Suicide Prevention (Veterans Integrated Service Network 2)	Veterans	Psychosocial interventions for those at risk Risk and protective factor interactions	Treatment Epidemiology and/or basic science/neurological mechanisms
01/11–12/11	100,000	*Documenting Variability in Suicide Event Reporting*	Robert Bossarte, Ph.D.	VA Center of Excellence for Suicide Prevention (Veterans Integrated Service Network 2)	Veterans	Population-based screening	Prevention, education, and training Epidemiology and/or basic science/neurological mechanisms
08/10–07/15	1,098,989	*Assessing Medications as Interventions to Prevent Suicide in the VHA*	Eric G. Smith, M.D., M.P.H.	Edith Nourse Rogers Memorial Veterans Hospital, Bedford, Massachusetts	Veterans	Psychosocial interventions for those at risk Risk and protective factor interactions	Treatment Epidemiology and/or basic science/neurological mechanisms
08/09–07/13	832,420	*Patient and Provider Outcomes of E-Learning Training in Collaborative Assessment and Management of Suicidality*	Kathryn M. Magruder, Ph.D., M.P.H.	Ralph H. Johnson VA Medical Center, Charleston, South Carolina	Veterans	Enhanced continuity of care Psychosocial interventions for those at risk Risk and protective factor interactions	Prevention, education, and training Epidemiology and/or basic science/neurological mechanisms
04/09–09/10	387,711	*Management of Suicidal Veterans during Substance Use Disorder*	Mark A. Ilgen, Ph.D.	VA Ann Arbor Healthcare System, Ann Arbor, MI	Veterans	Reduction in access to lethal means Psychosocial interventions for those at risk Risk and protective factor interactions	Prevention, education, and training Treatment

Table A.3—Continued

Start–End	Funding ($)	Title	Principal Investigator(s)	Researching Organization	Participants	NAASP Category	MOMRP Category
07/05–08/09	756,588	*Suicide Among Veterans: Using the VA Depression Registry to Inform Care*	Marcia T. Valenstein, M.D.	VA Ann Arbor Healthcare System	Veterans	Enhanced continuity of care Prediction of imminent risk	Prevention, education, and training Assessment
04/12–03/17	823,624	*Motivational Interviewing to Prevent Suicide in High Risk Veterans*	Peter Britton, Ph.D., M.S.	Syracuse VA Medical Center	Veterans	Prediction of imminent risk	Assessment Epidemiology and/or basic science/ neurological mechanisms
10/09–09/13	654,318	*Neurobiology of Suicide Risk in Traumatic Brain Injury and Substance Abuse*	Deborah Yurgelun-Todd, Ph.D.	VA Rocky Mountain Network (Veterans Integrated Service Network 19)	Veterans	Prediction of imminent risk Improved biological interventions	Assessment Epidemiology and/or basic science/ neurological mechanisms
04/08–03/12	601,175	*Serotonin 2C Receptor mRNA Editing in Suicide*	Stella Dracheva (Plevan), Ph.D.	Bronx VA Hospital	Veterans	Prediction of imminent risk Improved biological interventions	Assessment Epidemiology and/or basic science/ neurological mechanisms

Table A.4
DHHS-Funded Suicide Prevention Studies

Funding Dept.	Start–End	Funding ($)	Title	Principal Investigator(s)	Researching Organization	Participants	NAASP Category	MOMRP Category
AHRQ	01/10–06/13	1,476,745	*Health-Related Quality of Life in Teens with Depression–HRQL Teen Depression*	Frances Lynch, Ph.D.	Kaiser Foundation	Civilians	Risk and protective factor interactions	Early screening/intervention; Epidemiology and/or basic science/neurological mechanisms
AHRQ	08/10–06/12	299,576	*The Public Health Trust Jackson Health System Proposes to Improve Patients*	Nicoletta Tessler, M.A.	Public Health Trust of Miami-Dade County, Florida	Civilians	Affordable, accessible, and effective care; Population-based risk reduction/resilience-building	Assessment
CDC-NCIPC	09/08–08/11	897,518	*Prospective Risk and Protective Factors for Suicide and Co-Occurring Risk Behaviors*	Malfred van Dulmen, Ph.D.	Kent State University	Civilians	Risk and protective factor interactions	Assessment; Epidemiology and/or basic science/neurological mechanisms
CDC-NCIPC	09/10–09/15	396,100	*Links to Enhancing Teens' Connectedness (LET's CONNECT)*	Cheryl King, Ph.D.	University of Michigan	Civilians	Affordable, accessible, and effective care	Early screening/intervention; Epidemiology and/or basic science/neurological mechanisms
CDC-NCIPC	08/10–07/13	399,930	*Etiology of Suicidal Behavior During Adolescence and Emerging Adulthood*	Kenneth Conner, Ph.D.	University of Rochester	Civilians	Risk and protective factor interactions; Prediction of imminent risk	Early screening/intervention; Epidemiology and/or basic science/neurological mechanisms
National Center for Infectious Diseases	09/09–08/11	698,270	*College Students with Elevated Suicide Risk: Enhancing Treatment Linkage*	Cheryl A. King, Ph.D.	University of Michigan	Civilians	Affordable, accessible, and effective care; Risk and protective factor interactions; Prediction of imminent risk	Early screening/intervention; Epidemiology and/or basic science/neurological mechanisms

Table A.4—Continued

Funding Dept.	Start–End	Funding ($)	Title	Principal Investigator(s)	Researching Organization	Participants	NAASP Category	MOMRP Category
National Institute on Alcohol Abuse and Alcoholism	08/08–08/13	157,021	*Alcohol, Suicide and HIV Prevention of Teens in Mental Health Treatment*	Christianne L. Esposito-Smythers, Ph.D.	George Mason University	Civilians	Population-based risk reduction/resilience-building	Prevention, education, and training
							Population-based screening	Early screening/intervention
								Epidemiology and/or basic science/neurological mechanisms
National Institute on Alcohol Abuse and Alcoholism	09/11–08/14	344,918	*Acute Alcohol Use and Suicide*	Mark S. Kaplan, Ph.D.	Portland State University	Veterans	Psychosocial interventions for those at risk	Prevention, education, and training
							Risk and protective factor interactions	Early screening/intervention
							Population-based risk reduction/resilience-building	Epidemiology and/or basic science/neurological mechanisms
National Institute on Alcohol Abuse and Alcoholism	04/11–03/13	203,436	*Suicidal Ideation and Alcohol Outcomes In Emerging Adult College Drinkers*	Vivian M. Gonzalez, Ph.D.	University of Alaska, Anchorage	Civilians	Risk and protective factor interactions	Early screening/intervention
								Epidemiology and/or basic science/neurological mechanisms
National Institute on Alcohol Abuse and Alcoholism	08/11–07/13	146,077	*Novel Web-Based Intervention for Heavy Drinking and Depressed College Students*	Irene M. Geisner, Ph.D.	University of Washington	Civilians	Psychosocial interventions for those at risk	Treatment
National Institute on Alcohol Abuse and Alcoholism	08/12–07/14	214,906	*The Acute Alcohol-Suicide Attempt Relation as a Function of Alcohol Use Disorders*	Courtney L. Bagge, Ph.D.	University of Mississippi Medical Center	Civilians	Psychosocial interventions for those at risk	Assessment
							Risk and protective factor interactions	Epidemiology and/or basic science/neurological mechanisms
							Prediction of imminent risk	
							Population-based screening	

Funding Dept.	Start–End	Funding ($)	Title	Principal Investigator(s)	Researching Organization	Participants	NAASP Category	MOMRP Category
Eunice Kennedy Shriver National Institute on Child Health and Human Development	09/04–08/08	2,049,838	*Youth Violence Exposure: A National Longitudinal Study*	Dean G. Kilpatrick, Ph.D., M.D.	Medical University of South Carolina	Civilians	Risk and protective factor interactions Prediction of imminent risk Population-based screening	Early screening/intervention Epidemiology and/or basic science/neurological mechanisms
Eunice Kennedy Shriver National Institute on Child Health and Human Development	09/06–08/10	234,000	*School-Based Suicide Prevention: Building Skills, Resources and Capacity*	Richard K Ries, Ph.D.	University of Washington	Civilians	Enhanced continuity of care Provider and gatekeeper training Risk and protective factor interactions	Prevention, education, and training Early screening/intervention Epidemiology and/or basic science/neurological mechanisms
Eunice Kennedy Shriver National Institute on Child Health and Human Development	09/09–08/10	421,116	*School-Based Suicide Prevention: Building Skills, Resources and Capacity*	Elaine M. Walsh, Ph.D.	University of Washington	Civilians	Enhanced continuity of care Provider and gatekeeper training Risk and protective factor interactions	Prevention, education, and training Early screening/intervention Epidemiology and/or basic science/neurological mechanisms
Eunice Kennedy Shriver National Institute on Child Health and Human Development	07/10–05/14	1,014,831	*Quasi-Experimental Studies of Early Risk Factors for Severe Psychopathology*	Brian M. D'Onofrio, Ph.D.	Indiana University, Bloomington	Civilians	Risk and protective factor interactions	Early screening/intervention Epidemiology and/or basic science/neurological mechanisms

Funding Dept.	Start–End	Funding ($)	Title	Principal Investigator(s)	Researching Organization	Participants	NAASP Category	MOMRP Category
National Institute on Drug Abuse	05/09–04/10	195,000	*Preventing Addiction-Related Suicide*	Richard Ries, M.D.	University of Washington	Civilians	Affordable, accessible, and effective care Psychosocial interventions for those at risk Risk and protective factor interactions	Treatment Epidemiology and/or basic science/neurological mechanisms
National Institute on Drug Abuse	01/09–05/10	193,125	*Developing an Intervention to Address Suicide Risk During Substance Use Disorder*	Mark Ilgen, Ph.D.	University of Michigan	Civilians	Affordable, accessible, and effective care Psychosocial interventions for those at risk Risk and protective factor interactions	Treatment
NIMH	07/03–03/08	1,324,991	*Community-Based Cognitive Therapy for Suicide Attempters*	Aaron T. Beck, M.D.	University of Pennsylvania	Civilians	Prevention of reattempts Psychosocial interventions for those at risk	Assessment Treatment
NIMH	09/03–08/09	584,760	*Study of Gatekeeper Training for Suicide Prevention*	Peter A. Wyman, Ph.D.	University of Rochester	Civilians	Provider and gatekeeper training Affordable, accessible, and effective care Psychosocial interventions for those at risk Risk and protective factor interactions	Prevention, education, and training Early screening/intervention Assessment Epidemiology and/or basic science/neurological mechanisms
NIMH	08/06–05/11	2,028,646	*Components of Effective Suicide Prevention in the USAF*	Kerry L. Knox, Ph.D.	University of Rochester	Air Force	Provider and gatekeeper training Psychosocial interventions for those at risk Risk and protective factor interactions Stigma reduction Population-based risk reduction/resilience-building	Prevention, education, and training Early screening/intervention

Table A.4—Continued

Funding Dept.	Start–End	Funding ($)	Title	Principal Investigator(s)	Researching Organization	Participants	NAASP Category	MOMRP Category
NIMH	03/07–02/10	635,842	*Development of an Intervention for Suicide Attempters*	Ivan W. Miller, Ph.D.	Butler Hospital	Civilians	Prevention of reattempts Prediction of imminent risk	Treatment
NIMH	05/07–02/10	625,726	*Family Based Intervention for Adolescent Suicide Attempters*	Joan R. Asarnow, Ph.D.	University of California, Los Angeles	Civilians	Prevention of reattempts	Treatment
NIMH	08/07–05/10	615,600	*Adolescent Emergency Patients: Suicide Risk Detection and Treatment Facilitation*	Cheryl A. King, Ph.D.	University of Michigan	Civilians	Provider and gatekeeper training Prediction of imminent risk	Assessment Epidemiology and/or basic science/neurological mechanisms
NIMH	03/08–12/12	2,177,675	*5-HT1A Receptor Anti-Apoptotic Transduction Pathways in Suicide*	Victoria Arango, Ph.D.	Columbia University Health Sciences	Civilians	Improved biological interventions	Epidemiology and/or basic science/neurological mechanisms
NIMH	09/08–05/13	3,261,056	*Prevention of Suicidality in College Students: A Common Core Process Approach*	Steven C. Hayes, Ph.D.	University of Nevada, Reno	Civilians	Psychosocial interventions for those at risk	Early screening/intervention
NIMH	08/09–07/12	725,838	*Concurrent Treatment for Parents and Adolescents Who Attempt Suicide*	Anthony N. Spirito, Ph.D.	Brown University	Civilians	Prevention of reattempts Prediction of imminent risk	Treatment
NIMH	09/09–05/14	9,872,609	*Emergency Department Safety Assessment and Follow-Up Evaluation (ED-SAFE) Trial*	Edwin D. Boudreaux, Ph.D.	University of Massachusetts	Civilians	Enhanced continuity of care Prediction of imminent risk	Early screening/intervention Assessment Treatment

Funding Dept.	Start–End	Funding ($)	Title	Principal Investigator(s)	Researching Organization	Participants	NAASP Category	MOMRP Category
NIMH	07/10–04/15	1,749,266	*Effectiveness Trial of Youth Suicide Prevention Delivered by Teen Peer Leaders*	Peter A. Wyman, Ph.D.	University of Rochester	Civilians	Psychosocial interventions for those at risk Stigma reduction Population-based screening	Early screening/intervention Treatment
NIMH	02/10–01/14	566,200	*Measurement of Social-Cognitive Risk Factors for Suicidal Ideation and Behavior*	Regina Miranda, Ph.D.	City University of New York, Research Foundation	Civilians	Risk and protective factor interactions Prediction of imminent risk	Assessment Epidemiology and/or basic science/neurological mechanisms
NIMH	04/12–08/16	1,289,112	*Attachment-Based Family Therapy for Suicidal Adolescents*	Guy S. Diamond, Ph.D.	Children's Hospital of Philadelphia	Civilians	Prevention of reattempts Provider and gatekeeper training	Treatment
NIMH	10/12–12/12	485,671	*Coping Long-Term with Attempted Suicide Program—Adolescents*	Shirley Yen, Ph.D.	Brown University	Civilians	Prevention of reattempts Risk and protective factor interactions	Treatment Epidemiology and/or basic science/neurological mechanisms
NIMH	09/12–08/16	235,500	*Reducing Suicide Ideation Through Insomnia Treatment (REST-IT)*	Andrew D. Krystal, Ph.D.	Duke University	Civilians	Improved biological interventions	Treatment Epidemiology and/or basic science/neurological mechanisms
NIMH	07/12–04/17	584,104	*Ketamine vs. Midazolam: Testing Rapid Relief of Suicide Risk in Depression*	Michael F. Grunebaum, Ph.D.	Columbia University	Civilians	Risk and protective factor interactions Improved biological interventions	Treatment Epidemiology and/or basic science/neurological mechanisms
NIMH	07/12–08/13	360,000	*Pilot Study of Online Interventions for Population-Based Suicide Prevention*	Ursula S. Whiteside, Ph.D.	Group Health Cooperative Central Hospital	Civilians	Population-based risk reduction/resilience-building Prediction of imminent risk Population-based screening	Early screening/intervention Epidemiology and/or basic science/neurological mechanisms

