

**U.S. National Suicide
Prevention Research Efforts:
2008-2013 Portfolio Analyses**
Research Prioritization Task Force
2015



The Public-Private Partnership Advancing the National Strategy for Suicide Prevention



U.S. National Suicide Prevention Research Efforts: 2008-2013 Portfolio Analyses

Prepared by the National Institute of Mental Health
on behalf of the National Action Alliance for Suicide Prevention's
Research Prioritization Task Force

Disclaimer

The views expressed in this report are those of the Research Prioritization Task Force of the National Action Alliance for Suicide Prevention, and do not necessarily reflect the official views of the funding agencies and organizations.

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Background

Suicide is a major public health issue, affecting individuals across the range of ages, income, and education levels, and all racial and ethnic groups. In 2013, suicide was the 10th leading cause of death for all Americans, claiming over 40,000 lives (Kochanek et al, 2014) and affecting the lives of many more, including family members, friends, neighbors, and colleagues. The extent and toll of suicide attempts and suicidal thoughts are far greater. In 2013, 1.3 million adults in the U.S. reported having attempted suicide in the past year, and 9.3 million adults reported having serious thoughts of suicide (SAMHSA, 2014; <http://www.samhsa.gov/data/sites/default/files/NSDUHmhfr2013/NSDUHmhfr2013.htm#3-1>).

About the National Action Alliance for Suicide Prevention

The [National Action Alliance for Suicide Prevention](#) (Action Alliance), established in 2010 with support from the Substance Abuse and Mental Health Services Administration (SAMHSA), is the public-private partnership working to advance the [National Strategy for Suicide Prevention](#) and make suicide prevention a national priority (NSSP; HHS, 2012). The Action Alliance envisions a nation free from the tragic experience of suicide. The **mission of the Action Alliance is to** advance the NSSP by: championing suicide prevention as a national priority; catalyzing efforts to implement high priority objectives of the NSSP; and cultivating the resources needed to sustain progress. The Action Alliance is led by a private sector and a private sector co-chair. Currently, Public Sector Co-Chair, The Honorable Jessica L. Garfola Wright, Under Secretary of Defense for Personnel and Readiness, U.S. Department of Defense, and Private Sector Co-Chair, Robert W. Turner, Senior Vice President – Corporate Relations, Union Pacific Corporation. The Action Alliance consists of rotating Executive Committee members, priority groups, and task forces, as well as a Secretariat (operated by the Education Development Center, Inc., with support from SAMHSA).

About the Research Prioritization Task Force

The Action Alliance [Research Prioritization Task Force](#) (RPTF) was initiated in 2010. The RPTF was initially comprised of 11 organizations, representing the public and private sectors in research, advocacy, and practice. The RPTF developed a national research agenda that addressed the following goal (National Action Alliance for Suicide Prevention, 2014):

Overall, U.S. rates of suicide have not decreased appreciably in 50 years. Each year, over 678,000 individuals report that they have received medical attention for a suicide attempt; and each year, more than 30,000 individuals die by suicide. The Research Prioritization Task Force will develop an agenda for research that has the potential to reduce morbidity (attempts) and mortality (deaths) each, by at least 20% in 5 years, and 40% or greater in 10 years, if implemented successfully.

Need for a Portfolio Review

In response to Goal 12 of the 2012 NSSP, the RPTF aimed to develop a new prioritized research agenda to help reduce suicide. The RPTF set out to:

Develop a prioritized approach for allocating funds and monitoring future suicide research to ensure that available resources target research with the greatest likelihood of reducing suicide morbidity and mortality.

As part of this prioritized research agenda development process, the RPTF sought to determine how recently funded U.S. research studies, supported by both public (federal) and private (e.g., industry, foundations) entities, could benefit and/or be leveraged by the RPTF prioritized research agenda. The portfolio analysis presented here is part of the RPTF efforts to assess the “state of the science” for suicide prevention. It was developed to prioritize what research steps and pathways are needed to help reduce the suicide deaths and attempts in the U.S, and to identify strengths and gaps in the U.S. research portfolio.

This effort also is intended to support suicide funders’ needs to:

- determine where investments have already been made;
- consider how future studies can leverage current efforts;
- identify and make public basic information on funded studies to promote knowledge sharing early in the research process;
- promote research collaborations (e.g., multi-disciplinary needs; comparable study approaches; measure harmonization, etc.); and
- facilitate efforts devoted to assessing the ‘value of information’ for policy makers.

The RPTF’s *Prioritized Research Agenda for Suicide Prevention: An Action Plan to Save Lives* (Agenda) identifies six Key Questions that reflect the breadth of the science optimally needed to reduce suicide burden. These questions mirror the range of public health and medical approaches to public health problems.

- Key Question 1: Why do people become suicidal?
- Key Question 2: How can we better or more optimally detect/predict risk?
- Key Question 3: What interventions prevent individuals from engaging in suicidal behavior?
- Key Question 4: What services are most effective for treating the suicidal person and prevention suicidal behavior?
- Key Question 5: What other types of interventions (outside health care settings) reduce suicide risk?
- Key Question 6: What new and existing research infrastructure is needed to reduce suicidal behavior?

The Agenda also includes three short-term and three long-term Research Objectives for Key Questions 1-5. The Key Questions and Research Objectives are used in this portfolio analysis to categorize the current state of suicide prevention research.

In addition to the Key Questions and Research Objectives, the Agenda includes numerous Research Pathways that serve as methodologies for achieving the Research Objectives and, thus, answering the Key Questions. For purposes of this portfolio analysis, those Research Pathways were not categorized. Those interested in reading more about the Research Pathways can do so by downloading the Agenda or its accompanying *Suicide Research Prioritization Plan of Action* document at www.suicide-research-agenda.org.

Approach to this Portfolio Review

Inclusion Criteria

RPTF members—along with National Institutes of Mental Health (NIMH) RPTF support staff—generated a list of public and private funding entities, based on their knowledge of the field. From a list of agencies, contacts were made to find those most appropriate to assist in the categorizing of studies in their respective suicide research portfolios. The threshold for including an agency or foundation in this analysis was an investment of \$100,000 or more for suicide-related studies in any one calendar year, between the years 2008 and 2013. Each agency or foundation selected their own studies for inclusion in this review.

U.S. Government and Private Organizations that Fund Suicide Prevention Research

The contributors to these analyses included:

U.S. Federal Government (Public)

Agency for Healthcare Research and Quality (AHRQ)
Centers for Disease Control and Prevention (CDC)
Department of Defense (DoD)
Department of Veterans Affairs (VA)
Department of Transportation (DOT)/Federal Railroad Administration (FRA)
National Institutes of Health (NIH)
National Institute of Justice (NIJ)
National Science Foundation (NSF)
Substance Abuse and Mental Health Services Administration (SAMHSA)

U.S. Private Foundations

American Foundation for Suicide Prevention (AFSP)
Brain & Behavior Research Foundation (BBRF)

To find out more about these funding organizations' interest in suicide research, please see Appendix B (page 30) of this document.

Approaches to Identifying U.S. Federal Government Research

Because federal funding of suicide prevention research does not have one central, publically accessible website (and thus motivated the need for this report), NIMH program staff used multiple approaches to identify research studies that included searching online research solicitations, and contacting federal program staff at various agencies who could help report relevant funding. Funders not affiliated with

NIH (AHRQ, CDC, DoD, VA, DOT/FRA, NIJ, NSF, SAMHSA, AFSP, and BBRF) provided the NIMH with lists of suicide research studies they had funded from 2008 to 2013 for inclusion. Specific approaches are described here:

National Institutes of Health (NIH) projects included in the portfolio analyses are those studies categorized under the Research Portfolio Online Reporting Tools (RePORT) 'suicide' category, which is drawn from the NIH Research, Condition, and Disease Categorization (RCDC) System (see http://report.nih.gov/categorical_spending.aspx). NIH studies that received initial funding in 2008, and those studies with any funding in the following years up to 2013, were included in the database. Due to our inclusion process, the NIH suicide funding in this report differs from the officially reported amounts (see *How Complete is this Inventory* section, pages 10-11). The official annual funding amounts can be found via the RCDC link above.

