Prioritized Research Gaps Report for Suicide Prevention Topics CY 2020

Psychological Health Center of Excellence

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Table of Contents

Executive Summary 3
1.0 Background 4
2.0 Methods 4
3.0 Results 5
4.0 Discussion 8
5.0 References 9
6.0 Acronyms 11
Appendix A: CPG Gaps, Recommendations, and Needs Statements 12
Appendix B: Deep Dive Search Annex 16
Appendix C: Deep Dive Screening Criteria 21
Appendix D: Deep Dive PRISMAs 23
Appendix E: Development of Final Research Gaps 28
Appendix F: Stakeholder Rating Form 32

Figures and Tables

Table 1. List of Contributing Stakeholder Characteristics 6
Table 2. List of Prioritized Suicide Prevention Research Gaps 7
Table 3. List of Prioritized Categories of Research Gaps 8
Figure 1. Active Military Operational Medicine Research Program Funding on Military Suicide Prevention Research Broken Down by CPG Categories 8

Executive Summary

Background. The Psychological Health Center of Excellence (PHCoE) conducts regular gap analyses on high priority psychological health topics, employing a systematic methodology to identify and prioritize research gaps within the selected topic area. In 2020, the decision was made to identify key research gaps within the domain of suicide prevention. The aims of this report are to provide Department of Defense (DoD) funding agencies and suicide prevention researchers with a list of prioritized research gaps.

Methods. The multidisciplinary Workgroup comprised 12 members with experience in military psychological health care, epidemiology, public health, and research methodology. The Workgroup relied on the 2019 VA/DoD Clinical Practice Guideline for the Assessment and Management of Patients at Risk for Suicide (CPG) as the primary source document to identify research gaps. Relevant research gaps were extracted and reworded using the "PICO" (i.e., population, interventions, comparisons, and outcomes) or "PEO" (i.e., population, exposure, and outcome) formats. Literature searches were conducted in PubMed to identify any new research published after the dates of the CPG literature searches. Records identified during the literature searches were screened and relevant studies were evaluated to determine if research gap statements should be removed, combined, or changed. A suicide research gap prioritization form was then developed for stakeholders to rate the identified research gaps and rank research gap categories. A target group of external stakeholders independently prioritized the list of research gaps, from lowest to highest priority, and rank-ordered six general categories of CPG research gaps. The funding of active suicide studies in the Military Operational Medicine Research Program (MOMRP) portfolio was also reviewed in order to assess how existing research investments aligned with the identified CPG research gaps categories. For the research gap analyses, a Q factor analysis was used to examine the relative endorsement of the identified research gaps and to examine the category rankings. Factor scores were calculated and summary scores derived as the sum of factor scores weighted by the proportion of variance explained based on the distribution of the rotated eigenvalues. For the MOMRP portfolio review, the percentage of the total amount awarded was calculated as categorized across the six 2019 CPG categories.

Results. The research gap methodology resulted in a total of 35 research gap questions across six CPG categories. Nineteen of 29 stakeholders who were contacted completed the prioritization form. The highest rated research gap topic was: *Are lethal means safety interventions effective in increasing safety behaviors and/or reducing suicide-related outcomes?* This topic was rated 1.4 standard deviations (SDs) above the average rated topics. Research on *the effectiveness of crises response planning* and several other non-pharmacological interventions were also highly rated (e.g., *implementation of cognitive behavioral therapy, technology-based behavioral interventions*, and *use of dialectical behavior therapy other than for Borderline Personality Disorder*). Consistent with the specific research gaps, the category of *non-pharmacological interventions* for suicide prevention was ranked highest, followed by *screening/risk determination* and *community-based interventions*. A full list of the prioritized gaps for suicide prevention research is included in Table 2 and the ranking of categories of suicide prevention research are included in Table 3. The highest proportion of active military suicide research funding was dedicated to screening, evaluation, and risk determination (45%), non-pharmacologic (33%), and community-based (16%) interventions (Figure 1). Using a systematic and transparent methodology, a list of prioritized research gaps was developed using the VA/DoD CPG and incorporating input from DoD and VA stakeholders.

Discussion. Our stakeholders' ratings of individual research gaps were consistent with their rankings of categories of suicide prevention gaps (categories from the CPG), and were similar to the relative funding of awards by MOMRP. The specific results from this gaps analysis can help guide the efforts of suicide prevention researchers and inform decisions about future DoD funding of suicide prevention studies.