Funding Dept.	Start–End	Funding ($)	Title	Principal Investigator(s)	Researching Organization	Participants	NAASP Category	MOMRP Category
NIMH	09/07–05/11	295,200	*Genetic Risk Factor Suicidal Behavior*	Virginia L. Willour, Ph.D.	University of Iowa	Civilians	Risk and protective factor interactions	Epidemiology and/or basic science/neurological mechanisms
NIMH	12/09–11/14	642,170	*Stress Responses as Prospective Predictors of Girls' Suicidality and Self-Injury*	Mitchell J. Prinstein, Ph.D.	University of North Carolina Chapel Hill	Civilians	Risk and protective factor interactions	Early screening/intervention Epidemiology and/or basic science/neurological mechanisms
NIMH	12/08–11/09	400,750	*Future Suicide Attempt: Psychobiological Features*	Maria A. Oquendo, M.D.	Columbia University	Civilians	Risk and protective factor interactions	Early screening/intervention Epidemiology and/or basic science/neurological mechanisms
NIMH	04/09–02/10	244,383	*Adapting Exercise Treatment for Depression to Adolescents: A Pilot Study*	Andrea L. Dunn, Ph.D.	Klein Buendel, Inc.	Civilians	Provider and gatekeeper training Affordable, accessible, and effective care Psychosocial interventions for those at risk Risk and protective factor interactions	Treatment Epidemiology and/or basic science/neurological mechanisms
NIMH	07/09–06/10	129,546	*Statistical Methods for Predicting Suicide Attempt*	Hanga Galfalvy, Ph.D.	Columbia University	Civilians	Prediction of imminent risk	Prevention, education, and training Early screening/intervention Epidemiology and/or basic science/neurological mechanisms
NIMH	08/09–04/12	178,340	*Antidepressant Use and Suicidality: Comparative Safety in Children and Adults*	Sebastian Schneeweiss, M.D.	Brigham and Women's Hospital	Civilians	Risk and protective factor interactions Reduction in access to lethal means	Prevention, education, and training Epidemiology and/or basic science/neurological mechanisms

Table A.4—Continued

Funding Dept.	Start–End	Funding ($)	Title	Principal Investigator(s)	Researching Organization	Participants	NAASP Category	MOMRP Category
NIMH	08/09–01/12	265,558	*Antidepressant Use and Suicide*	Susan Busch, Ph.D.	Yale University	Civilians	Risk and protective factor interactions	Prevention, education, and training
							Reduction in access to lethal means	Epidemiology and/or basic science/neurological mechanisms
NIMH	07/09–06/10	32,150	*Anorexia Nervosa and Suicidal Behaviors*	April Smith, Ph.D.	Florida State University	Civilians	Risk and protective factor interactions	Assessment
							Prediction of imminent risk	Epidemiology and/or basic science/neurological mechanisms
NIMH	09/09–08/10	606,836	*Glutamatergic Modulators for Rapid and Sustained Antidepressant Effect*	April Smith, Ph.D.	Florida State University	Civilians	Improved biological interventions	Epidemiology and/or basic science/neurological mechanisms
NIMH	01/07–01/09	286,771	*Seasonality of Suicide and Airborne Allergens*	Teodor Postolache, M.D.	University of Maryland	Civilians	Risk and protective factor interactions	Epidemiology and/or basic science/neurological mechanisms
NIMH	09/11–09/12	41,309	*Early Stress and Suicidal Behavior*	Quetzal Class	Indiana University, Bloomington	Civilians	Prediction of imminent risk	Prevention, education, and training
								Early screening/intervention
NIMH	08/11–08/12	41,800	*Brief Skills Training Intervention for Suicidal Individuals*	Erin Ward-Ciesielski	University of Washington	Civilians	Affordable, accessible, and effective care	Treatment
							Psychosocial interventions for those at risk	
NIMH	07/11–05/16	614,555	*Family Therapy for Hospital Care*	Guy Diamond, Ph.D.	Children's Hospital of Philadelphia	Civilians	Enhanced continuity of care	Treatment
							Psychosocial interventions for those at risk	

Funding Dept.	Start–End	Funding ($)	Title	Principal Investigator(s)	Researching Organization	Participants	NAASP Category	MOMRP Category
National Institute of Nursing Research	09/04–08/08	1,364,937	*Youth Suicide Prevention: Maintaining Long-Term Change*	Brooke P. Randell, Ph.D. (year 1–3); Carole Hooven, Ph.D. (year 4)	University of Washington	Civilians	Population-based risk reduction/resilience-building	Early screening/intervention Assessment Epidemiology and/or basic science/neurological mechanisms
National Institute of Nursing Research	06/06–03/11	1,606,542	*Cast Intervention for Reducing Adolescent Risk Behaviors*	Elaine A. Thompson, Ph.D., R.N.	University of Washington	Civilians	Risk and protective factor interactions	Prevention, education, and training Epidemiology and/or basic science/neurological mechanisms

Table A.5
American Foundation for Suicide Prevention Studies

Grant Year	Funding ($)	Title	Principal Investigator(s)	Researching Organization	Participants	NAASP Category	MOMRP Category
2012	100,000	*Mindfulness-Based Cognitive Therapy + Safety Planning for Suicidal Behavior: A Treatment Development Study Postdoctoral Research Fellowship*	Megan Chesin, Ph.D.	Columbia University	Civilians	Psychosocial interventions for those at risk	Assessment Treatment Epidemiology and/or basic science/neurological mechanisms
2012	98,804	*Feasibility of an Online Intervention for Population-Based Suicide*	Ursula Whiteside, Ph.D.	Group Health Cooperative	Civilians	Psychosocial interventions for those at risk Risk and protective factor interactions	Treatment
2012	85,000	*Self Harm and Suicide Attempt Risk: Evaluation of an Intervention for Youths with Self-Harm Behavior*	Jennifer L. Hughes, Ph.D.	University of California, Los Angeles	Civilians	Enhanced continuity of care Risk and protective factor interactions	Prevention, education, and training Assessment Epidemiology and/or basic science/neurological mechanisms
2012	85,000	*Optical Brain Imaging Predictors of Treatment Response to Dialectical Behaviour Therapy for Non-Suicidal Self-Injury in Borderline Personality Disorder*	Anthony Ruocco, Ph.D.	University of Toronto, Scarborough	Civilians	Prediction of imminent risk Improved biological interventions	Recovery and return to duty Epidemiology and/or basic science/neurological mechanisms
2012	85,000	*Identifying Risk Factors and Intervention Methods to Prevent Suicide in Pediatric Bipolar Disorder*	Sally M. Weinstein, Ph.D.	University of Illinois at Chicago	Civilians	Prediction of imminent risk	Prevention, education, and training Early screening/intervention Assessment Treatment
2012	84,072	*The Electronic Intervention for Suicidality (EIS): A Novel Adjunctive Treatment for Suicide Risk*	Michael Armey, Ph.D.	Butler Hospital	Civilians	Enhanced continuity of care	Prevention, education, and training Treatment

Grant Year	Funding ($)	Title	Principal Investigator(s)	Researching Organization	Participants	NAASP Category	MOMRP Category
2012	83,911	*Posttraumatic Stress Disorder and Suicide Among Massachusetts Veterans*	Jaimie L. Gradus, D.Sc., M.P.H.	Boston VA Research Institute	Veterans	Enhanced continuity of care	Prevention, education, and training
2012	75,000	*Placebo-Controlled Trial of Lithium + TAU for Acute Suicidal Ideation and/or Behavior in Patients with Major Depression*	Michael Bauer, M.D., Ph.D.	University Hospital Carl Gustav Carus, Technische Universität Dresden	Civilians	Prevention of reattempts Improved biological interventions	Treatment Epidemiology and/or basic science/neurological mechanisms
2012	75,000	*Modeling 5-HT1A Receptor Transduction Pathways in Suicide*	Thomas Franke, M.D., Ph.D.	New York University School of Medicine	Civilians	Psychosocial interventions for those at risk Risk and protective factor interactions Population-based risk reduction/resilience-building	Prevention, education, and training Early screening/intervention Epidemiology and/or basic science/neurological mechanisms
2012	75,000	*Multilingual Assessment of Suicidal Ideation and Behavior on the Internet*	Yan Leykin, Ph.D.	University of California, San Francisco	Civilians	Population-based risk reduction/resilience-building Prediction of imminent risk	Treatment Epidemiology and/or basic science/neurological mechanisms
2012	75,000	*Brief Sleep Intervention for Suicide in Bipolar Disorder*	Louisa Sylvia, Ph.D.	Massachusetts General Hospital	Civilians	Affordable, accessible, and effective care Psychosocial interventions for those at risk	Prevention, education, and training Assessment Treatment
2012	74,944	*Suicide Onset Following Antidepressant Initiation*	Robert Penfold, Ph.D.	Group Health Cooperative	Civilians	Psychosocial interventions for those at risk	Treatment
2012	74,767	*Randomized, Double-Blind Ketamine Augmentation in Chronically Suicidal, Treatment-Resistant Major Depression*	Cristina Cusin, M.D.	Massachusetts General Hospital	Civilians	Psychosocial interventions for those at risk Risk and protective factor interactions Population-based risk reduction/resilience-building Prediction of imminent risk	Treatment

Table A.5—Continued

Grant Year	Funding ($)	Title	Principal Investigator(s)	Researching Organization	Participants	NAASP Category	MOMRP Category
2012	72,818	*Improving Clinical Evaluations of Suicide Risk and Their Relationship to Care Planning*	Christopher Buckingham, Ph.D.	Aston University, UK	Civilians	Prevention of reattempts	Assessment
2012	72,040	*Feasibility and Efficacy of a DBT Skills "App" for Suicidal Individuals with BPD*	Shireen Rizvi, Ph.D.	Rutgers University	Civilians	Psychosocial interventions for those at risk Risk and protective factor interactions	Prevention, education, and training Assessment
2012	30,000	*Familial Risk for Suicide and Self-Injury: Testing Theories in Multigenerational Pedigrees*	Sheila Crowell, Ph.D.	University of Utah	Civilians	Prediction of imminent risk	Prevention, education, and training
2012	30,000	*A Pilot Study of Suicide Assessment in Rural Adults*	Kelly Cukrowicz, Ph.D.	Texas Tech University	Civilians	Affordable, accessible, and effective care Prediction of imminent risk	Prevention, education, and training
2012	30,000	*Person-Specific Modeling of Suicidal Ideation in Sexual Minority Youth*	Katerina O. Sinclair, Ph.D., M.A.S.	University of Arizona	Civilians	Prediction of imminent risk	Assessment
2012	29,969	*Medical Students' Suicide Risk Assessment Proficiency After Interacting with a Virtual Patient in Crisis*	Adriana Foster, M.D.	Medical College of Georgia, Georgia Health Sciences University	Civilians	Prediction of imminent risk	Prevention, education, and training Assessment
2011	100,000	*Life Stress and Affect Regulation in Multiple and First-Time Adolescent Suicide Attempters*	Richard Liu, M.A., Ph.D. candidate	University of Illinois, Chicago	Civilians	Improved biological interventions	Epidemiology and/or basic science/neurological mechanisms
2011	100,000	*White Matter Integrity and Suicide Attempt History*	Doreen Olvet, Ph.D.	Columbia University	Civilians	Psychosocial interventions for those at risk	Prevention, education, and training Assessment Treatment

Grant Year	Funding ($)	Title	Principal Investigator(s)	Researching Organization	Participants	NAASP Category	MOMRP Category
2011	88,000	*Functional Analysis of Differential DNA Methylation in Frontal Cortex of Suicide Completers*	Gilles Maussion, Ph.D.	Douglas Mental Health Institute, McGill University	Civilians	Risk and protective factor interactions	Epidemiology and/or basic science/neurological mechanisms
2011	85,000	*Lethal Means Restriction for Suicide Prevention: Beliefs and Behaviors of Emergency Department Providers*	Marian Betz, M.D., M.P.H.	University of Colorado, Denver	Civilians	Psychosocial interventions for those at risk	Prevention, education, and training Assessment
2011	85,000	*Copy Number Variation in Suicide*	Carl Ernst, Ph.D.	Harvard University	Civilians	Enhanced continuity of care Stigma reduction	Prevention, education, and training Early screening/intervention
2011	85,000	*A Test of the Interpersonal-Psychological Theory of Suicide in Prison Inmates*	Jon T. Mandracchia, Ph.D.	University of Southern Mississippi	Civilians	Improved biological interventions	Epidemiology and/or basic science/neurological mechanisms
2011	85,000	*Ketamine for Rapid Reduction of Suicidal Ideation and Suicide Risk in Hospitalized Patients*	James W. Murrough, M.D.	Mount Sinai School of Medicine	Civilians	Psychosocial interventions for those at risk	Epidemiology and/or basic science/neurological mechanisms
2011	85,000	*Objective Sleep and Suicide in General Population Sample of Youth*	Ravi Singareddy, M.D.	Pennsylvania State University	Civilians	Risk and protective factor interactions	Prevention, education, and training Epidemiology and/or basic science/neurological mechanisms
2011	81,990	*The Acquired Capability for Suicide: A Mechanism Underlying the Gender Disparity in Suicide Rates*	Phillip Smith, Ph.D.	University of South Alabama	Civilians	Risk and protective factor interactions	Early screening/intervention Epidemiology and/or basic science/neurological mechanisms
2011	75,000	*The Neural Circuitry of Suicidality in Adolescent Depression*	Hilary P. Blumberg, M.D.	Yale University	Civilians	Psychosocial interventions for those at risk	Epidemiology and/or basic science/neurological mechanisms