Discretionary research project funding by the Agency for Healthcare Research and Quality (AHRQ) can be found in the electronic Research Administration (eRA) system (see <http://era.nih.gov/>). For the years addressed in this report, only one contract to review evidence-based studies on suicide screening and intervention studies met our analyses criteria and was included.

The Centers for Disease Control and Prevention (CDC) supports a wide variety of suicide prevention efforts, ranging from surveillance infrastructure to investigator initiated intervention studies. The majority of suicide research supported by CDC was identified by the eRA system. With regard to surveillance, this report includes only research studies addressing surveillance methods, as well as community program evaluation grants.

Identifying Department of Defense (DoD) suicide research efforts was complex due to multiple funding streams. The bulk of DoD suicide research funding is managed through the US Army Medical Research and Materiel Command (MRMC). The MRMC manages the programming, planning, budgeting and execution of medical research, development, testing and evaluation (RDT&E) funding on behalf of the Office of the Assistant Secretary of Defense for Health Affairs (OASD [HA]) Defense Health Program (DHP). DHP funds support the majority of the DoD suicide research. MRMC also manages Army medical research RDT&E funds from the Assistant Secretary of the Army for Acquisitions Logistics and Technology (ASA[ALT]). At MRMC, the Joint Program Committee for Military Operational Medicine (JPC5) is responsible for the programmatic management of DHP funded suicide research, and the Congressionally Directed Medical Research Programs (CDMRP) supports the JPC5 in managing projects. The work funded by the DHP can be found through the CDMRP a public website (<http://cdmrp.army.mil/search.aspx>) under the Psychological Health and Traumatic Brain Injury program. One of the largest DHP-funded efforts is the Military Suicide Research Consortium, which is aimed at identifying and delivering evidence-based suicide prevention interventions. MRMC staff assisted NIMH in identifying the studies that are Service (Army, Air Force, Navy and Marine Corps) funded, which included intramural and extramural research through their Operations and Maintenance funding (O & M) and Research Development, Test and Evaluation (RDT&E) funding. Studies supported by the Defense Advanced Research Projects Agency (DARPA)—specifically, the Detection and Computational Analysis of Psychological Signals (DCAPS) program within DARPA's Information Innovation Office (I2O)—were included in the DoD category.

One of the largest Army (\$50 million) and NIMH funded (\$15 million) suicide research investments is the Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS). The effort was primarily funded by the Army and was awarded by NIMH (<http://www.armystarrs.org/>). Army STARRS is comprised of five study components—the Historical Administrative Data Study, New Soldier Study, All Army Study, Soldier Health Outcomes Study, and Special Studies—to identify factors that help protect a Soldier’s mental health and factors that contribute to a Soldier’s mental health problems and suicide risk. Because of its large cost, the Army STARRS investments in a number of analyses dramatically affected total amount and proportions; therefore, in a number of analyses presented here, the results depicted indicate whether Army STARRS funding is included, or not.

The Department of Transportation (DOT) invested in suicide research through the Federal Railroad Administration (FRA), which supported studies through the Railroad Research Foundation and the Volpe Center.

The National Institute of Justice (NIJ) lists studies supported on their funding and awards website by fiscal year (<http://nij.gov/funding/awards/Pages/welcome.aspx>). NIJ suicide relevant studies were identified for inclusion by NIJ staff.

The National Science Foundation (NSF) has a funding website where a key word search can be conducted on an awards data base (<http://www.nsf.gov/awardsearch/>). Suicide relevant studies for inclusion were identified by NSF staff.

A number of evaluations of grant programs supported by the Substance Abuse and Mental Health Services Administration (SAMHSA) were identified in the eRA system, and included in the analyses.

The Veterans Administration Office of Research and Development staff provided information on funded research, and pointed NIMH to two VA Centers of Excellence on suicide prevention. In the future, VA Research studies will also be available in NIH RePORT, as VA utilizes the same eRA system for proposal submission.

Approaches to Identifying U.S. Private/ Foundation Research

Staff from the Brain & Behavioral Research Foundation (BBRF) identified relevant funding efforts for the designated time period, and provided NIMH staff information on the studies.

Studies supported by the American Foundation for Suicide Prevention (AFSP) for the designated time period were identified and categorized by AFSP staff. More recent funding activities can be found through the AFSP website (<http://www.afsp.org/research/our-researchers/all-grants>).

How Complete is this Inventory of U.S. Funding for Suicide Prevention Research?

Due to the lack of a central, publically accessible website, the multiple approaches used to identify suicide research studies in this initial portfolio analyses result in an inventory that is likely incomplete. For example, contact with staff at the Food and Drug Administration (FDA) determined that FDA staff conducts internal analyses of safety profiles of medications and devices. However, the FDA has not issued discretionary funding for suicide research solicitations. The Department of Education supports research grants through the Institute of Education Sciences (IES) and the Office of Safe and Healthy Students (OSHS; includes discretionary grant programs and state grant programs). NIMH program staff conducted an online search of IES (<http://ies.ed.gov/funding/grantsearch/?slctCenter=1>) but did not find any studies that were obviously related to suicide prevention research. However, future efforts will include contacts with IES and OSHS program staff to determine if there are relevant suicide prevention studies to include. Other federal agencies and private entities will also be included in future reports as awareness of this suicide research portfolio effort broadens, and/or other agencies and foundations support suicide research.

As described above, the majority of the search efforts for NIH suicide relevant research grants were done through eRA searches and the ‘suicide’ research category of the NIH RePORT website. The RCDC system is based on computer algorithms driven by key words. In some instances, NIH studies were not consistently drawn into the ‘suicide’ category across the six years of this portfolio review. In the limited instances where that occurred, NIMH staff included a study for each of the funding years for this report, even if the RePORT website did not do so. In other cases, closer review of a study led NIMH staff to consider the study not centrally relevant to suicide, so it was not included in the portfolio review. Therefore, correspondence between this portfolio report and lists of studies from the ‘suicide’ category of RePORT will not exactly align.

Categorizing Studies by Key Question and Research Objectives

Reviewing and categorizing studies for the purposes of analyses involved a detailed review of project funding applications. This application review was used to identify which single Key Question (KQ) from the Agenda best matched the goals and methods of each study, as well as which funded studies aligned with Research Objectives. While many studies addressed multiple KQs to some degree, this report selected the primary KQ (KQ1 - KQ5) and a primary Research Objective related to the Key Question. KQ 6—which posed questions about research infrastructure—was considered separately for each study. Therefore, studies were categorized for their relevance to KQ6 as well as KQ1 to KQ5.

Representatives from the AHRQ, CDC, DARPA, DoD, VA, DOT/FRA, NIJ, NSF, SAMHSA, and BBRF reviewed the NIMH categorizing decisions on their funded studies to verify the categories assigned. Categorizing of VA studies was conducted by both VA and NIMH staff. NIMH staff reviewed the categorized studies completed by AFSP. Across all funders, when there was not initial agreement in categorization between funders and the NIMH, assignment of a category was reached by consensus.

Portfolio Analysis Findings

Who Funds Suicide Research in the U.S.?