Grant Year	Funding ($)	Title	Principal Investigator(s)	Researching Organization	Participants	NAASP Category	MOMRP Category
2011	75,000	*Meta-Analysis of Case-Control Psychological Autopsy Studies of Suicide*	Kenneth R. Conner, Psy.D.	University of Rochester Medical Center	Civilians	Improved biological interventions	Epidemiology and/or basic science/neurological mechanisms
2011	75,000	*The Consequences of Bereavement by Suicide*	Annette Erlangsen, Ph.D.	Johns Hopkins University	Civilians	Risk and protective factor interactions Stigma reduction Prediction of imminent risk	Postvention Epidemiology and/or basic science/neurological mechanisms
2011	75,000	*Fatal Decisions: Behavioral Economic Study of Decision Pathways to Suicidal Behavior in the Second Half of Life*	Katalin Szanto, M.D.	University of Pittsburgh Western Psychiatric Institute	Civilians	Psychosocial interventions for those at risk	Prevention, education, and training Early screening/intervention
2011	74,655	*Smoking and Suicide: Changes in State Tobacco Policies as Natural Experiments*	Richard A. Grucza, Ph.D., M.P.E.	Washington University School of Medicine	Civilians	Prediction of imminent risk	Prevention, education, and training Assessment
2011	73,680	*A Functional Magnetic Imaging Study (fMRI) in First-Degree Relatives of Suicide Completers*	Fabrice Jollant, M.D., Ph.D.	Douglas Mental Health Institute, McGill University	Civilians	Psychosocial interventions for those at risk Improved biological interventions	Early screening/intervention Epidemiology and/or basic science/neurological mechanisms
2010	100,000	*Investigation of Inheritance Patterns of Polymorphisms in Genes Regulating the Hypothalamic-Pituitary-Adrenal (HPA Axis), in Relation to Suicidal Behavior and Its Endophenotypes*	Danuta Wasserman, M.D., Ph.D.	Karolinska Institute, Stockholm, Sweden	Civilians	Psychosocial interventions for those at risk	Epidemiology and/or basic science/neurological mechanisms
2010	100,000	*GABA System Genes and Suicidal Behavior in Psychiatric Disorders*	Clement Zai, Ph.D.	Centre for Addiction and Mental Health, Toronto	Civilians	Risk and protective factor interactions	Assessment Epidemiology and/or basic science/neurological mechanisms

Grant Year	Funding ($)	Title	Principal Investigator(s)	Researching Organization	Participants	NAASP Category	MOMRP Category
2010	85,000	*Global Expression Analysis of Patients with Treatment Emergent Suicidal Ideations Young Investigator Grant*	Falk Lohoff, M.D.	University of Pennsylvania	Civilians	Improved biological interventions	Epidemiology and/or basic science/neurological mechanisms
2010	84,888	*Identification of Neurophysiological Markers of Suicidal Behavior and Impulsivity in Bipolar Disorder*	Masoud Kamali, M.D.	University of Michigan	Civilians	Risk and protective factor interactions	Assessment Epidemiology and/or basic science/neurological mechanisms
2010	74,944	*MicroRNAs in Postmortem Brains of Suicide Subjects*	Yogesh Dwivedi, Ph.D.	University of Illinois at Chicago	Civilians	Improved biological interventions	Epidemiology and/or basic science/neurological mechanisms
2009	240,031	*Optimizing Treatment of Complicated Grief*	Katherine Shear, M.D.	Columbia University University of Pittsburgh School of Medicine Harvard Medical School University of California, San Diego San Diego VA Healthcare System	Civilians	Enhanced continuity of care Provider and gatekeeper training Affordable, accessible, and effective care Improved biological interventions	Treatment Epidemiology and/or basic science/neurological mechanisms
2009	99,996	*Emergency Mental Health Management Following Deliberate Self-Harm*	Mark Olfson, M.D., M.P.H.	Columbia University	Civilians	Enhanced continuity of care Affordable, accessible, and effective care	Treatment
2009	99,500	*Differential microRNA (µRNA) Expression in the Prefrontal Cortex of Suicides*	Gustavo Turecki, M.D., Ph.D.	Douglas Hospital Research Institute, McGill University	Civilians	Improved biological interventions	Epidemiology and/or basic science/neurological mechanisms

Table A.5—Continued

Grant Year	Funding ($)	Title	Principal Investigator(s)	Researching Organization	Participants	NAASP Category	MOMRP Category
2009	98,570	*An fMRI Study of Affect Arousal and Cognitive Control in Suicidal Subjects with Borderline Personality Disorder*	Paul Soloff, M.D.	University of Pittsburgh	Civilians	Psychosocial interventions for those at risk	Epidemiology and/or basic science/neurological mechanisms
2009	98,406	*Factors Associated with Suicide in Youth and Adults with Eating Disorders*	Cynthia Bulik, Ph.D., F.A.E.D.	University North Carolina	Civilians	Risk and protective factor interactions Prediction of imminent risk	Assessment Epidemiology and/or basic science/neurological mechanisms
2009	85,000	*Personality Disorders and Suicidal Behaviors: A Prospective Study of Associations, Mediators and Moderators*	Emily B. Ansell, Ph.D.	Yale University School of Medicine	Civilians	Psychosocial interventions for those at risk	Treatment Epidemiology and/or basic science/neurological mechanisms
2009	85,000	*Investigation into the Role of Genes and Stress in Depression and Suicide Among Medical Interns*	Srijan Sen, Ph.D., M.D.	University of Michigan	Civilians	Improved biological interventions	Epidemiology and/or basic science/neurological mechanisms
2009	85,000	*BDNF Promoter Methylation and Suicidal Behavior in Bipolar Disorder*	John Strauss, M.D., M.Sc.	Centre for Addiction and Mental Health, University of Toronto	Civilians	Improved biological interventions	Epidemiology and/or basic science/neurological mechanisms
2009	85,000	*Development of a Treatment Protocol for Suicidal Latino/a Adolescents*	Yovanska Duarte-Velez, Ph.D.	Brown University	Civilians	Provider and gatekeeper training Affordable, accessible, and effective care Psychosocial interventions for those at risk Prediction of imminent risk	Treatment
2009	84,722	*Epidemiology of Undetermined Deaths: Prevalence and Patterns of Misclassified Suicides*	Nathalie Huguet, Ph.D.	Portland State University	Civilians	Risk and protective factor interactions	Epidemiology and/or basic science/neurological mechanisms

Grant Year	Funding ($)	Title	Principal Investigator(s)	Researching Organization	Participants	NAASP Category	MOMRP Category
2009	84,508	*Evaluation of a Gatekeeper Training Program as Suicide Intervention Training for Medical Students*	Shay-Lee Bolton, M.Sc.	University of Manitoba	Civilians	Enhanced continuity of care Provider and gatekeeper training	Prevention, education, and training
2009	75,000	*Predicting Suicidal Behavior: Internal Consistency and Predictive Validity of the Suicide Trigger Scale*	Igor Galynker, M.D., Ph.D.	Beth Israel Medical Center	Civilians	Prediction of imminent risk	Prevention, education, and training Early screening/intervention
2009	75,000	*Paliperidone and Lithium in the Treatment of Suicidality-Treatment Indication and Epigenetic Regulation*	Richard Shelton, M.D.	University of Alabama, Birmingham	Civilians	Enhanced continuity of care Improved biological interventions	Treatment Epidemiology and/or basic science/neurological mechanisms
2009	75,000	*Number and Severity of Suicide Attempts: Relationship with Toxoplasma Gondii Antibodies*	Teodor Postolache, M.D.	University of Maryland School of Medicine	Civilians	Improved biological interventions	Epidemiology and/or basic science/neurological mechanisms
2009	74,700	*A Randomized Controlled Trial Investigating the Impact of a Regular SMS on Suicide Risk Among School Students*	Jo Robinson, M.Sc.	Orygen Youth Health Research Center	Civilians	Enhanced continuity of care Psychosocial interventions for those at risk	Treatment Epidemiology and/or basic science/neurological mechanisms
2009	74,526	*Genetic and Clinical Predictors of Suicidal Behavior in Veterans Returning from Iraq and Afghanistan*	Rachel Yehuda, Ph.D.	Mount Sinai School of Medicine	Veterans	Risk and protective factor interactions	Early screening/intervention Epidemiology and/or basic science/neurological mechanisms
2009	29,320	*Alcohol as an Acute Risk Factor for Suicide Attempts: A Case-Crossover Pilot Study*	Courtney Bagge, Ph.D.	University of Mississippi Medical Center	Civilians	Risk and protective factor interactions	Early screening/intervention Epidemiology and/or basic science/neurological mechanisms

Table A.5—Continued

Grant Year	Funding ($)	Title	Principal Investigator(s)	Researching Organization	Participants	NAASP Category	MOMRP Category
2008	100,000	*Diffusion Tensor Imaging Studies of Suicidal Behavior*	Emil F. Coccaro, M.D.	University of Chicago	Civilians	Psychosocial interventions for those at risk	Prevention, education, and training
2008	100,000	*Childhood Traumatic Stress and Adolescent Girls' Suicidality: A Longitudinal Examination of Psychophysiological Mechanisms*	Nicole Heilbron, Ph.D.	University of North Carolina	Civilians	Risk and protective factor interactions Prediction of imminent risk	Epidemiology and/or basic science/neurological mechanisms
2008	100,000	*Dissecting Serotonergic Influences on Impulsivity and Aggression*	Luis Pennanen, Ph.D.	University of California, San Francisco	Civilians	Prediction of imminent risk Improved biological interventions	Assessment Epidemiology and/or basic science/neurological mechanisms
2008	100,000	*Examination of a Relapse Prevention Task in Preventing Future Suicide Attempts*	Megan Spokas, Ph.D.	University of Pennsylvania	Civilians	Enhanced continuity of care Provider and gatekeeper training Psychosocial interventions for those at risk	Postvention Epidemiology and/or basic science/neurological mechanisms
2008	99,998	*Suicide Clusters Across the Globe: Geospatial Trends from America, Ireland and New Zealand*	Gregory Luke Larkin, M.D., M.S., M.S.P.H.	Yale University School of Medicine	Civilians	Risk and protective factor interactions	Epidemiology and/or basic science/neurological mechanisms
2008	99,928	*Safety Planning Intervention for Suicidal Individuals Who Contact Crisis Centers*	Barbara Stanley, Ph.D.	Columbia University	Civilians	Provider and gatekeeper training Psychosocial interventions for those at risk	Treatment
2008	89,783	*A Prospective Study of Completed Suicide in a Large Bipolar I Disorder Sample*	William Coryell, M.D.	University of Iowa	Civilians	Population-based risk reduction/ resilience-building Prediction of imminent risk	Postvention Epidemiology and/or basic science/neurological mechanisms
2008	85,000	*Bio-Behavioral Markers of Affect Regulation in Teen Suicide Attempters versus Non-Suicidal Self-Injurers*	Daniel P. Dickstein, M.D.	Brown University	Civilians	Prediction of imminent risk Improved biological interventions	Early screening/intervention Epidemiology and/or basic science/neurological mechanisms

Grant Year	Funding ($)	Title	Principal Investigator(s)	Researching Organization	Participants	NAASP Category	MOMRP Category
2008	85,000	*Cognitive Control and Emotion Processing Markers of High-Intent Suicide Ideations in Adolescents*	Fadi T. Maalouf, M.D.	University of Pittsburgh	Civilians	Prediction of imminent risk	Early screening/intervention Assessment
2008	85,000	*Childhood Trauma and Suicidal Behaviors: The Role of the Hypothalamic-Pituitary-Adrenal Axis in Mediating Risk*	Holly C. Wilcox, Ph.D.	Johns Hopkins University	Civilians	Improved biological interventions	Epidemiology and/or basic science/neurological mechanisms
2008	85,000	*Family Therapy for Hospital Care*	Guy Diamond, Ph.D.	Children's Hospital of Philadelphia	Civilians	Enhanced continuity of care Psychosocial interventions for those at risk	Treatment
2008	85,000	*Suicide among Military Veterans: Analysis of the National Violent Death Reporting System*	Mark Kaplan,M.P.H., Dr.P.H.	Portland State University	Civilians	Psychosocial interventions for those at risk Risk and protective factor interactions	Prevention, education, and training Epidemiology and/or basic science/neurological mechanisms
2008	85,000	*Glutamatergic Signaling in the Locus Coeruleus in Depression and Suicide*	Gregory Ordway, Ph.D.	East Tennessee State University	Civilians	Improved biological interventions	Epidemiology and/or basic science/neurological mechanisms
2008	85,000	*Explaining the Sexual Orientation Disparity in Adolescent Suicide Risk*	Stephen Russell, Ph.D.	University of Arizona	Civilians	Prediction of imminent risk	Prevention, education, and training Epidemiology and/or basic science/neurological mechanisms
2008	74,700	*Suicide Rates and Misclassification of Suicides in Hui, Tibetan and Han in Qinghai Province of China*	Liang Zhou, M.D., Ph.D.	Xiangya Medical School	Civilians	Psychosocial interventions for those at risk Risk and protective factor interactions	Prevention, education, and training Epidemiology and/or basic science/neurological mechanisms
2008	72,250	*Genetic Variation in Glutamate Receptor Subunits May Contribute to Suicidal Ideation Susceptibility in Pregnancy*	Alicia Smith, Ph.D.	Emory University	Civilians	Prediction of imminent risk Improved biological interventions	Assessment

Table A.5—Continued

Grant Year	Funding ($)	Title	Principal Investigator(s)	Researching Organization	Participants	NAASP Category	MOMRP Category
2008	72,250	*The Impact of RNA Editing on Suicide Risk*	Monsheel Sodhi, Ph.D.	University of Alabama	Civilians	Improved biological interventions	Epidemiology and/or basic science/neurological mechanisms
2008	72,250	*Suicide Risk and the Danish Criminal Justice System: A Nested Case-Control Study*	Roger Webb, Ph.D., M.Sc., M.A.	University of Manchester	Civilians	Psychosocial interventions for those at risk Risk and protective factor interactions Prediction of imminent risk	Epidemiology and/or basic science/neurological mechanisms
2008	72,250	*An Adjunctive Intervention to Reduce Suicide Risk in Patients with Bipolar I Disorder*	Lauren Weinstock, Ph.D.	Brown University	Civilians	Enhanced continuity of care Provider and gatekeeper training Affordable, accessible, and effective care Psychosocial interventions for those at risk	Prevention, education, and training Early screening/intervention
2008	72,250	*Genome-Wide Association Study of Attempted Suicide*	Virginia Willour, Ph.D.	Johns Hopkins University	Civilians	Psychosocial interventions for those at risk	Epidemiology and/or basic science/neurological mechanisms
2008	63,750	*Identifying Early Intervention Targets for College Students at Risk for Suicide*	Amelia Arria, Ph.D.	University of Maryland	Civilians	Prediction of imminent risk	Early screening/intervention Epidemiology and/or basic science/neurological mechanisms
2008	63,750	*Expression of Truncated Isoform of Neuronal Tryptophan Hydroxylase in the Brainstem of Depressed Suicides*	Helene Bach, Ph.D.	Columbia University	Civilians	Improved biological interventions	Epidemiology and/or basic science/neurological mechanisms
2008	63,750	*Reduced Plasticity in the Hippocampus of Suicide*	Maura Boldrini, M.D., Ph.D.	Columbia University	Civilians	Psychosocial interventions for those at risk	Epidemiology and/or basic science/neurological mechanisms
2008	63,750	*Does the Nature of Treatment Provided After a Suicide Attempt Impact the Risk of Repetition*	Cindy Claassen, Ph.D.	University of Texas	Civilians	Prevention of reattempts	Postvention Epidemiology and/or basic science/neurological mechanisms

Table A.5—Continued

Grant Year	Funding ($)	Title	Principal Investigator(s)	Researching Organization	Participants	NAASP Category	MOMRP Category
2008	63,750	*Ionotropic Glutamate Receptor mRNA Editing in Suicide*	Stella Dracheva, Ph.D.	Mount Sinai School of Medicine	Civilians	Improved biological interventions	Epidemiology and/or basic science/neurological mechanisms
2008	63,750	*Developing Preclinical Models of Suicide Endophenotypes to Delineate Lithium's Antisuicidal Target*	Todd Gould, M.D.	University of Maryland	Civilians	Improved biological interventions	Epidemiology and/or basic science/neurological mechanisms
2008	63,750	*Transmission of Suicidal Behavior in Three Generations of the Same Families: A 30 Year Community Study*	Stephanie Kasen, Ph.D.	New York State Psychiatric Institute, Columbia University	Civilians	Risk and protective factor interactions Population-based risk reduction/ resilience-building	Prevention, education, and training Assessment Epidemiology and/or basic science/neurological mechanisms
2008	63,750	*Suicidality Among Childbearing Women*	Richard Neugebauer, M.D., Ph.D.	Columbia University	Civilians	Risk and protective factor interactions	Epidemiology and/or basic science/neurological mechanisms
2008	63,750	*fMRI Study of Brain Circuitry Underlying Impulsivity and Affect Regulation in Suicidal Patients with Adolescent Bipolar Disorder*	Mani Pavuluri, M.D., Ph.D.	University of Illinois at Chicago	Civilians	Improved biological interventions	Epidemiology and/or basic science/neurological mechanisms
2008	63,750	*Using a Laboratory Measure of Emotion Regulation to Characterize Suicide Attempters*	Zachary Rosenthal, Ph.D.	Duke University	Civilians	Improved biological interventions	Epidemiology and/or basic science/neurological mechanisms
2008	63,750	*Determining the Effects of Early Alcohol Use on Suicide Attempts in Early Adolescence Through Young Adolescence*	Monica Swahn, Ph.D., M.P.H.	Georgia State University	Civilians	Risk and protective factor interactions	Prevention, education, and training Epidemiology and/or basic science/neurological mechanisms

Table A.5—Continued

Grant Year	Funding ($)	Title	Principal Investigator(s)	Researching Organization	Participants	NAASP Category	MOMRP Category
2008	59,790	*A Prospective Study of the Relationship Between Non-Suicidal Self-Injury and Suicidal Behavior in a College Population*	Janis Whitlock, Ph.D., M.P.H.	Cornell University	Civilians	Risk and protective factor interactions	Epidemiology and/or basic science/neurological mechanisms
2008	20,000	*Investigating Glial Cells Line-Derived Neurotrophic Factor (GDNF) in the Amygdala of Suicide Victims*	Naguib Mechawar, Ph.D.	McGill University	Civilians	Improved biological interventions	Epidemiology and/or basic science/neurological mechanisms
2008	20,000	*Factors Promoting Good Adult Functioning in Adolescents with Suicidal Ideation: A Pilot Study*	Helen Reinherz, Sc.D.	Simmons College	Civilians	Provider and gatekeeper training; Psychosocial interventions for those at risk; Prediction of imminent risk	Prevention, education, and training; Early screening/intervention
2008	20,000	*Assessing Implicit Self-Injurious Behavior in Police Officers*	John Violanti, M.D., Ph.D.	State University of New York at Buffalo	Civilians	Prediction of imminent risk	Assessment
2007	99,321	*Culturally Competent Family-Based Intervention Versus Enhanced Usual Care in the Community for Reducing Psychological Distress and Enhancing Functioning in Suicidally Bereaved African Americans*	Nadine Kaslow, Ph.D.	Emory University	Civilians	Affordable, accessible, and effective care; Psychosocial interventions for those at risk; Risk and protective factor interactions	Treatment; Epidemiology and/or basic science/neurological mechanisms

Alternative Allocation Analysis

In Chapter Two, we allocated funds for interventions across multiple categories, resulting in "double-counting." An alternative strategy would be to allocate funds equally across categories. We conducted a secondary analysis using this method. The results are presented in Tables B.1 and B.2.

Table B.1
Funding Totals for Each NAASP Category, Assuming Dispersed Equal Allocations

NAASP Category	Funding ($)				
	Overall	DoD	VA	DHHS	AFSP
Psychosocial interventions	36,106,203	27,150,147	1,399,937	5,891,984	1,664,135
Prediction of imminent risk	15,319,954	4,732,877	1,860,590	7,684,702	1,041,785
Risk and protective factors	32,259,925	18,461,386	2,292,637	10,125,437	1,380,466
Biological interventions	11,454,261	5,826,035	627,747	3,312,063	1,688,417
Accessible and effective care	21,907,716	20,536,585	0	1,136,205	234,925
Enhanced continuity of care	13,146,012	6,118,409	991,661	5,461,954	573,989
Population-based risk-reduction	12,515,246	9,735,432	387,919	2,233,937	157,958
Provider/gatekeeper training	7,988,608	5,973,327	0	1,783,743	231,538
Population-based screening	2,944,440	989,941	435,894	1,518,605	0
Prevention of reattempts	5,834,140	2,803,619	0	2,856,453	174,068
Stigma reduction	6,003,066	4,946,749	0	988,818	67,500
Access to lethal means	351,186	0	129,237	221,949	0

Table B.2
Funding Totals for Each MOMRP Category, Assuming Dispersed Equal Allocations

MOMRP Category	Funding ($)				
	Overall	DoD	VA	DHHS	AFSP
Prevention, education, and training	22,102,217	17,455,846	2,011,117	2,635,255	1,015,804
Early screening and intervention	17,052,808	3,740,201	0	13,312,607	456,508
Assessment	14,632,933	6,239,801	2,375,835	6,017,297	722,547
Treatment	53,910,793	43,160,528	777,863	9,972,402	1,135,418
Recovery and return to duty	42,500	0	0	0	42,500
Postvention	4,857,287	4,857,287	0	0	164,267
Epidemiology and/or basic science/ neurological mechanisms	46,059,939	31,820,842	2,960,808	11,278,289	3,677,738

Statistical Procedure for Extracting Rankings from the RAND ExpertLens Panel

Bayesian Modeling

We employed a Bayesian framework to analyze the data derived from the ExpertLens elicitation process. The framework treats model parameters as unknown, random variables on which we imposed prior distributions that were updated or "learned" by the data. For example, if our model holds one parameter, θ, let us assign a prior distribution, $\pi(\theta)$, to model the uncertainty for θ. The data will "learn" the value for by updating our prior distribution to a posterior distribution, $\pi(\theta \mid \mathbf{y})$, using Bayes' theorem:

$$\pi(\theta \mid \mathbf{y}) = \frac{f(x \mid \theta)\pi(\theta)}{\int f(\mathbf{y} \mid \theta)\pi(\theta)d\theta},$$

where $\mathbf{y}$ denotes the sample data. We choose a Bayesian approach for our work because it allowed us to introduce a latent continuous response in generating our observed ordered scores, an intuitive formulation that provides for useful inference.

Model to Extract Intrinsic Goal Score

We introduced a latent response, t_{ij}, where $i = 1, \ldots, G = 60$ indexes a goal-criterion combination, such as the importance of population-based risk reduction/resilience-building in reducing the military suicide rate. We evaluated each of the goals according to five criteria to produce the $G = 60$ combination. Here, we refer to the goal-criterion combination with the shorthand label "goals when discussing the model and the results from the expert elicitation." The index, $j = 1, \ldots, J = 28$, denotes participating raters, where rater provides an ordered score, y_{ij}, for goal i. Each t_{ij} takes values on a continuous scale and is associated with our observed ordered category scores, y_{ij}. We can interpret t_{ij} as the latent propensity for rater j, scoring goal i, to be in the category associated with the observed y_{ij} (Hausman and Wise, 1978). We formally make the "link" between t_{ij} and y_{ij} by introducing a set of random cut points, γ, that divide the support (or values of) t_{ij} into categories associated with y_{ij}. More specifically, we restrict $\gamma \ell - 1 < t_{ij} \leq \gamma \ell$ when the associated $y_{ij} = \ell$. Figure C.1 provides a conceptual illustration of how portions of the probability mass for the latent response, t, are allocated to each observed score category, $y = \ell$ for $\ell = (1, \ldots, C)$ ordered categories, based on the cut points, γ.

Figure C.1
γ "Chops" Up Probability Mass of t to Compute
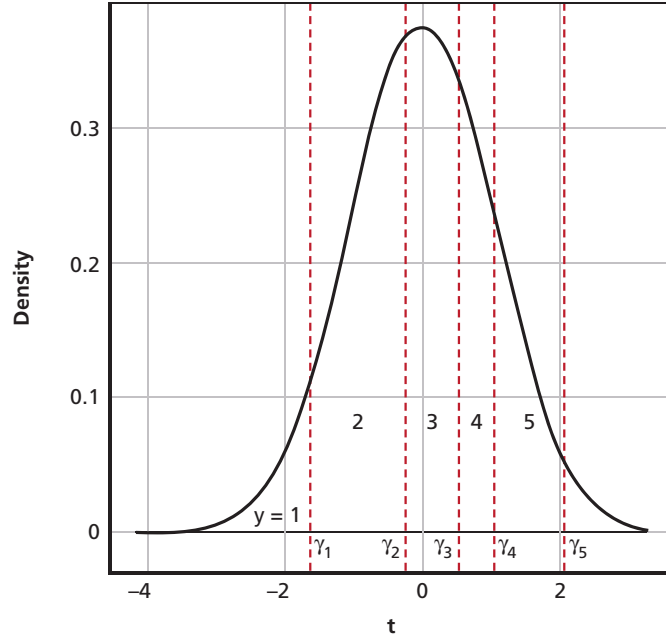
Prior research (Johnson, 1996; Johnson and Albert, 1999; Savitsky and Dalal, 2014) specifies a Bayesian parametric approach for the analysis of multirater ordered data that defines the regression construction

$$t_{ij} \overset{\text{ind}}{\sim} N\left(z_i, v_j^{-1}\right)\|\left(\gamma_{j,y_{ij}-1} < \gamma_{j,y_{ij}}\right),$$

where the likelihood for t_{ij} is induced from the observed ordered y_{ij} through γ. This formulation possesses the feature that precision parameters, v_j, are specified by rater to differentially denoise or weight the multiple ratings to reveal an intrinsic latent "true" score, z_i, for goal $i \in (1, \ldots, G)$. Rater j, with estimated precision, $\hat{v}_j > \hat{v}_{j'}$, will be weighted more highly than rater j' in determining $(z_i)_{i=1,\ldots,G}$. Raters who express higher-precision values are viewed as possessing more expertise or being more engaged in the elicitation process. This construction achieves both denoising and differential weighting of raters based on the precisions that encode their expertise.

Each panel in Figure C.2 presents the distribution of observed scores, $\mathbf{y}_j = (y_{1,j}, \ldots, y_{G,i})$, for randomly selected raters, $i \in (1, \ldots, J = 28)$, to provide intuition on the precision of raters' scores. We observe that raters Expert 14 and Expert 86 express relatively diffuse distributions for their raw scores over the goals, while Expert 16 and Expert 89 are relatively more concentrated.

The precision parameters receive the prior formulation,

$$v_j \overset{\text{iid}}{\sim} Ga\left(a_v, b_v\right),$$

Figure C.2
Distributions of Raw Scores for Selected Raters
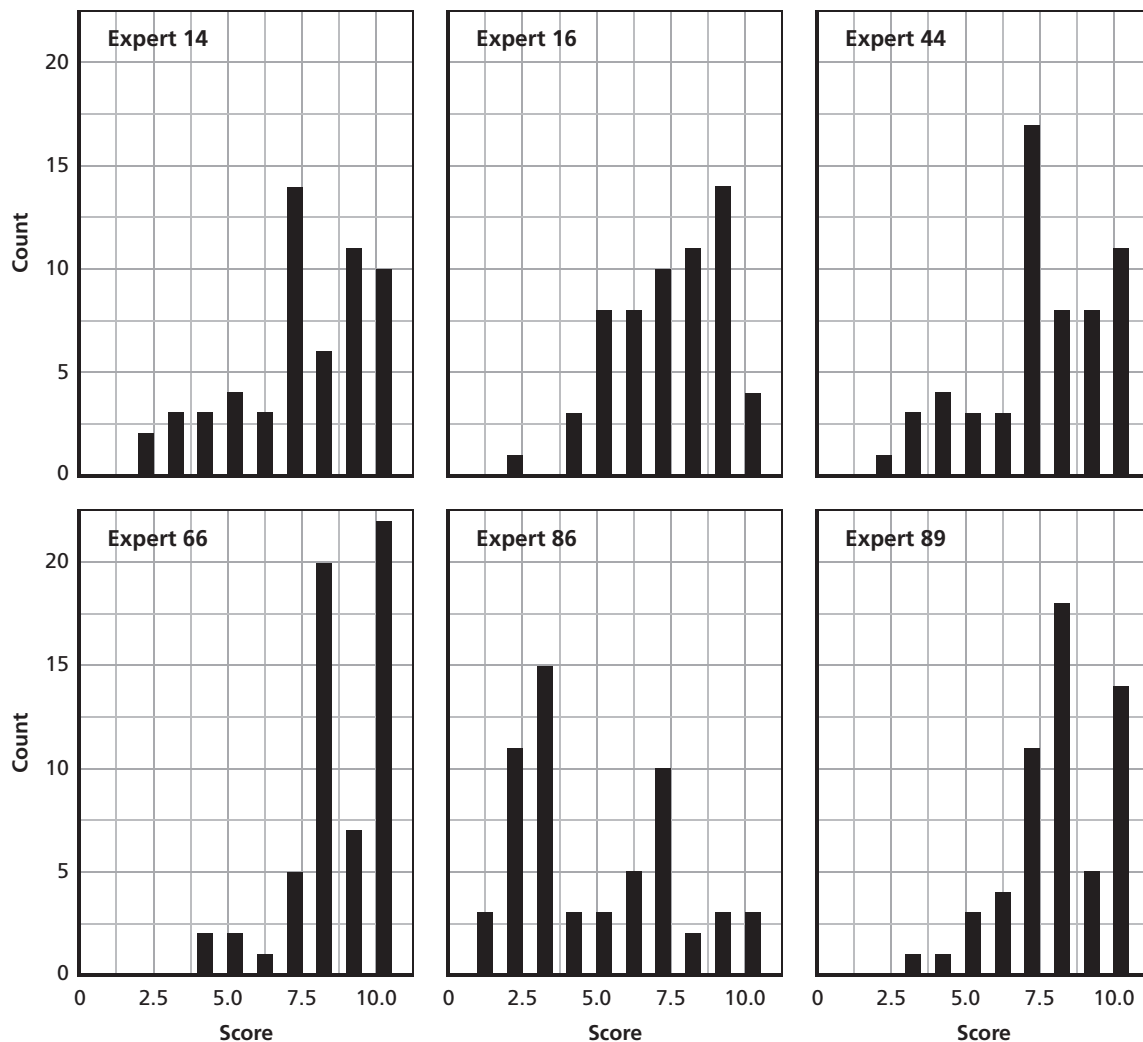
where shape hyperparameter, a_v, and rate hyperparameter, b_v, are each drawn from a further $U(1,25)$ prior. The cut points, γ_j, are random and specified with priors:

$$\gamma_{j,\ell} \sim N\left(0,\left(\tau^\gamma\right)^{-1}\right)\|\left(\gamma_{j,\ell-1} < \gamma_{j,\ell} < \gamma_{j,\ell+1}\right).$$

We employed the construction from Ishwaran (2000) to improve mixing in posterior samplings for γ_j that specifies

$$\phi_j = \left(\phi_{j,1},\ldots,\phi_{j,C-1}\right)$$

$$\phi_{j,\ell} \overset{\text{iid}}{\sim} N\left(0,\left(\tau^\phi\right)^{-1}\right),$$

$$\text{for } \gamma_{j,\ell} \equiv \exp\left(\sum_{q=1}^{\ell} \phi_{j,q}\right).$$

The constant, $C = 10$, denotes the number of ordered categories for each observed y_{ij}. This construction allows the ϕ_j to be sampled without order restrictions, and the exponentiation inflates the prior scale for γ_j, which could improve mixing.