There were 383 unique studies (grants, contracts, cooperative agreements, and intramural research) included in the analyses for this report, distributed across funding agencies in the following way:

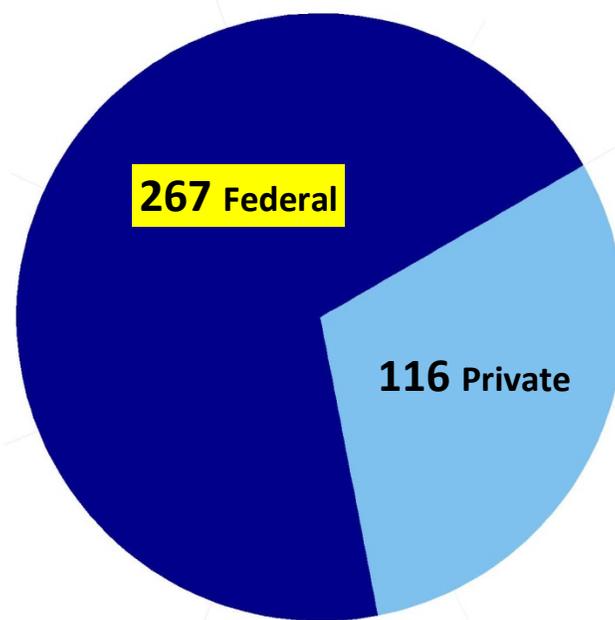
Funding Organization	Number of Studies (N)=383
Agency for Healthcare Research and Quality (AHRQ)	1
Centers for Disease Control and Prevention (CDC)	12
Department of Defense (DoD)	51
Department of Transportation/Federal Railroad Administration (DOT-FRA)	4
National Institutes of Health (NIH)	156
National Institute of Justice (NIJ)	2
National Science Foundation (NSF)	7
Substance Abuse and Mental Health Services Administration (SAMHSA)	3
Department of Veterans Affairs (VA)	31
American Foundation for Suicide Prevention (AFSP)	99
Brain & Behavioral Research Foundation (BBRF)	17

Who Funds What Proportion of Suicide Research in the U.S.?

When comparing the number of Federal and private studies in suicide research from 2008 to 2013, Figure 1 shows that the majority of the studies were funded by the Federal government. Thirty percent of the funded studies were supported by private foundations.

Figure 1. Number of U.S. Suicide Studies

Private vs. Federal, 2008-2013
N=383



Source ■ Federal (N=267) ■ Private (N=116)

However, Figure 2 shows that the combined funding amounts of private foundations were far exceeded by federal investments, which provided 98% of funding during this time period. The combined U.S. Federal and private investment in suicide research from 2008 to 2013, was \$429,800,794.

Figure 2. U.S. Suicide Research Investments

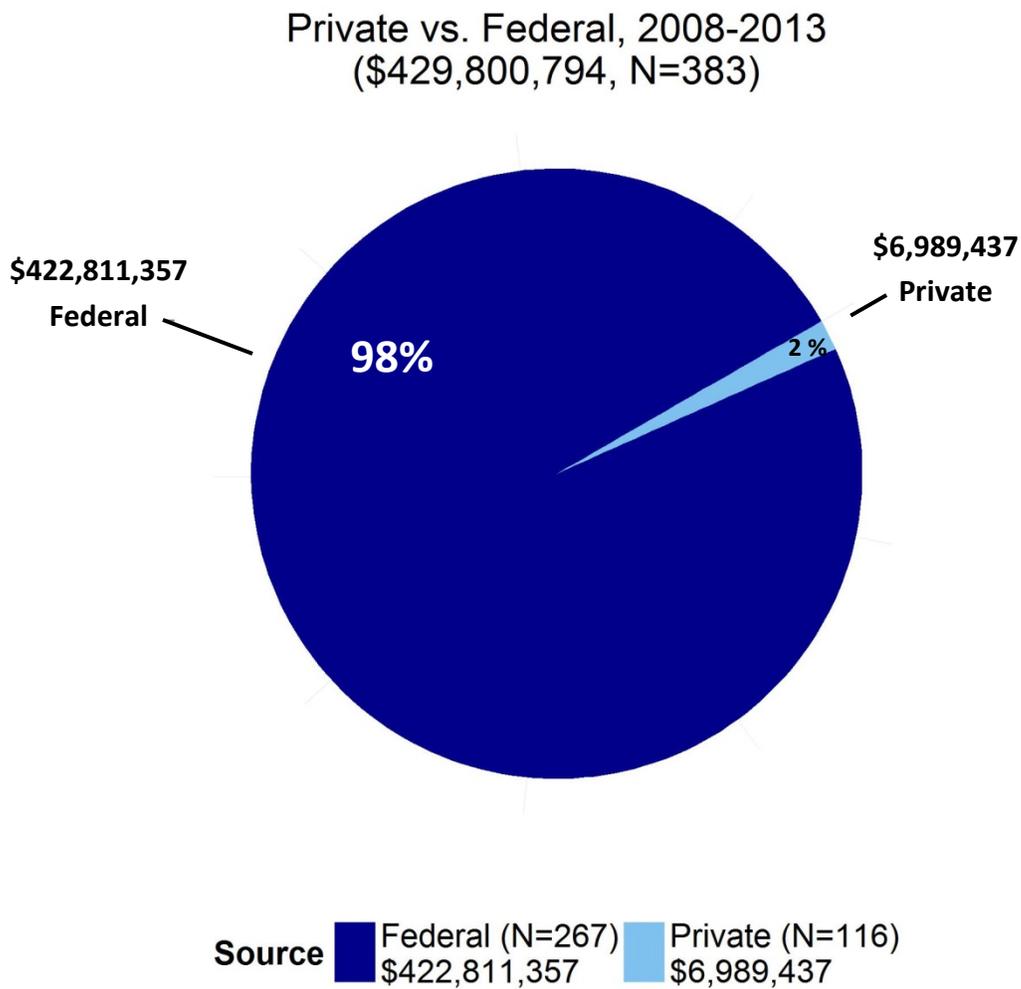
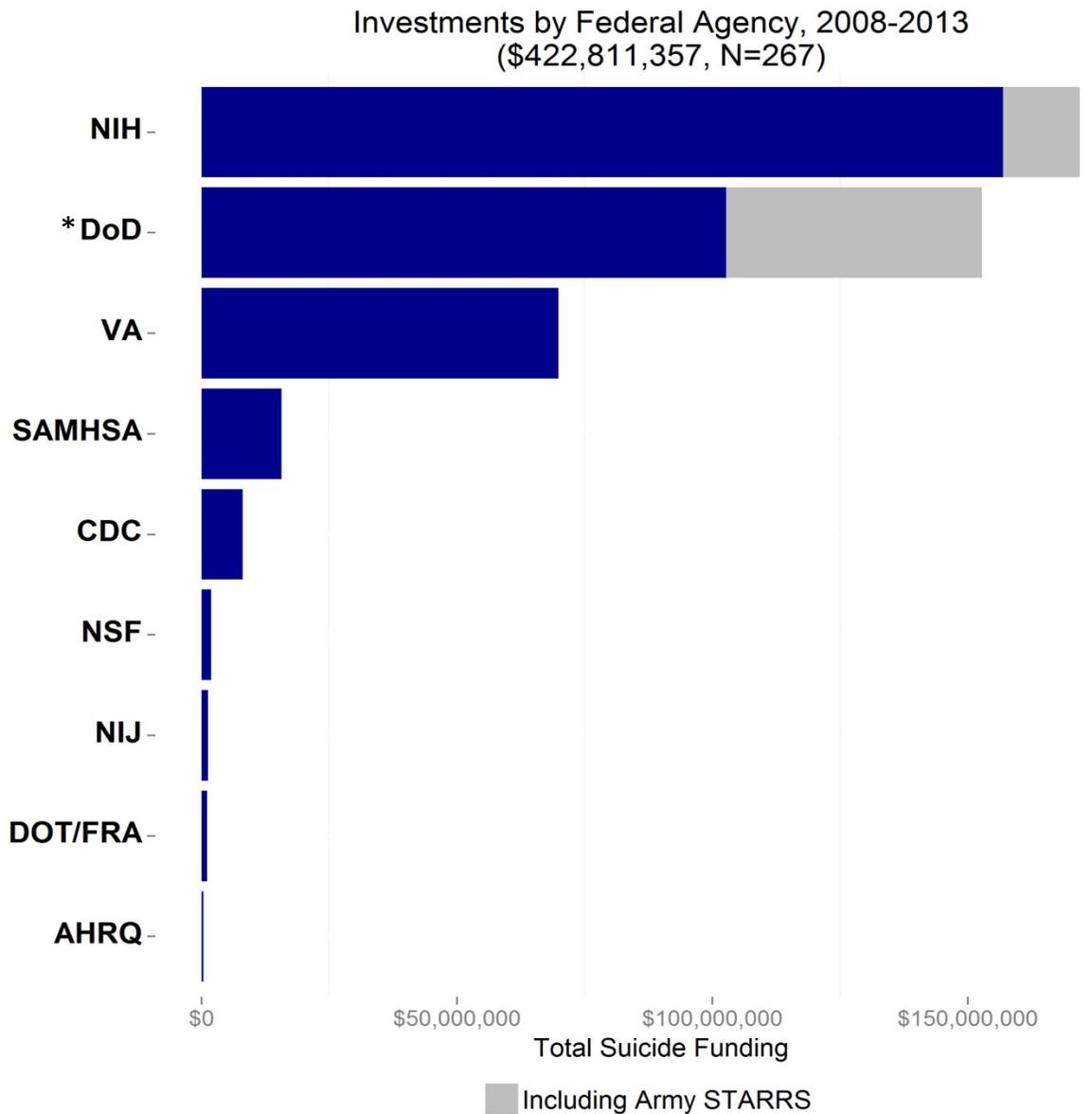