Finally, we set the prior for the intrinsic goal scores:

$$z_i \overset{\text{iid}}{\sim} N(0,1),$$

where we fix the scale to 1 to identify the scale for the model because ordered data do not convey scale information.

Results

We extracted posterior distributions for the intrinsic goal scores, z_i, after collapsing overraters for each criterion. The relative differences between the $z_i, i = 1, \ldots, G = 60$ may be used to rank their performance for each criterion. In particular, each panel in Figure C.3 presents the posterior distributions of the intrinsic scores for each of the goals. While the relative rankings differ somewhat across criteria, we note that four of the goals that consistently rank highly are (1) gatekeeper training, (2) continuity of care, (3) high-quality care, and (4) provider training. These top-ranked goals focus on aspects of treatment delivery rather than the root causes of suicidal ideation or differential approaches to screening. The gatekeeper training goal includes identifying at-risk service members such that there may be an implicit preference for human-based screening performed by those closest to service members, rather than more mechanical or technological alternatives. It also bears mentioning that 25 of $j = 28$ participating raters were not primarily researchers, so there may be more a preference for exploring treatment modalities rather than root causes.

Figure C.4 presents the posterior distributions for the rater precisions, v_j, for each of the raters included in our expert elicitation, ordered from highest to lowest posterior mean precision. We recall that higher precisions connote more expertise and more engagement with the process, while low values connote the opposite. The precision distributions express a high gradient or variation among the raters, with Expert 16 producing among the highest values and Expert 14 the lowest. So, we are wise to differentially weight rater contributions in determining the intrinsic goal scores, z_i.
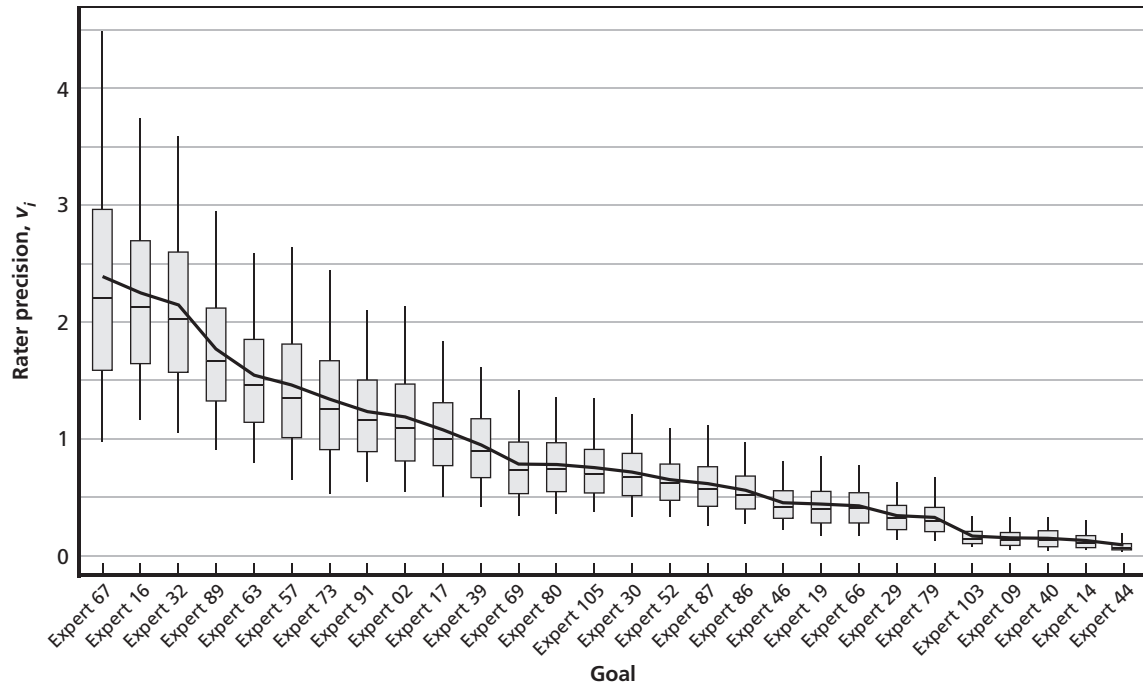
Figure C.3
Posterior Distributions of the Intrinsic Goal Scores, z_i
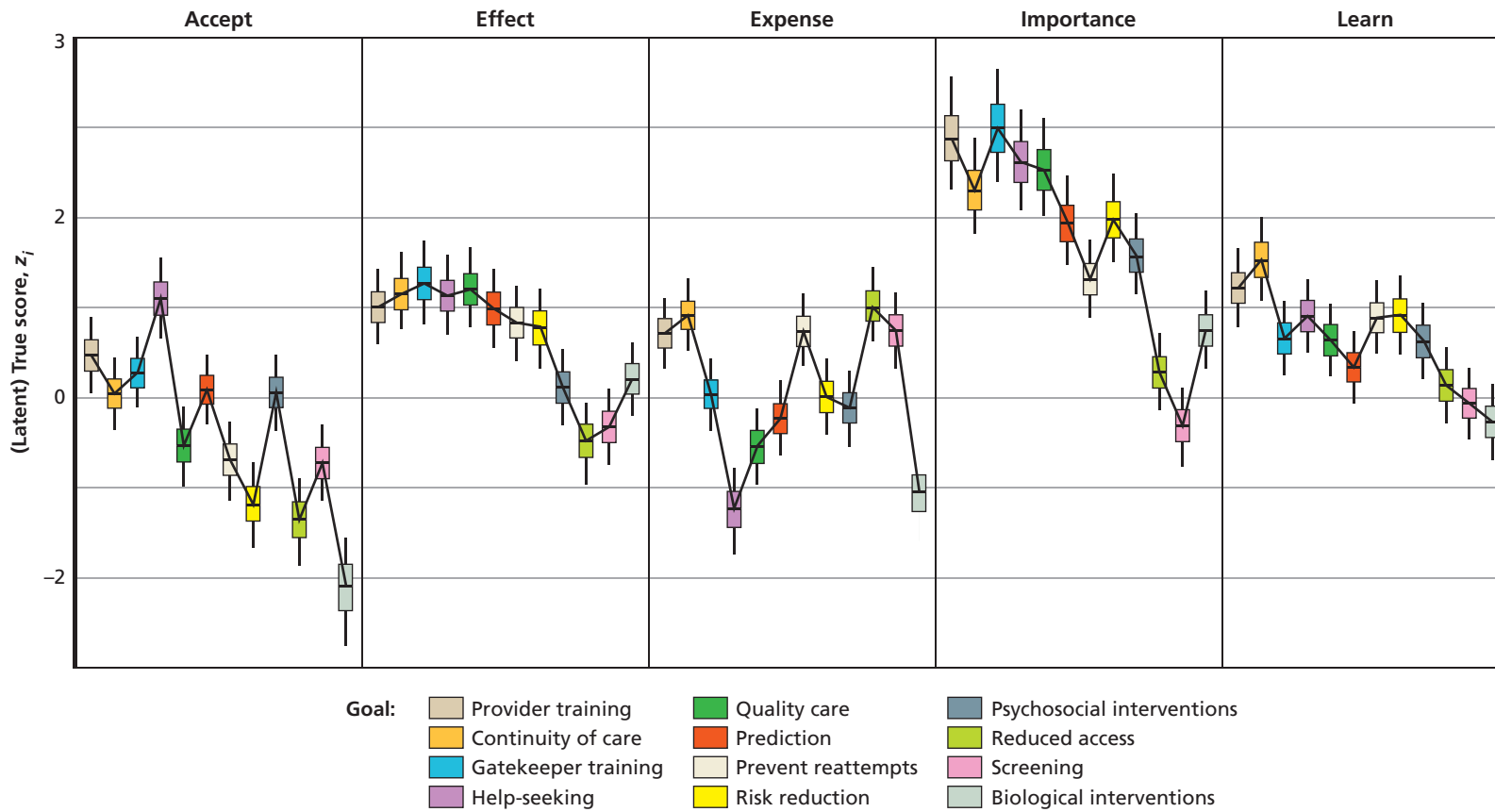
NOTE: Each panel contains the intrinsic goal scores for a single criterion.
RAND *RR559-C.3*

Figure C.4
γ "Chops" Up Probability Mass of t to Compute y

Feedback from DoD Stakeholders About the RAND ExpertLens Process

At the end of round 3 of the RAND ExpertLens elicitation, participants were asked a series of questions about their perceptions of the online process. For the most part, participants had positive feedback, as shown in Table D.1.

Table D.1
DoD Stakeholder Feedback on the RAND ExpertLens Process

Feedback Prompt	% Agreeing or Strongly Agreeing
A small number of people dominated the discussions.	20
The discussions gave me a better understanding of the issues.	60
This study was too long.	10
I had trouble following the discussions.	0
I was reluctant to share some of my views during the discussion.	5
The ExpertLens was easy to use.	60
Participants debated each other's viewpoints during the discussion.	5
Participation in this study was frustrating.	0
The discussions brought out views I hadn't considered.	15
Participation in this study took a lot of effort.	10
The discussions brought out divergent views.	25
Participants sometimes misinterpreted each other's comments during the discussion.	5
Participation in this study was interesting	35
The discussion round caused me to revise my original answers.	20
I was comfortable expressing my views in the discussion round.	40
The right set of questions was asked in this study.	30
My expertise/experience is relevant to the topic of study.	75
I would like to use ExpertLens in the future.	45

Sensitivity Analysis of the Benefit-Cost Index Rankings

This appendix explores the robustness of the benefit-cost index when presented in terms of ordinal rankings. We first discuss how an error in any parameter value would affect the overall index value. We then quantify the extent to which index values may change without affecting ordinal rankings.

Index Sensitivity to Errors in Parameters

$$\text{index} = \frac{\text{suicides prevented}}{\text{cost}} = \frac{n \times p \times s \times i}{c}.$$

Based on the formula for the index, it is straightforward to infer how a percentage error or percentage change in the parameters will affect the index. Any change in the numerator will induce an equal change in the index. For example, a 5-percent individual error in any of the four variables or a 5-percent combined error in the variables in the numerator will translate to a 5-percent error in the index (see Table E.1). Because cost is in the denominator, a percentage error in the denominator requires taking the inverse. Table E.1 shows how errors in the parameters translate to errors in the index.

Robustness of Ordinal Rankings

While the index values are directly sensitive to errors in the parameters that compose the index, we are less concerned with the cardinal value of the index than with the ordinal value

Table E.1
Percentage Change in the Benefit-Cost Index, by Variable

Variable	Percentage Change										
$n \times p \times s \times i$	−50	−20	−10	−5	−1	0	1	5	10	20	50
Index	−50	−20	−10	−5	−1	0	1	5	10	20	50
c	−50	−20	−10	−5	−1	0	1	5	10	20	50
Index	100	25	11	5	1	0	−1	−5	−9	−17	−33

(i.e., the rankings of the indexes). Table E.2 shows the indexes we calculated for each aspirational research goal. The percentage "lead" over the next-lower goal is the absolute value of the percentage change from that goal to the next goal below. Conceptually, the percentage column shows the relative margin of error. For example, the difference between *provider training* and *help-seeking* is 47 percent. Thus, our estimates for *provider training* and *help-seeking* could be inaccurate, but the *provider training* index would have to be 47-percent too high, the *help-seeking* index would have to be 47 percent too low, or both would have to vary to a proportional degree for the ordinal rankings to change. For certain goals (*reduced access*, *psychosocial interventions*, *risk reduction*, and *quality care*), the relative margins are close, so a small change (< 15 percent) would affect the rankings. For example, if the *risk reduction* index decreased by more than 1 percent, it would fall behind *quality care* in the rankings.

Another way to see the margin for the estimation error is to graph the log(index) for each goal. In Figure E.1, differences in the heights of each bar are expressed in terms of percentage changes. We can see that only a large error in estimating the parameters would cause the order of the blue bars to change, but among the red bars, all of which have roughly the same heights, a small change would result in slightly reordered rankings.

To illustrate, *help-seeking* has a significant relative margin from both the next-higher and next-lower goals. We originally assumed that the per-person cost of implementing *help-seeking* was $1 based on the average historical anti-stigma campaign expenditure (Evans-Lacko et al., 2013). The reference also includes a minimum expenditure of $0.60 per person and a maximum expenditure of $1.50 per person. If we recalculate the *help-seeking* index using either the minimum or maximum expenditure, we find that the change in the cost is not enough to displace *help-seeking* as the second-ranked goal.

Therefore, based on Figure E.1, we would generally expect the highest- and lowest-ranked research goals to maintain their rankings, given reasonable errors in the assumptions underly-

Table E.2
Percentage Change in Benefit-Cost Index, by Goal

Aspirational Goal	Benefit-Cost Index	% "Lead" Over Next Lower
Provider training	93.333	47
Help-seeking	49.558	96
Reduced access	1.800	7
Gatekeeper training	1.667	33
Prevent reattempts	1.125	35
Psychosocial interventions	0.733	8
Risk reduction	0.672	1
Quality care	0.667	10
Continuity of care	0.600	33
Screening	0.400	67
Biological interventions	0.133	63
Prediction	0.050	—

ing their indexes. However, several of the midranked goals have indexes that are relatively close together, and we could see reordered rankings in the middle given a different set of parameter assumptions.