Figure 3 shows that among the Federal agencies, the NIH invested 41% of the government share in this time period. This was closely followed by a comparable proportion of funding by the DoD, with 36% of the Federal investment (includes the Army STARRS study). The VA ranked third, with 17% of the Federal investment in suicide research.

Figure 3: U.S. Suicide Research Investments by Federal Agencies



**Total dollars were not available for one DOD/Marine Corps award.*

How is Funding Distributed among Key Research Questions? How Do Studies Align with the Prioritized Research Objectives?

In order to determine where current suicide research investments fall within the Agenda, funded studies were categorized by the KQs (Figure 4, next page). Within each of these KQs, the funded studies were next considered with regard to whether they addressed the short- and long-term Research Objectives within the Key Questions that were identified by the RPTF and considered most likely to reduce the burden of suicide attempts and deaths. Categorizing of the studies was based on the logic and approaches used in the Agenda, and definitions of terms such as 'risk factors', 'prediction,' vary considerably by researchers. For example, a study focused on risk factors will often discuss the implications for eventual screening or detection of some level of risk, but the study contribution to meeting the research objective is more about the etiology and/or course of suicide.

Appendix A provides a table with all six Research Objectives (three short-term; three long-term) under each KQ, along with the number of studies categorized as addressing the Research Objective. A web-link for each of the 'number of studies' connects to a file that provides a list of all study funding organizations, titles, principal investigator names, year funding for the study began, and abstracts related to each Research Objective. It is important to note that in Appendix A, some Research Objectives did not have any studies that aligned with them, and as a consequence a zero (and no web-link) listed in the table for that Objective.

The following are brief summaries of the studies that aligned with Key Questions (Figure 4) and the related Research Objectives (Appendix A):

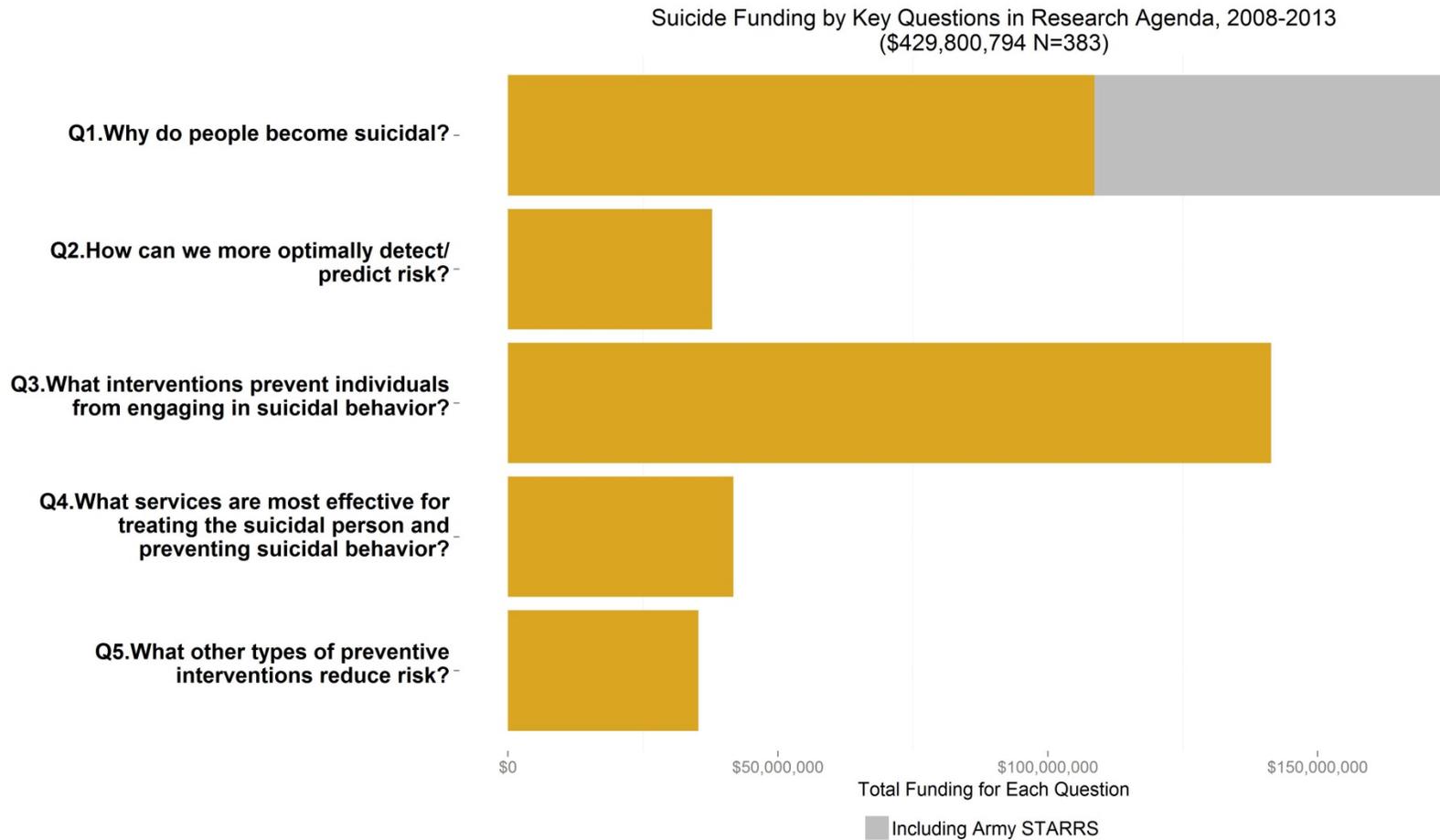
Key Question 1: Why do people become suicidal?