Figure E.1
Logarithmic Scale of Suicides Prevented per Cost
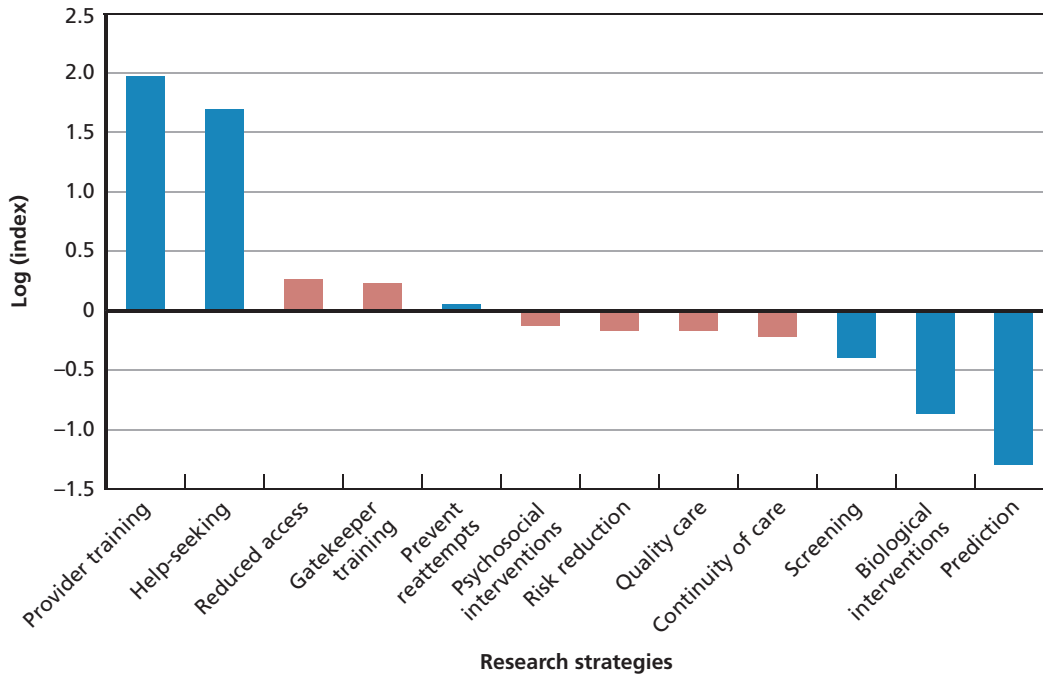
Research Domains and Approaches for Assessing Research Quality

This appendix describes in detail the types of research domains and research approaches relevant to evaluating quality research. This appendix should be referenced in conjunction with the guidelines for identifying quality research as discussed in the section "Evidence of Research Quality" (the second component for effectively diffusing research into practice) in Chapter Six.

Relevant Research Domains

Suicide research can be generated in many research domains and is being performed in several different disciplines and areas of biomedical and social sciences.

Biomedical Research

Biomedical research is generally conducted in the areas of psychiatry, epidemiology, and public health. *Psychiatry research* attempts to understand human behavior through both observations of people and an understanding of the biomedical factors that contribute to adaptive and maladaptive behavior and to modify behavior through behavioral or medical interventions. *Epidemiology research* attempts to identify the underlying patterns or causes of health issues and diseases within a broader population or within a specific group. *Public health research* seeks to inform policy decisions to improve the health of individuals.

Social Science Research

Social science research is conducted in three broad areas:

1. *Psychological/behavioral health (e.g., clinical psychology, counseling psychology, clinical social work).* Generally, this type of research attempts to understand human behavior through both observations and experiments that typically have less of a biomedical focus than psychiatric research and to modify behavior or cognitions through behavioral methods.

2. *Sociocultural (e.g., sociology, social psychology, developmental psychology, family systems).* In this domain, sociological research attempts to improve society by examining societal processes and sociocultural groups (e.g., race/ethnicity). Social psychology research focuses on understanding individual differences in behaviors within and between sociocultural groups. Developmental psychology looks at the behavior of individuals or groups over a lifespan or targets one specific developmental period (e.g., childhood). Family systems research seeks to understand human behavior by examining an individual influenced by the patterns of behavior within families.

3. *Holistic approaches* attempt to reach across disciplines and settings to understand behavior on a broader level. Such approaches may incorporate community partners to examine a new idea and can spread to areas, such as spirituality and religion, to understand behavior.

Types of Research Approaches

Studies are typically cross-sectional or longitudinal in design. *Cross-sectional studies* look at groups or individuals at one point in time. Because variables are measured and compared at the same point in time, cross-sectional studies cannot imply causality. *Longitudinal studies*, in which one variable is measured at time *A* and another is measured at time *B*, are stronger in this sense because they are better able to suggest causation. That is, they can reveal that the variable measured at time *A* affected the occurrence at time *B*.

Studies are designed with varying levels of rigor and are classified as having experimental or nonexperimental designs:

-   *Experimental designs* manipulate something in the environment to look at the effects on behavior. Experimental studies are typically longitudinal in design:
    -   *RCTs* are the standard for high-quality experimental study. These trials involve randomly assigning individuals to a treatment condition (e.g., an intervention to reduce depression) or a control condition (e.g., no treatment or treatment as usual) to determine whether reductions (or improvements) in the targeted outcomes of the treatment are significantly better for those who received the treatment compared with those who did not.
    -   *Group randomized studies* randomly assign groups to conditions and evaluate differences between these conditions based on group membership. These studies are typically conducted when randomly assigning individuals (as opposed to groups) may be difficult.
    -   *Quasi-experimental designs* include no randomization. This process is sometimes used when it is difficult to randomly assign participants because they are already receiving treatment.
    -   *A mixed-methods paradigm* involves the use of case studies (i.e., qualitative research) in the midst of an RCT (Dattilio, Edwards, and Fishman, 2010). Case studies are likely much more accessible to providers and personnel working with service members because these personnel can relate the experience of a case target with their own experiences with service members.
-   *Nonexperimental designs* include surveys, meta-analyses, observational studies, case studies, program evaluations, and studies using existing data for the secondary analyses of research ideas. While not all as rigorous in design as experimental studies, all of these studies have implications for informing practice in biomedical and social science settings. Nonexperimental studies can either be longitudinal or cross-sectional:
    -   *Survey research* involves distributing questionnaires in person, by mail, by phone, by computer, or over the Internet to solicit responses from a population of interest.

- *Meta-analyses* look at the results reported in prior studies to make conclusions about the potential effectiveness of that body of research (e.g., analyses of all published research on RCTs in a specific area).
- *Observational studies* use methods to document overt observations of human behavior in natural settings or in contrived research or laboratory settings.
- *Comparison studies* (pre-post designs) use nonrandomized group data to compare differences in outcomes between individuals and between groups or changes over time within individuals and within groups.
- *Case studies* provide important information about behavior. In clinical settings, they are typically a description of one individual's unique behavior or describe an individual's reaction to a treatment or program.
- *Program evaluations* are studies that look at the effects of an established program on behavior or public health policy.
- *Studies examining existing data for secondary analysis purposes* can answer other research questions that may come about after a study is completed.

Types of Research Findings

Two categories of relevant research results are applicable to military suicide. Both qualitative and quantitative results yield important research data:

- *Qualitative results* from research studies typically involve exploratory methods with general flexibility in the research questions. It describes variation, relationships, and individual/group experiences, typically through open-ended responses from interviewees or focus-group attendees. Researchers often analyze qualitative results by categorizing the data into themes. The data are typically reviewed by several members of a research team, who agree to the categorizations.
- *Quantitative results* from research studies typically test specific hypotheses that have been established since the inception of the study (a priori). Quantitative results are typically analyzed using rigorous statistical procedures.

References

AFSP—*See* American Foundation for Suicide Prevention.

Agency for Healthcare Research and Quality, "U.S. Preventive Services Task Force (USPSTF): An Introduction," web page, last updated September 2012. As of February 14, 2014:
http://www.ahrq.gov/professionals/clinicians-providers/guidelines-recommendations/uspstf/index.html

———, *Preventing Falls in Hospitals: A Toolkit for Improving Quality of Care*, Rockville, Md., January 2013. As of February 4, 2014:
http://www.ahrq.gov/professionals/systems/hospital/fallpxtoolkit/fallpxtoolkit.pdf

AHRQ—*See* Agency for Healthcare Research and Quality.

Alm, Steven S., "HOPE for the Criminal Justice System," *The Champion*, August 2010, pp. 28–30.

American Foundation for Suicide Prevention, "All Grants," web page, undated. As of February 4, 2014:
http://www.afsp.org/research/our-researchers/all-grants

Anderson, Jane E., Douglas E. Jorenby, Walter J. Scott, and Michael C. Fiore, "Treating Tobacco Use and Dependence: An Evidence-Based Clinical Practice Guideline for Tobacco Cessation," *Chest*, Vol. 121, No. 3, March 2002, pp. 932–941.

Armed Forces Health Surveillance Center, "Mental Disorders and Mental Health Problems, Active Component, U.S. Armed Forces, 2000–2011," *Medical Surveillance Monthly Report*, Vol. 19, No. 6, June 2012, pp. 11–17.

Attridge, Mark, "Personal and Work Outcomes of Employee Assistance Services," paper presented at the American Psychological Association Annual Conference, San Francisco, Calif., August 2001.

———, "Employee Assistance Program Outcomes Similar for Counselor (Phone and In-Person) and Legal/Finance Consultation Clients," paper presented at the American Psychological Society Annual Conference, New Orleans, La., June 2002.

Barth, Michael C., "A Low-Cost, Post Hoc Method to Rate Overall Site Quality in a Multi-Site Demonstration," *American Journal of Evaluation*, Vol. 25, No. 1, March 2004, pp. 79–97.

Barth, Michael C., and Cynthia Hansel Sherlock, "The Diffusion of a Pediatric Care Innovation in a Large Urban Nonprofit Health Care System," *Nonprofit Management and Leadership*, Vol. 14, No. 1, Fall 2003, pp. 93–106.

Berenholtz, Sean M., Peter J. Pronovost, Pamela A. Lipsett, Deborah Hobson, Karen Earsing, Jason E. Farley, Shelley Milanovich, Elizabeth Garrett-Mayer, Bradford D. Winters, Haya R. Rubin, Todd Dorman, and Trish M. Perl, "Eliminating Catheter-Related Bloodstream Infections in the Intensive Care Unit," *Critical Care Medicine*, Vol. 32, No. 10, 2004, pp. 2014–2020.

Berwick, Donald M., "Disseminating Innovations in Health Care," *Journal of the American Medical Association*, Vol. 289, No. 15, April 16, 2003, pp. 1969–1975.

Berwick, Donald M., David R. Calkins, C. Joseph McCannon, and Andrew D. Hackbarth, "The 100,000 Lives Campaign: Setting a Goal and a Deadline for Improving Health Care Quality," *Journal of the American Medical Association*, Vol. 295, No. 3, January 18, 2006, pp. 324–327.

Bohus, Martin, Brigitte Haaf, Timothy Simms, Matthias F. Limberger, Christian Schmahl, Christine Unckel, Klaus Lieb, and Marsha M. Linehan, "Effectiveness of Inpatient Dialectical Behavioral Therapy for Borderline Personality Disorder: A Controlled Trial," *Behavioral Research and Therapy*, Vol. 42, No. 5, May 2004, pp. 487–499.

Bootman, J. Lyle, Donald L. Harrison, and Emily Cox, "The Health Care Cost of Drug-Related Morbidity and Mortality in Nursing Facilities," *Archives of Internal Medicine*, Vol. 157, No. 18, October 13, 1997, pp. 2089–2096.

Boulkedid, Rym, Hendy Abdoul, Marine Loustau, Olivier Sibony, and Corirne Alberti, "Using and Reporting the Delphi Method for Selecting Healthcare Quality Indicators: A Systematic Review," *PloS ONE*, Vol. 6, No. 6, 2011, Article e20476.

Bradley, Elizabeth H., Tashonna R. Webster, Dorothy Baker, Mark Schlesinger, Sharon K. Inouye, Michael C. Barth, Kate L. Lapane, Debra Lipson, Robyn Stone, and Mary Jane Koren, "Translating Research into Practice: Speeding the Adoption of Innovative Health Care Programs," Washington, D.C.: Commonwealth Fund, Issue Brief No. 724, July 2004.

Bray, Robert M., Michael R. Pemberton, Laurel L. Hourani, Michael Witt, Kristine L. Rae Olmsted, Janice M. Brown, BeLinda Weimer, Marian E. Lane, Mary Ellen Marsden, Scott Scheffler, Russ Vandermaas-Peeler, Kimberly R. Aspinwall, Erin Anderson, Kathryn Spagnola, Kelly Close, Jennifer L. Gratton, Sara Calvin, and Michael Bradshaw, *2008 Department of Defense Survey of Health Related Behaviors Among Active Duty Military Personnel*, Washington, D.C.: U.S. Department of Defense, September 2009. As of February 4, 2014: http://www.tricare.mil/tma/2008HealthBehaviors.pdf

Cabana, Michael D., Cynthia S. Rand, Neil R. Powe, Albert W. Wu, Modena H. Wilson, Paul-André C. Abboud, and Haya R. Rubin, "Why Don't Physicians Follow Clinical Practice Guidelines?: A Framework for Improvement," *Journal of the American Medical Association*, Vol. 282, No. 15, October 20, 1999, pp. 1458–1465.

Carlton, Thomas G., "The Integration of Science and Practice in Trauma and Dissociation: A Clinician's View," *Journal of Trauma and Dissociation*, Vol. 13, No. 1, 2012, pp. 1–8.

Carpenter, Deborah, Veronica Nieva, Tarek Albaghal, and Joann Sorra, "Development of a Planning Tool to Guide Research Dissemination," in *Advances in Patient Safety: From Research to Implementation, Vol. 4: Programs, Tools, and Products*, Rockville, Md.: Agency for Healthcare Research and Quality, 2005.

Center for Construction Research and Training, *Sounding the Alarm on Dangerous Nail Guns*, Silver Spring, Md., 2012. As of February 4, 2014: http://www.cpwr.com/sites/default/files/publications/NailGunsIMPACTCard.pdf

Chard, Kathleen M., Elizabeth G. Ricksecker, Ellen T. Healy, Bradley E. Karlin, and Patricia A. Resick, "Dissemination and Experience with Cognitive Processing Therapy," *Journal of Rehabilitation Research and Development*, Vol. 49, No. 5, 2012, pp. 667–678.

Charters, W. W., Jr., and Roland J. Pellegrin, "Barriers to the Innovation Process: Four Case Studies of Differentiated Staffing," *Educational Administration Quarterly*, Vol. 9, No. 1, January 1973, pp. 3–14.

Chatterji, Pinka, Christine M. Caffray, Maura Crowe, Linda Freeman, and Peter Jensen, "Cost Assessment of a School-Based Mental Health Screening and Treatment Program in New York City," *Mental Health Services Research*, Vol. 6, No. 3, September 2004, pp. 155–166.