Due to the significant investment in Army STARRS, the largest proportion (40%) of U.S. suicide research investments between 2008 and 2013 have been to understand the etiology of suicide as described in the Agenda. When DoD and NIH funding of Army STARRS is omitted from the analyses, etiologic research falls second to the investments in interventions (Key Question 3).

Many of the studies addressing psychosocial contributors to etiology and course of suicide leveraged existing longitudinal data sets (e.g., prior grant investments in community cohort studies; national surveys; military and veteran cohort studies). Among the short-term Research Objectives were: 62 research studies aimed at identifying biomarkers for proximal or future suicide risk status; 51 studies addressing cognitive or other neural circuitry dysfunction associated with suicide risk. Again research infrastructure was utilized among many of these investments (e.g., animal models; postmortem brain banks; clinical cohort studies). There were 25 studies that addressed either healthy social connections as protection against suicide risk, or examined models that promoted risk or contagion.

As expected, there were fewer numbers of studies that addressed the long-term etiology Research Objectives. Among them were 18 studies integrating multiple data sources to develop risk models; and 2 studies addressed whether reducing risk conditions (e.g., insomnia, addiction, pain, etc.) also mitigates suicide risk (see Appendix A).

Figure 4: Suicide Funding by Key Questions in Research Agenda



* Total dollars were not available one DOD/MC award. Percentage of total studies is reported along with total number of studies. Percentages may not sum to 100% due to rounding.

See Appendix A for web links to specific studies addressing these Key Questions and Research Objectives.

Key Question 2: How can we better or more optimally detect/predict risk?

One of the most challenging research areas in suicide prevention has been the inability to accurately predict who is or is not at risk for suicidal behavior within a specific time period. A number of funders, recognizing this challenge, had requested applications on this specific topic (DoD/DARPA; AFSP; NIMH) over the 2008 to 2013 time period, resulting in 26 studies addressing objectives of KQ 2 (see Appendix A).

Among the short-term Research Objectives currently being addressed, 13 studies were examining risk algorithms within health care data; 7 were examining multiple-method (e.g., activity monitors; daily mood reports) screening approaches, and 4 studies were addressing screening approaches in care settings. Contexts and settings where detection research took place included online web sites, military and veteran settings, and prisons. For example, the Detection and Computational Analysis of Psychological Signals (DCAPS) studies (funded by DoD/DARPA) were categorized under Short-term Research Objective 2.C.

Only one of the three long-term Research Objectives was addressed; two military-based studies examined lifetime risk approaches (see Appendix A).

Key Question 3: What interventions prevent individuals from engaging in suicidal behavior?

Because the world literature on suicide research is mostly focused on risk factors (e.g., Goldblatt et al, 2012), a very encouraging result of the portfolio analyses was that the next largest category of all funding involved interventions aimed at preventing suicidal behavior.

As indicated in Appendix A, the 64 studies that aligned with KQ 3 resulted, in part, due to rapid DoD (e.g., Military Suicide Research Consortium) and VA funding efforts that initiated multiple intervention trials among active duty service members and veterans. Twenty-four studies were focused on the short-term Research Objective regarding the testing of adjunctive interventions (e.g., safety planning) among individuals with psychiatric, substance use, or other physical conditions to reduce suicide risk. Another 19 studies were focused on feasible and fast acting interventions (pharmacologic, psychotherapeutic, and somatic [e.g., sleep]). Sixteen studies focused on the short-term Research Objective of determining effective interventions for high risk groups (e.g., American Indian communities; LGBT teens; prisoners; individuals with suicide attempt histories).

Of the 3 long-term Research Objectives related to interventions, 4 studies addressed whether adequate treatment of risk conditions mitigated suicide risk. One study addressed whether intervention moderators or treatment mechanisms could be identified to further refine interventions (see Appendix A).

Key Question 4: What services are most effective for treating the suicidal person, and preventing suicidal behavior?

Thirty-seven studies addressed the complex questions as to what services were most effective in reducing suicide risk (see Appendix A). Sixteen studies addressed the short-term Research Objective related to improving provider skills. A similar number (15 studies) addressed approaches to improving help-seeking and engaging in treatment. Five studies addressed the short-term Research Objective relevant to moderators of response, or intermediate outcomes associated with lower suicide risk.

Only 1 of the 3 long-term Research Objectives was addressed; one study was relevant to the objective of determining whether multiple quality improvements in a system (health care; justice; older adult care setting) resulted in reduced suicide risk (see Appendix A).

Key Question 5: What other types of interventions (outside health care settings) reduce suicide risk?

Thirteen studies addressed community prevention and/or environmental interventions (see Appendix A). Given the many community-based approaches that are already fielded, and are not evidence based, this limited investment in research can be considered a gap.

Among the short-term Research Objectives addressed, 5 studies were relevant to how policies (alcohol advertising; medication prescribing practices) affect suicide risk. Another 5 studies focused on the mechanisms of risk and resilience. Despite the significant need for additional research on the effectiveness of reduced access to lethal means, only one study addressed that topic.

With regard to long-term Research Objectives, only 1 of 3 objectives was addressed. Two studies examined the objective related to how technology could enhance efforts to improve intermediate outcomes in organizations (e.g., schools, worksites; see Appendix A).

Key Question 6: What new and existing research infrastructure is needed to reduce suicidal behavior?

Each study also was categorized as to whether certain infrastructure resources were being used in the study (e.g, data repository; research center), as well as whether the funder was supporting a new researcher in suicide prevention. Figure 5 illustrates that about 70% of all suicide research investments leverages some infrastructure and/or provides research training opportunities. Figure 6 illustrates the proportion of studies and dollars associated with various types of infrastructures. It is also apparent from Figure 6 that Army STARRS expands the infrastructure use extensively through repositories, registries (many merged administrative data sets), and research centers (e.g., survey centers).

Figure 5: Investments in Infrastructure

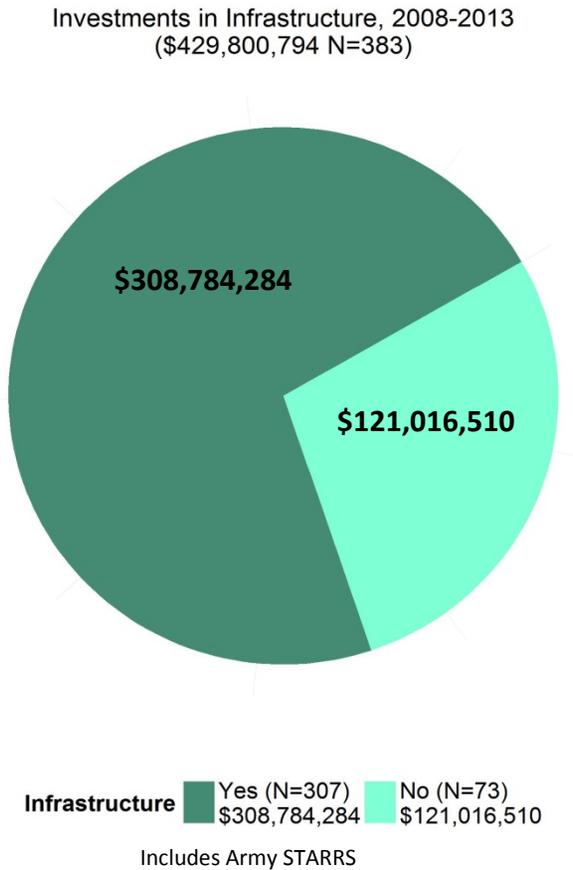
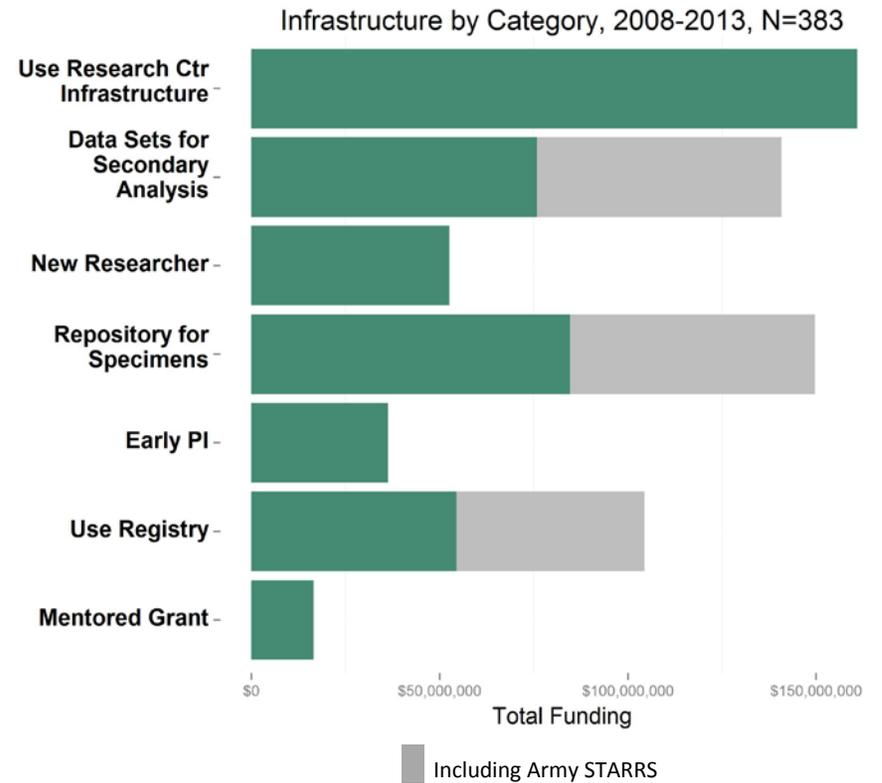


Figure 6: Investments in Infrastructure by Category



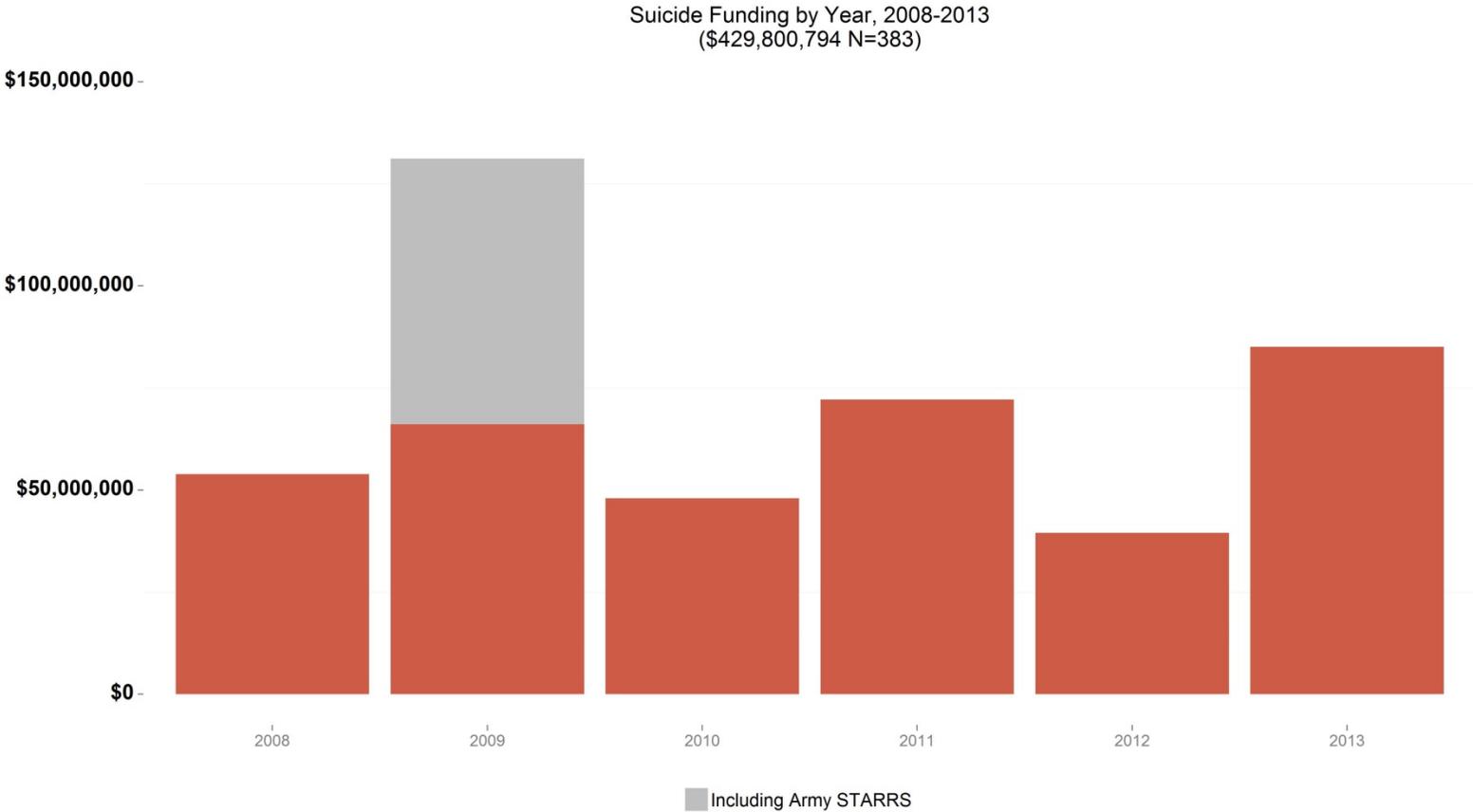
Infrastructure categories are not mutually exclusive

Annual U.S. Funding For Suicide Research, 2008-2013

Figure 7 shows that over the 6 years of funding examined here, investments in suicide research have not consistently, nor substantially, increased. Taking an average across the 6 funding years, the annual combined investment in suicide research is \$71.6 million per year, inclusive of Army STARRS (\$60.8 million excluding Army STARRS). Because of the limited research dollars devoted to suicide prevention, the funding of single large studies dramatically affects the trajectory of funding over time.

While AFSP has increased its research funding over time, its proportion of total funding is not large enough to offset reductions in overall federal spending. For example, when taking into account inflation of medical research costs, NIH's federal appropriations and spending has decreased since 2003. This trend has concerned many patient advocates and policy makers (e.g., <http://fastercures.tumblr.com/post/102962455709/the-future-of-u-s-research-leadership>). Funders included in this review are in the process of considering various approaches to addressing the decreasing federal investment, and broadening the scope of private investment in suicide research.