Chinman, Matthew, Pamela Imm, and Abraham Wandersman, *Getting To Outcomes™ 2004: Promoting Accountability Through Methods and Tools for Planning, Implementation, and Evaluation*, Santa Monica, Calif.: RAND Corporation, TR-101-CDC, 2004. As of February 4, 2014: http://www.rand.org/pubs/technical_reports/TR101.html

Coalition for Evidence-Based Policy, *Identifying and Implementing Educational Practices Supported by Rigorous Evidence: A User Friendly Guide*, Washington, D.C.: U.S. Department of Education, Institute of Educational Sciences, December 2003. As of February 4, 2014: http://www2.ed.gov/rschstat/research/pubs/rigorousevid/rigorousevid.pdf

Cochrane Collaboration, "Information for Practitioners, Providers and Policymakers," web page, last updated June 11, 2012. As of February 14, 2014: http://www.cochrane.org/information-practitioners

Cohen, Lori, "Translating Research into Practice," *Journal of Safety Research*, Vol. 38, No. 2, 2007, p. 135.

Cohen, Lawrence H., Meredith M. Sargent, and Lee B. Sechrest, "Use of Psychotherapy Research by Professional Psychologists," *American Psychologist*, Vol. 41, No. 2, February 1986, pp. 198–206.

Committee on Gulf War and Health, *Gulf War and Health, Vol. 6: Physiologic, Psychologic, and Psychosocial Effects of Deployment-Related Stress*, Washington, D.C.: National Academies Press, 2008.

Cook, Joan M., Tatyana Biyanova, and James C. Coyne, "Barriers to Adoption of New Treatments: An Internet Study of Practicing Community Psychotherapists," *Administration and Policy in Mental Health and Mental Health Services Research*, Vol. 36, No. 2, March 2009, pp. 83–90.

Corrigan, Patrick W., "Best Practices: Strategic Stigma Change (SSC): Five Principles for Social Marketing Campaigns to Reduce Stigma," *Psychiatric Services*, Vol. 62, No. 8, 2011, pp. 824–826.

Dalal, Siddhartha, Dmitry Khodyakov, Ramesh Srinivasan, Susan Straus, and John Adams, "ExpertLens: A System for Eliciting Opinions from a Large Pool of Non-Collocated Experts with Diverse Knowledge," *Technological Forecasting and Social Change*, Vol. 78, No. 8, October 2011, pp. 1426–1444.

Daschner, Mary, Sandra Brownstein, Kathleen A. Cameron, and Janice L. Feinberg, "Fleetwood Phase II Tests a New Model of Long-Term Care Pharmacy," *Consultant Pharmacist*, Vol. 15, October 2000, pp. 989–1005.

Dattilio, Frank M., David J. A. Edwards, and Daniel B. Fishman, "Case Studies Within a Mixed Methods Paradigm: Toward a Resolution of the Alienation Between Researcher and Practitioner in Psychotherapy Research," *Psychotherapy*, Vol. 47, No. 4, December 2010, pp. 427–441.

Davis, D. A., and A. Taylor-Vaisey, "Translating Guidelines into Practice: A Systematic Review of Theoretic Concepts, Practical Experience and Research Evidence in the Adoption of Clinical Practice Guidelines," *Canadian Medical Association Journal*, Vol. 157, No. 4, August 15, 1997, pp. 408–416.

Defense Manpower Data Center, *Fiscal Year 2011 Health Manpower Statistics*, 2012.

DMDC—*See* Defense Manpower Data Center.

Eibner, Christine, Jeanne S. Ringel, Beau Kilmer, Rosalie Liccardo Pacula, and Claudia Diaz, "The Cost of Post-Deployment Mental Health and Cognitive Conditions," in Terri Tanielian and Lisa H. Jaycox, eds., *Invisible Wounds of War: Psychological and Cognitive Injuries, Their Consequences, and Services to Assist Recovery*, Santa Monica, Calif.: RAND Corporation, MG-720-CCF, 2008, pp. 169–241. As of February 4, 2014: http://www.rand.org/pubs/monographs/MG720.html

Ellickson, Phyllis L., and Robert M. Bell, "Drug Prevention in Junior High: A Multi-Site Longitudinal Test," *Science*, Vol. 247, No. 4948, March 16, 1990, pp. 1299–1305.

Ellickson, Phyllis L., Robert M. Bell, and Kimberly McGuigan, "Preventing Adolescent Drug Use: Long-Term Results of a Junior High Program," *American Journal of Public Health*, Vol. 83, No. 6, June 1993, pp. 856–861.

Ellickson, Phyllis L., Joan S. Tucker, and David J. Klein, "Ten-Year Prospective Study of Public Health Problems Associated with Early Drinking," *Pediatrics*, Vol. 111, No. 5, May 1, 2003, pp. 949–955.

Evans-Lacko, Sara, Claire Henderson, Graham Thornicroft, and Paul McCrone, "Economic Evaluation of the Anti-Stigma Social Marketing Campaign in England 2009–2011," *British Journal of Psychiatry*, Vol. 55, April 2013, pp. s95–s101.

Field, Marilyn J., and Kathleen N. Lohr, eds., *Clinical Practice Guidelines: Directions for a New Program*, Washington, D.C.: National Academies Press, 1990.

Foa, Edna B., Jonathan R. T. Davidson, and Allen Frances, "Treatment of Posttraumatic Stress Disorder," *Journal of Clinical Psychiatry*, Vol. 60, Suppl. 16, 1999.

Francke, Anneke L., Marieke C. Smit, Anke J. E. de Veer, and Patriek Mistiaen, "Factors Influencing the Implementation of Clinical Guidelines for Health Care Professionals: A Systematic Meta-Review," *BMC Medical Informatics and Decision Making*, Vol. 8, September 2008, p. 38.

Glasgow, Russell E., Edward Lichtenstein, and Alfred C. Marcus, "Why Don't We See More Translation of Health Promotion Research to Practice? Rethinking the Efficacy-to-Effectiveness Transition," *American Journal of Public Health*, Vol. 93, No. 8, August 2003, pp. 1261–1267.

Gotham, Heather J., "Advancing the Implementation of Evidence-Based Practices into Clinical Practice: How Do We Get There from Here?" *Professional Psychology: Research and Practice*, Vol. 37, No. 6, December 2006, pp. 606–613.

Greenhalgh, Trisha, Glenn Robert, Fraser Macfarlane, Paul Bate, and Olivia Kyriakidou, "Diffusion of Innovations in Service Organizations: Systematic Review and Recommendations," *Milbank Quarterly*, Vol. 82, No. 4, 2004, pp. 581–629.

Guo, Christopher, "A Bayesian Approach to Energy R&D Portfolio Analysis," Santa Barbara, Calif.: University of California, Santa Barbara, 2012.

Gutierrez, Peter M., and Nigel Bush, "Usability and Utility of a Virtual Hope Box (VHB) for Reducing Suicidal Ideation," presentation at the fourth annual DoD/VA Suicide Prevention Conference, Washington, D.C., June 20–22, 2012.

Gutierrez, Peter M., Thomas Joiner, and Carl Castro, "Preventing Suicide in the United States Military: Research Challenges and Opportunities," paper presented at the European Symposium on Suicide and Suicidal Behaviour, Tel Aviv, Israel, September 5, 2012.

Harms, Susan L., and Judith Garrard, "The Fleetwood Model: An Enhanced Method of Pharmacist Consultation," *Consultant Pharmacist*, Vol. 13, December 1998, pp. 1350–1355.

Harris, E. Clare, and Brian Barraclough, "Suicide as an Outcome for Mental Disorders: A Meta-Analysis," *British Journal of Psychiatry*, Vol. 170, No. 3, March 1997, pp. 205–228.

Hartwell, Tyler, Paul Steele, Michael T. French, Frank J. Potter, Nathaniel F. Rodman, and Gary A. Zarkin, "Aiding Troubled Employees: The Prevalence, Cost and Characteristics of Employee Assistance Programs in the United States," *American Journal of Public Health*, Vol. 86, No. 6, June 1996, pp. 804–808.

Hausman, Jerry A., and David A. Wise, "A Conditional Probit Model for Qualitative Choice: Discrete Decisions Recognizing Interdependence and Heterogenous Preferences," *Econometrica*, Vol. 46, No. 2, March 1978, pp. 403–426.

Hempel, Susanne, Sydne Newberry, Zhen Wang, Paul G. Shekelle, Roberta M. Shanman, Breanne Johnsen, Tanja Perry, Debra Saliba, and David A. Ganz, *Review of the Evidence on Falls Prevention in Hospitals: Task 4 Final Report*, Santa Monica, Calif.: RAND Corporation, WR-907-AHRQ, 2012. As of February 4, 2014: http://www.rand.org/pubs/working_papers/WR907.html

Hoge, Charles W., and Carl A. Castro, "Preventing Suicides in US Service Members and Veterans: Concerns After a Decade of War," *Journal of the American Medical Association*, Vol. 308, No. 7, August 15, 2012, pp. 671–672.

HSR&D—*See* U.S. Department of Veterans Affairs, Office of Health Services Research and Development.

Hughes, Susan L., Joan Cummings, Frances Weaver, Larry Manheim, Barbara Braun, and Kendon Conrad, "A Randomized Trial of the Cost Effectiveness of VA Hospital-Based Home Care for the Terminally Ill," *Health Services Research*, Vol. 26, No. 6, February 1992, pp. 801–817.

Ishwaran, Hemant, "Univariate and Multirater Ordinal Cumulative Link Regression with Covariate Specific Cutpoints," *Canadian Journal of Statistics*, Vol. 28, No. 4, December 2000, pp. 715–730.

Johnson, Valen E., "On Bayesian Analysis of Multirater Ordinal Data: An Application to Automated Essay Grading," *Journal of the American Statistical Association*, Vol. 91, No. 433, March 1996, pp. 42–51.

Johnson, Valen E., and James H. Albert, *Ordinal Data Modeling*, New York: Springer-Verlag, Inc., 1999.

Karlin, Bradley E., Josef I. Ruzek, Kathleen M. Chard, Afsoon Eftekhari, Candice M. Monson, Elizabeth A. Hembree, Patricia A. Resick, and Edna B. Foa, "Dissemination of Evidence-Based Psychological Treatments for Posttraumatic Stress Disorder in the Veterans Health Administration," *Journal of Traumatic Stress*, Vol. 23, No. 6, December 2010, pp. 663–673.

Kellermann, Arthur L., and Frederick P. Rivara, "Silencing the Science on Gun Research," *Journal of the American Medical Association*, Vol. 309, No. 6, February 13, 2013, pp. 549–550.

Knox, Kerry L., David A. Litts, G. Wayne Talcott, Jill Catalano Feig, and Eric D. Caine, "Risk of Suicide and Related Adverse Outcomes After Exposure to a Suicide Prevention Programme in the US Air Force: Cohort Study," *British Medical Journal*, Vol. 327, No. 7428, December 13, 2003, pp. 1376–1381.

Knox, Kerry L., Steven Pflanz, Gerald W. Talcott, Rick L. Campise, Jill E. Lavigne, Alina Bajorska, Xin Tu, and Eric D. Caine, "The US Air Force Suicide Prevention Program: Implications for Public Health Policy," *American Journal of Public Health*, Vol. 100, No. 12, December 2010, pp. 2457–2463.

Lamb, Sara, Merwyn R. Greenlick, and Dennis McCarty, eds., *Bridging the Gap Between Practice and Research: Forging Partnerships with Community-Based Drug and Alcohol Treatment*, Washington, D.C.: National Academies Press, 1998.

Landeta, Jon, "Current Validity of the Delphi Method in Social Sciences," *Technological Forecasting and Social Change*, Vol. 73, No. 5, June 2006, pp. 467–482.

Lapane, Kate L., Carmel M. Hughes, Jennifer B. Christian, Lori A. Daiello, Kathleen A. Cameron, and Janice Feinberg, "Evaluation of the Fleetwood Model of Long-Term Care Pharmacy," *Journal of the American Medical Directors Association*, Vol. 12, No. 5, June 2011, pp. 355–363.

Lashoher, Angela, and Peter Pronovost, "Creating a More Efficient Healthcare Knowledge Market: Using Communities of Practice to Create Checklists," *Quality and Safety in Health Care*, Vol. 19, No. 6, December 1, 2010, pp. 471–472.

Linehan, Marsha M., *Cognitive Behavioral Treatment of Borderline Personality Disorder*, New York: Guilford Press, 1993.

Lipscomb, Hester J., James Nolan, Dennis Patterson, Mark Fullen, Brandon C. Takacs, and Lisa A. Pompeii, "Buyer Beware: Personnel Selling Nail Guns Know Little About Dangerous Tools," *American Journal of Industrial Medicine*, Vol. 54, No. 8, August 2011, pp. 571–578.

Lohr, Kathleen N., "Rating the Strength of Scientific Evidence: Relevance for Quality Improvement Programs," *International Journal for Quality in Health Care*, Vol. 16, No. 1, 2004, pp. 9–18.

Lomas, Jonathan, "Making Clinical Policy Explicit: Legislative Policy Making and Lessons for Developing Practice Guidelines," *International Journal of Technology Assessment in Health Care*, Vol. 9, No. 1, Winter 1993, pp. 11–25.

Louisiana Spirit Suicide Prevention Summit Meeting Planning Committee, *Suicide Prevention Gatekeeper Trainings Matrix*, Waltham and Newton, Mass.: Suicide Prevention Research Center and Education Development Center, December 2006. As of August 14, 2014: http://workingminds.org/images/SPRC_Gatekeeper_Matrix.pdf

Lukas, Carol Van Deusen, Sally K. Holmes, Alan B. Cohen, Joseph Restuccia, Irene E. Cramer, Michael Shwartz, and Martin P. Charns, "Transformational Change in Health Care Systems: An Organizational Model," *Health Care Manage Review*, Vol. 32, No. 4, October–December 2007, pp. 309–320.

Mahajan, Vijay, Eitan Muller, and Yoram Wind, "New Product Diffusion Models: From Theory to Practice," in Vijay Mahajan, Eitan Muller, and Yoram Wind, eds., *New Product Diffusion Models*, Dordrecht, the Netherlands: Kluver Academic, 2002, pp. 4–24

Marsh USA and Mercer Health and Benefits, *Survey of Health, Productivity, and Absence Management Programs 2007*, New York: Marsh and McLennan Companies, 2008.

Military Suicide Research Consortium, homepage, undated. As of February 4, 2014: https://msrc.fsu.edu/

Miller, Peter M., Ruth Stockdell, Lynne Nemeth, Chris Feifer, Ruth G. Jenkins, Paul J. Nietert, Andrea Wessell, Heather Liszka, and Steven Ornstein, "Initial Steps Taken by Nine Primary Care Practices to Implement Alcohol Screening Guidelines with Hypertensive Patients: The AA-TRIP Project," *Substance Abuse*, Vol. 27, Nos. 1–2, 2006, pp. 61–70.

Morrow-Bradley, Cheryl, and Robert Elliott, "Utilization of Psychotherapy Research by Practicing Psychotherapists," *American Psychologist*, Vol. 41, No. 2, February 1986, pp. 188–197.

Motto, Jerome A., and Alan G. Bostrom, "A Randomized Controlled Trial of Postcrisis Suicide Prevention," *Psychiatric Services*, Vol. 52, No. 6, June 2001, pp. 828–833.

MSRC—*See* Military Suicide Research Consortium.

Murphy, Kim, "Comprehensive Soldier Fitness Program Aims to Equip Troops Mentally," *Los Angeles Times*, December 26, 2011.

NAASP—*See* National Action Alliance for Suicide Prevention.

NAMI—*See* National Alliance on Mental Illness.

National Action Alliance for Suicide Prevention, "Research Prioritization Task Force Aspirational Research Goals with Example Survey Responses," undated. As of February 4, 2014:
http://actionallianceforsuicideprevention.org/system/files/RP_goals.pdf

———, *A Prioritized Research Agenda for Suicide Prevention: An Action Plan to Save Lives*, Rockville, Md., 2014. As of February 4, 2014:
http://actionallianceforsuicideprevention.org/sites/actionallianceforsuicideprevention.org/files/Agenda.pdf

National Alliance on Mental Illness, *NAMI Education, Training and Peer Support Center Education Programs*, 2011. As of August 14, 2014:
http://www.nami.org/ContentManagement/ContentDisplay.cfm?ContentFileID=136636

National Institute for Occupational Safety and Health and Occupational Safety and Health Administration, *Nail Gun Safety: A Guide for Construction Contractors*, 2011. As of February 14, 2014:
https://www.osha.gov/Publications/NailgunFinal_508_02_optimized.pdf

Office of the Deputy Under Secretary of Defense for Military Community and Family Policy, *2011 Demographics: Profile of the Military Community*, Washington, D.C., November 2012. As of February 4, 2014:
http://www.militaryonesource.mil/12038/MOS/Reports/2011_Demographics_Report.pdf

Owen, Neville, Karen Glanz, James F. Sallis, and Steven H. Kelder, "Evidence-Based Approaches to Dissemination and Diffusion of Physical Activity Interventions," *American Journal of Preventive Medicine*, Vol. 31, No. 4 Suppl., 2006, pp. s35–s44.

Oxman, Andrew D., Mary Ann Thomson, David A. Davis, and R. Brian Haynes, "No Magic Bullets: A Systematic Review of 102 Trials of Interventions to Improve Professional Practice," *Canadian Medical Association Journal*, Vol. 153, No. 10, November 15, 1995, pp. 1423–1431.

Pagoto, Sherry L., Bonnie Spring, Elliot J. Coups, Shelagh Mulvaney, Marie-France Coutu, and Gozde Ozakinci, "Barriers and Facilitators of Evidence-Based Practice Perceived by Behavioral Science Health Professionals," *Journal of Clinical Psychology*, Vol. 63, No. 7, 2007, pp. 695–705.

Perlick, Deborah A., Ann H. Nelson, Kate Mattias, James Selzer, Carla Kalvin, Charles H. Wilber, Brittney Huntington, Caroline S. Holman, and Patrick W. Corrigan, "In Our Own Voice—Family Companion: Reducing Self-Stigma of Family Members of Persons with Serious Mental Illness," *Psychiatric Services*, Vol. 62, No. 12, December 2011, pp. 1456–1462.

Pirkis, Jane, and Merete Nordentoft, "Media Influences on Suicide and Attempted Suicide," in Rory C. O'Connor, Stephen Platt, and Jacki Gordon, eds., *International Handbook of Suicide Prevention: Research, Policy and Practice*, Chichester, West Sussex, UK: John Wiley-Blackwell, 2011, pp. 531–544.

Pringle, Beverly, Lisa J. Colpe, Robert K. Heinssen, Michael Schoenbaum, Joel T. Sherrill, Cynthia A. Claassen, and Jane L. Pearson, "A Strategic Approach for Prioritizing Research and Action to Prevent Suicide," *Psychiatric Services*, Vol. 64, No. 1, January 2013, pp. 71–75.

Pronovost, Peter, Dale Needham, Sean Berenholtz, David Sinopoli, Haitao Chu, Sara Cosgrove, Bryan Sexton, Robert Hyzy, Robert Welsh, Gary Roth, Joseph Bander, John Kepros, and Christine Goeschel, "An Intervention to Decrease Catheter-Related Bloodstream Infections in the ICU," *New England Journal of Medicine*, Vol. 355, No. 26, December 28, 2006, pp. 2725–2732.

Ramchand, Rajeev, Joie Acosta, Rachel M. Burns, Lisa H. Jaycox, and Christopher G. Pernin, *The War Within: Preventing Suicide in the U.S. Military*, Santa Monica, Calif.: RAND Corporation, MG-953-OSD, 2011. As of February 4, 2014:
http://www.rand.org/pubs/monographs/MG953.html

Riddle, James R., Tyler C. Smith, Besa Smith, Thomas E. Corbeil, Charles C. Engel, Timothy S. Wells, Charles W. Hoge, Joyce Adkins, Mark Zamorski, and Dan Blazer, "Millennium Cohort: The 2001–2003 Baseline Prevalence of Mental Disorders in the U.S. Military," *Journal of Clinical Epidemiology*, Vol. 60, No. 2, February 2007, pp. 192–201.

Riley, William T., Mary F. Schumann, Valerie L. Forman-Hoffman, Patricia Mihm, Bradford W. Applegate, and Ofer Asif, "Responses of Practicing Psychologists to a Web Site Developed to Promote Empirically Supported Treatments," *Professional Psychology: Research and Practice*, Vol. 38, No. 1, February 2007, pp. 44–53.

Rogers, Everett M., *Diffusion of Innovations*, 5th ed., New York: Free Press, 2003.

Roman, Paul M., and Terry C. Blum, "The Workplace and Alcohol Problem Prevention," *Alcohol Research and Health*, Vol. 26, No. 1, 2002, pp. 49–57.

Rosen, Emanuel, *The Anatomy of Buzz: How to Create Word-of-Mouth Marketing*, New York: Doubleday, 2000.

Rothermel, Scott, Wendy Slavit, Karen Marlo, and Dannel Dan, *An Employer's Guide to Employee Assistance Programs: Recommendations for Strategically Defining, Integrating and Measuring Employee Assistance Programs*, Washington, D.C.: Center for Prevention and Health Services, National Business Group on Health, December 2008.

Rusch, Laura C., Jonathan W. Kanter, Alisa F. Angelone, and Robyn C. Ridley, "The Impact of In Our Own Voice on Stigma," *American Journal of Psychiatric Rehabilitation*, Vol. 11, No. 4, 2008, pp. 373–389.

SAMHSA—See Substance Abuse and Mental Health Services Administration.

Savitsky, Terrance D., and Siddhartha R. Dalal, "Bayesian Semi-Parametric Analysis of Multirater Ordinal Data, with Application to Prioritizing Research Goals for Prevention of Suicide," *Journal of the Royal Statistical Society: Series C (Applied Statistics)*, Vol. 63, No. 4, 2014, pp. 539–557.

Sinkowitz-Cochran, Ronda L., Amanda Garcia-Williams, Andrew D. Hackbarth, Bonnie Zell, G. Ross Baker, C. Joseph McCannon, Elise M. Beltrami, John A. Jernigan, L. Clifford McDonald, and Donald A. Goldmann, "Evaluation of Organizational Culture Among Different Levels of Healthcare Staff Participating in the Institute for Healthcare Improvement's 100,000 Lives Campaign," *Infection Control and Hospital Epidemiology*, Vol. 33, No. 2, February 2012, pp. 135–143.

Smith, Jeffrey L., John W. Williams, Jr., Richard R. Owen, Lisa V. Rubenstein, and Edmund Chaney, "Developing a National Dissemination Plan for Collaborative Care for Depression: QUERI Series," *Implementation Science*, Vol. 3, No. 59, 2008, pp. 1748–5908.

Sobell, Linda Carter, "Bridging the Gap Between Scientists and Practitioners: The Challenge Before Us," *Behavior Therapy*, Vol. 27, No. 3, Summer 1996, pp. 297–320.

South Texas Research Organizational Network Guiding Studies on Trauma and Resilience, homepage, undated. As of February 4, 2014:
http://delta.uthscsa.edu/strongstar/

SRPC—*See* Suicide Prevention Resource Center.

Stewart, Rebecca E., and Dianne L. Chambless, "Does Psychotherapy Research Inform Treatment Decisions in Private Practice?" *Journal of Clinical Psychology*, Vol. 63, No. 3, 2007, pp. 267–281.

Stewart, Rebecca E., Shannon Wiltsey Stirman, and Dianne L. Chambless, "A Qualitative Investigation of Practicing Psychologists' Attitudes Toward Research-Informed Practice: Implications for Dissemination Strategies," *Professional Psychology: Research and Practice*, Vol. 43, No. 2, April 2012, pp. 100–109.

STRONG STAR—*See* South Texas Research Organizational Network Guiding Studies on Trauma and Resilience.

Substance Abuse and Mental Health Services Administration, National Registry of Evidence-Based Programs and Practices, homepage, last updated February 10, 2014. As of February 14, 2014:
http://www.nrepp.samhsa.gov

Suicide Prevention Resource Center, Best Practices Registry, homepage, undated. As of February 14, 2014:
http://www.sprc.org/bpr

Swenson, Charles R., "How Can We Account for DBT's Widespread Popularity?" *Clinical Psychology: Science and Practice*, Vol. 7, No. 1, March 2000, pp. 87–91.

TAGGS—*See* Tracking Accountability in Government Grants System.

Tan, K. M., "Influence of Educational Outreach Visits on Behavioral Change in Health Professionals," *Journal of Continuing Education in the Health Professions*, Vol. 22, No. 2, Spring 2002, pp. 122–124.

Tracking Accountability in Government Grants System, "TAGGS Advanced Search," undated. As of February 4, 2014:
http://taggs.hhs.gov/AdvancedSearch.cfm

Tucker, Joan S., Phyllis L. Ellickson, and David J. Klein, "Five-Year Prospective Study of Risk Factors for Daily Smoking in Adolescence Among Early Nonsmokers and Experimenters," *Journal of Applied Social Psychology*, Vol. 32, No. 8, August 2002, pp. 1588–1603.

U.S. Air Force, *The Air Force Suicide Prevention Program: A Description of Program Initiatives and Outcomes*, Air Force Pamphlet 44-160, Washington, D.C., April 2001.

U.S. Department of Defense Task Force on the Prevention of Suicide by Members of the Armed Forces, *The Challenge and the Promise: Strengthening the Force, Preventing Suicide and Saving Lives*, Washington, D.C., August 2010. As of August 14, 2014:
http://www.sprc.org/library_resources/items/challenge-and-promise-strengthening-force-preventing-suicide-and-saving-live

U.S. Department of Veterans Affairs, Office of Health Services Research and Development, "HSR&D Research Studies and Implementation Projects," undated. As of February 4, 2014:
http://www.hsrd.research.va.gov/research/default.cfm

U.S. Department of Veterans Affairs, Quality Enhancement Research Initiative, homepage, last updated January 31, 2014. As of February 14, 2014:
http://www.queri.research.va.gov

U.S. Department of Veterans Affairs and U.S. Department of Defense, *VA/DoD Clinical Practice Guideline for Management of Substance Use Disorders (SUD)*, Washington, D.C., August 2009. As of September 9, 2014:
http://www.healthquality.va.gov/guidelines/MH/sud/sud_full_601f.pdf

———, *VA/DoD Clinical Practice Guideline for Management of Post-Traumatic Stress Disorder*, Washington, D.C., October 2010. As of September 9, 2014:
http://www.healthquality.va.gov/guidelines/MH/ptsd/cpg_PTSD-FULL-201011612.pdf

———, *VA/DoD Clinical Practice Guideline for Assessment and Management of Patients at Risk for Suicide*, Washington, D.C., June 2013. As of September 9, 2014:
http://www.healthquality.va.gov/guidelines/MH/srb/VADODCP_SuicideRisk_Full.pdf

VA—*See* U.S. Department of Veterans Affairs.

Verhagen, Arianne P., Henrica C. W. de Vet, Robert A. de Bie, Alphons G. H. Kessels, Maarten Boers, Lex M. Bouter, and Paul G. Knipschild, "The Delphi List: A Criteria List for Quality Assessment of Randomized Clinical Trials for Conducting Systematic Reviews Developed by Delphi Consensus," *Journal of Clinical Epidemiology*, Vol. 51, No. 12, December 1998, pp. 1235–1241.

Wachter, Robert M., and Peter J. Pronovost, "The 100,000 Lives Campaign: A Scientific and Policy Review," *Joint Commission Journal on Quality and Patient Safety*, Vol. 32, No. 11, November 2006, pp. 621–627.

Watson Wyatt Worldwide, *Staying @ Work Report: Building an Effective Health and Productivity Framework*, Washington, D.C., 2007.

Weingardt, Kenneth R., and Steven W. Villafranca, "Translating Research into Practice: The Role of Web-Based Education," *Journal of Technology in Human Services*, Vol. 23, Nos. 3–4, 2005, pp. 259–273.

West, Suzanne, Valerie King, Timothy S. Carey, Kathleen N. Lohr, Nikki McKoy, Sonya F. Sutton, and Linda Lux, *Systems to Rate the Strength of Scientific Evidence*, Rockville, Md.: Agency for Healthcare Research and Quality, Evidence Report/Technology Assessment No. 47, April 2002. As of February 4, 2014:
http://www.thecre.com/pdf/ahrq-system-strength.pdf

Wood, Amy L., and Otto F. Wahl, "Evaluating the Effectiveness of a Consumer-Provided Mental Health Recovery Education Presentation," *Psychiatric Rehabilitation Journal*, Vol. 30, No. 1, 2006, pp. 46–53.

Wyman, Peter A., C. Hendricks Brown, Mark LoMurray, Karen Schmeelk-Cone, Mariya Petrova, Qin Yu, Erin Walsh, Xin Tu, and Wei Wang, "An Outcome Evaluation of the Sources of Strength Suicide Prevention Program Delivered by Adolescent Peer Leaders in High Schools," *American Journal of Public Health*, Vol. 100, No. 9, September 2010, pp. 1653–1661.

Yuan, Christina T., Ingrid M. Nembhard, Amy F. Stern, John E. Brush, Jr., Harlan M. Krumholz, and Elizabeth H. Bradley, "Blueprint for the Dissemination of Evidence-Based Practices in Health Care," Washington, D.C.: Commonwealth Fund, Issue Brief No. 86, May 2010.