Figure 7: U.S. Suicide Research Funding by Fiscal Year, 2008–2013



Conclusion

This initial analysis of all U.S. funded suicide research between 2008 and 2013 reveals that the Federal and private investments in research are **meager**, given that suicide is the 10th leading cause of death in the U.S., and a second leading cause for youth (<http://www.cdc.gov/injury/wisqars/leadingcauses.html>). The recent national suicide trends have revealed increased rates for middle aged Americans during the time frame of these research studies (<http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6217a1.htm>). In contrast to the recent increased mortality trend, the overall funding trend is decreasing.

Within this dire overall picture, there are signs of thoughtful investments by funders. Over 70% of the study investments use a type of research infrastructure. Moreover, much of that leveraging may yield benefits later. For example, investments in early career principal investigators and mentored grants can provide crucial research training and bear important research findings for years to come. Support to keep investigators ‘in the game’ and be available to apply for initiatives is a bigger research dilemma in the U.S. that goes beyond suicide prevention research. Funding policies that support contributions to data repositories, such as Army STARRS, will yield more opportunities for analyses in the future. Whether the 28% of total investments that did not utilize some sort of research infrastructure, is an appropriate proportion (e.g., new technologies, populations, or methods that require complete new data collection), is a determination to be further considered by funders.

Another indicator of ‘good stewardship’ has been the recent efforts by multiple funders to solicit studies that aim to identify those at significant suicide risk—an area of research that is particularly challenging and historically understudied. Targeted calls for proposals by DoD (e.g., DARPA), NIMH, and AFSP have helped contribute to the resulting 26 studies focused on optimally detecting risk.

Historically, one the most challenging problems for suicide prevention advocates has been the lack of empirically tested interventions for suicidal individuals. This portfolio analyses reveals that there is a growing knowledge base of intervention research, ranking approximately a third of all funding investments involving interventions aimed at preventing suicidal behavior. These interventions will need further testing as implemented practices. As intervention science advances into implementation studies, it is anticipated that investments in Key Question 4 will grow.

There were few studies focused on testing early prevention, or promotion of protective factors, community-level prevention programs, or environmental interventions (e.g., reducing access to lethal means). This is striking given that many nations have significantly reduced their suicide rate by addressing access to lethal means (World Health Organization, 2014). Because many community-based suicide prevention approaches that are fielded by federal, state, and local entities rarely have an evidence-base, the limited investments in studies that test communities’ approaches translates into a critical funding gap. In addition to the implementation challenges posed in fielding community interventions, this type of research often requires a long time horizon as well as accessible, current surveillance data—both of which are currently difficult to obtain.

Because the process used here to categorize studies selected a single Key Question and relevant Research Objective, the breadth of science addressed across this portfolio is underestimated. Many studies include exploratory aims that potentially span multiple Key Questions from the Agenda. To

address that limitation, access is provided to the study abstracts in two ways. Appendix A includes weblinks to abstracts that address the Agenda questions and Research Objectives (not all studies fit into the categories). For a complete list of the 383 studies included, users of this report can also search the Excel spreadsheet available online at www.suicide-research-agenda.org. This allows report users additional access to study information, and provides the opportunity to discover the diversity of suicide research that has been supported over these past 6 years. It is hoped that the research community— funders and researchers—can use this report and related documents to enhance synthesis of current efforts to make future research more efficient, strategic and potent in the effort to reduce the burden of suicide.

Appendix A—Number of Studies Addressing Short-term and Long-term Research Objectives

Research Objective	Number of Studies
Key Question 1: Why Do People Become Suicidal?	
1.A. (SHORT)—Discover models that explain contagion as well as resilient healthy social connections among at-risk groups.	<u>25</u>
1.B. (SHORT)—Identify biomarkers (e.g., genetic, epigenetic, immune function, neuropsychiatric profiles) and their interactions that are associated with current and future risk status.	<u>62</u>
1.C.(SHORT)—Identify cognitive dysfunction/neural circuitry profiles (e.g., anhedonia, impaired executive functioning) associated with suicide risk that may be amenable to current interventions.	<u>51</u>
1.A. (LONG)—Determine how to improve and sustain beneficial social connection processes that reduce suicide risk.	<u>1</u>
1.B. (LONG)—Identify multiple risk models based on integrated data sources (genetic, epigenetic, life event exposure, health conditions, traits, brain circuitry, neuropsychological profiles, etc.) for future intervention development.	<u>18</u>
1.C. (LONG)—Determine if processes that reduce risk conditions (e.g., insomnia, addiction, agitation, pain, etc.) also mitigate suicide risk.	<u>2</u>

Research Objective	Number of Studies
Key Question 2: How Can We Better or More Optimally Detect/Predict Risk?	
2.A. (SHORT)—Develop risk algorithms from health care data (utilization, health conditions, lab tests, etc.) that can be used for suicide risk detection.	<u>13</u>
2.B. (SHORT)—Improve care efficiencies and decision making tools by identifying screening approaches with concurrent and predictive validity with multiple care settings.	<u>4</u>
2.C. (SHORT)—Develop screening approaches using multiple methods that identify risk over time (e.g., activity monitors, mood assessments).	<u>7</u>
2.A. (LONG)—Overcome base rate challenges and response bias by identifying innovative bio-statistical and other research methods.	0
2.B. (LONG)—Determine low, moderate, and high lifetime-risk screening approaches for individuals so that appropriate preventive efforts can be sought.	<u>2</u>
2.C. (LONG)—Find a valid, feasible suicide risk screening approach that can be used across care settings, such as the Healthcare Effectiveness Data and Information Set (HEDIS).	0

Research Objective	Number of Studies
Key Question 3: What Interventions Are Effective? What Prevents Individuals From Engaging In Suicidal Behavior?	
3.A. (SHORT)—Identify feasible and effective, fast acting interventions (e.g., new medicines with properties similar to certain fast acting anesthetics; treatment engagement interventions).	<u>19</u>
3.B. (SHORT)—Determine if adjunct interventions (e.g., safety planning; adherence interventions) focused on suicidal crises for patients receiving usual care for health conditions (psychiatric, substance use, physical illness conditions) are effective.	<u>24</u>
3.C. (SHORT)—Find interventions for the highest risk groups in care settings or community settings (e.g., substance abuse specialty; jails, prisons, and courts; American Indian reservations) that reduce the risk of suicide.	<u>16</u>
3.A. (LONG)—Determine whether treatment of risk conditions (e.g., insomnia, psychosis, agitation, parental psychopathology), including optimal adherence and complete response, mitigates suicide risk.	<u>4</u>
3.B. (LONG)—Identify biomarkers (neurocognitive profiles; genes; traits) that point to promising treatments (new, repurposed); and/or predict treatment response.	0
3.C. (LONG)—Refine treatments for different high risk populations (demographic groups; disease groups) by identifying prognostic variables/ moderators of response and associated mechanisms from secondary analyses.	<u>1</u>

Research Objective	Number of Studies
Key Question 4: What Services Are Most Effective For Treating The Suicidal Person and Preventing Suicidal Behavior?	
4.A. (SHORT)—Identify efficient ways to increase the number of providers who implement adequate suicide assessment and management skills that improve care.	<u>16</u>
4.B. (SHORT)—In randomized practical trials, along with possible moderators (e.g., financial stress; patient gender) and intermediate outcomes (e.g., disengagement from care; functional limitations), find quality improvement components associated with reduced suicide risk.	<u>5</u>
4.C. (SHORT)—In at-risk populations, substantially increase effective help seeking and treatment engagement (e.g., involve family members, peers, information disseminated by media).	<u>15</u>
4.A. (LONG)—Prevent suicide crises and injuries through effective novel care system practice approaches matched to at-risk patient needs (e.g., alternatives to inpatient care).	0
4.B. (LONG)—Reduce suicide attempt and death outcomes through multiple, synergistic components of quality improvement within and across responsible systems (e.g., health care; justice systems, military installations, older adult care settings).	<u>1</u>
4.C. (LONG)—Sustain effective quality improvements (e.g., stakeholder feedback mechanisms such as service ratings and ‘report cards,’ quality improvement collaborative involvement, etc.) that include input from those affected by those systems (e.g., patients, providers, family members, policy leaders, and funders).	0

Research Objective	Number of Studies
Key Question 5: What Other Types of Prevention Interventions (Outside Health Care Settings) Reduce Suicide Risk?	
5.A. (SHORT)—Find effective, feasible approaches to keeping lethal means away from suicidal individuals through community partnership agreements.	<u>1</u>
5.B. (SHORT)—Determine if policies that affect risk factors in the populations (e.g., tobacco and alcohol advertising; medication prescribing practices) also reduce suicide risk.	<u>5</u>
5.C. (SHORT)—Determine mechanisms of risk and resilience for suicidal behavior outcomes. Determine how these mechanisms operate in other types of mortality (e.g., accidents) as well.	<u>5</u>
5.A. (LONG)—Reduce suicide risk through effective and durable means safety approaches that include multiple steps and/or synergistic components (e.g., social media images and messages; packaging; counseling; storage; barriers).	0
5.B. (LONG)—Reduce suicide risk and intermediate outcomes (e.g., isolation, depression) within organizations (e.g., schools; worksites; court systems) through successful applications of technology (e.g., phone apps) for monitoring and intervention delivery.	<u>2</u>
5.C. (LONG)—Maximize intervention effects at a community level by combining suicide surveillance and prevention efforts with other effective community programs, such as prevention of substance abuse and child abuse and neglect.	0

Appendix B—Funding Organizations’ Interest in Suicide Research (including websites)

Agency for Healthcare Research and Quality (AHRQ)

www.ahrq.gov

AHRQ’s mission is to produce evidence to make health care safer, higher quality, more accessible, equitable, and affordable, and to work with the U.S. Department of Health and Human Services and other partners to make sure that the evidence is understood and used.

Centers for Disease Control and Prevention (CDC)

www.cdc.gov

CDC works 24/7 to protect America from health, safety, and security threats, both foreign and in the U.S. Whether diseases start at home or abroad, are chronic or acute, curable or preventable, human error or deliberate attack, CDC fights disease and supports communities and citizens to do the same.

Defense Advanced Research Projects Agency (DARPA)

www.darpa.mil

Creating breakthrough technologies for national security is the mission of DARPA. By making pivotal investments in new technology-driven ideas for the United States, DARPA imagines and makes possible new capabilities that minimize or eliminate technological surprise. DARPA’s Detection and Computational Analysis of Psychological Signals (DCAPS) program (2010-2014) is aimed at developing novel analytical tools to assess psychological status of warfighters in the hopes of improving psychological health awareness and enabling them to seek timely help.

Department of Defense (DoD)

www.defense.gov

The medical mission of the Military Health System within the DoD is to enhance DoD and the Nation’s security by providing health support for the full range of military operations and sustaining the health of all of those entrusted to military care

(<http://fhp.osd.mil/pdfs/MHS%20QDR%20Medical%20Transformation%20Roadmap.pdf>). The mission of the Joint Program Committee for Military Operational Medicine (JPC5), which manages the suicide

prevention research, is to develop effective medical countermeasures against operational stressors and to prevent physical and psychological injuries during training and operations in order to maximize the health, performance, and fitness of Servicemembers. The DoD incorporates research gap areas of interest into program announcements. The following websites offer information to those interested in DoD research.

The following sites are resources for finding information about DoD funded awards:

Defense Technical Information Center (DTIC)- DoD award technical reports
(http://www.dtic.mil/dtic/search/advanced_search.html)

Congressionally Directed Medical Research Program- DoD funded awards
(<http://cdmrp.army.mil/search.aspx>)

Federal RePORTER (<http://federalreporter.nih.gov/reporter.cfm>)

Military Suicide Research Consortium (<https://msrc.fsu.edu/>)

Army STARRS (<http://www.armystarrs.org/>)

The following sites are resources for information about DoD funding opportunities:

Periodic Funding Opportunities appear in Grants.gov (www.grants.gov, enter 12.420 in the CFDA field under the basic search option)

USAMRMC Open Broad Agency Announcement (Open BAA)
(http://www.usamraa.army.mil/pages/baa_forms/index.cfm)

FED BIZ OPPS also includes research opportunities (<https://www.fbo.gov>)

Small Business Innovation Research & Small Business Technology Transfer (SBIR/STTR)
(<http://www.acq.osd.mil/osbp/sbir/>)

DoD Funded Investigator's Guide (http://cdmrp.army.mil/pubs/news/pdf/award_guide.pdf)

OASD (HA) Defense Health Program Defense Medical Research & Development Program (DMRDP) (<http://dmrdp.dhhq.health.mil/researchprogram/researchprogram.aspx>)

Department of Veterans Affairs (VA)

www.va.gov

The mission of the VA is to fulfill President Lincoln's promise "to care for him who shall have borne the battle, and for his widow, and his orphan" by serving and honoring the men and women who are America's veterans. Among the many research efforts supported, the VA Health Services Research and

Development Service pursues research that underscores all aspects of VA healthcare: patient care, care delivery, health outcomes, cost, and quality.

Federal Railroad Administration (FRA)

www.fra.dot.gov

FRA's mission is to enable the safe, reliable, and efficient movement of people and goods for a strong America, now and in the future.

National Institutes of Health (NIH)

www.nih.gov

The mission of the NIH is to seek fundamental knowledge about the nature and behavior of living systems and the application of that knowledge to enhance health, lengthen life, and reduce illness and disability.

National Institute of Justice (NIJ)

www.nij.gov

NIJ is the research, development, and evaluation agency of the U.S. Department of Justice. It is dedicated to improving knowledge and understanding of crime and justice issues through science. NIJ provides objective and independent knowledge and tools to reduce crime and promote justice, particularly at the state and local levels.

National Science Foundation (NSF)

www.nsf.gov

The NSF is an independent federal agency created by Congress in 1950 "to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense..."

Substance Abuse and Mental Health Services Administration (SAMHSA)

www.samhsa.gov

SAMHSA is the agency within the U.S. Department of Health and Human Services that leads public health efforts to advance the behavioral health of the nation. SAMHSA's mission is to reduce the impact of substance abuse and mental illness on America's communities.

American Foundation for Suicide Prevention (AFSP)

www.afsp.org

AFSP's mission is to prevent suicide through research, education and advocacy. AFSP is the leading private funder of research focused specifically on understanding and preventing suicide.

Brain & Behavior Research Foundation (BBRF)

www.bbrfoundation.org

One-hundred percent of all donor contributions for research are invested in NARSAD Grants leading to discoveries in understanding causes and improving treatments of disorders in children and adults, such as depression, bipolar disorder, schizophrenia, autism, attention deficit hyperactivity disorder, and anxiety disorders like obsessive-compulsive and post-traumatic stress disorders.

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The National Action Alliance for Suicide Prevention is the public-private partnership advancing the National Strategy for Suicide Prevention (NSSP) (<http://actionallianceforsuicideprevention.org/NSSP>) by championing suicide prevention as a national priority, catalyzing efforts to implement high-priority objectives of the NSSP, and cultivating the resources needed to sustain progress. The Action Alliance envisions a nation free from the tragic experience of suicide. For electronic copies of this document or for additional information about the Action Alliance and its task forces, please visit <http://www.actionallianceforsuicideprevention.org>.