1.0 Background

U.S. funding agencies, including the Department of Defense (DoD) regularly allocate resources to fund psychological health-related research, including research on suicide prevention. In addition, researchers regularly consider how to design their next study in order to try and fill a gap they perceive in current knowledge. The Psychological Health Center of Excellence (PHCoE) seeks to facilitate the efficient use of research funds, and assist researchers designing DoD-related research on psychological health topics by employing a systematic approach to identify and prioritize research gaps to promote research investments that have the greatest potential to advance care in the DoD. The current research gap analysis focuses on suicide prevention in the DoD. Organizations responsible for engaging in or directing international or national research strategies are relying more frequently on systematic reviews and/or the input of relevant stakeholders to identify research gaps (e.g., Ghaffar, 2009; National Institute for Health and Care Excellence, 2016; Council on Health Research for Development, 1997). Although systematic identification of research gaps to inform health research and health research funding are becoming more prevalent (Yoshida, 2016), there is no single gold standard method that is universally accepted. The present research gap analysis methodology builds upon systematic procedures that have been refined over the past several years (PHCoE, 2017; 2018; and 2019). The goals of this report are to help inform future research investments in suicide prevention in the DoD, as well as to suggest important topics for future research and/or program evaluation (funded or not) related to suicide prevention in the military.

2.0 Methods

The PHCoE research gap methodology (Kelber et al., 2019; Otto et al., 2018) consists of three key features: 1) identifying evidence gaps via authoritative source documents (e.g., government reports, policy documents, reports by nonprofit and international organizations, clinical practice guidelines, and literature reviews), 2) relying on subject-matter experts to review scientific literature to further substantiate and refine research gaps, and 3) engaging stakeholders to prioritize the identified research gaps.

2.1 Evidence Gaps Identification

The current research gap analysis relied on the 2019 VA/DoD Clinical Practice Guideline for the Assessment and Management of Patients at Risk for Suicide (subsequently referred to as the CPG). Research gaps were extracted from three CPG sections: 1) the research gaps section, 2) recommendations that are listed as having a strength grading of "Weak for," "Weak against," or "Neither for nor against," and 3) the text of the CPG which includes contextual literature review information. All of the identified research needs statements were compiled, sorted, and de-duplicated (See Appendix A). Each item in the refined list was edited into research questions using the 'population, intervention, comparator, outcome' (PICO) or 'population, exposure, and outcome' (PEO) framework depending on whether the research question is focused on an intervention or an exposure that may lead to an outcome of interest (Robinson, Saldanha, & McKoy, 2011).

2.2 Targeted Literature Reviews

Recently published literature was reviewed to identify relevant studies that were published after the evidence review was conducted for the CPG. The literature searches conducted by the CPG Workgroup were then replicated using a single database (PubMed), after adapting the search string syntax for PubMed, and beginning on the date when the CPG searches were completed (see Appendix B for full search syntax). Nine searches were conducted for the 12 key questions that were developed and used to guide the literature search for the CPG, resulting in 2,368 total records retrieved in PubMed for the time period of April, 2018 through October, 2019. The CPG collapsed the 12 Key Questions into five topics: Screening and Assessment, Interventions, Risk and Protective Factors, Post-acute Care, and Community-Based Interventions. Deduplication of records was done within each topic. Records were screened dually by workgroup members according to inclusion/exclusion criteria adapted from the CPG (Appendix C). The replicated literature search was then supplemented by hand-searching for relevant studies using Google Scholar and key findings were analyzed from each included study and then synthesized into a narrative summary. Workgroup members then made recommendations based on this review for modifications to the research gaps. Modification options included: consolidating (i.e., merging two with a similar or overlapping theme), reorganizing (i.e., moving it from one CPG category to another), removing (e.g., if redundant with another gap), revising the wording, or retaining the research question as is. Appendix D details the flow of literature for each topic with PRISMA flow diagrams (Moher, Liberati, Tetzlaff, & Altman, 2009).

After the literature reviews were completed, narrative summaries were generated and used to revise the final list of proposed research gaps (Appendix E).

2.3 Gap Prioritization Form

A gap prioritization form was developed and piloted using the final list of research gaps and categories (Appendix F). The final version of this form comprised two sections. In the first section, respondents were asked to review a list of individual research questions for potential future study. Respondents then were required to prioritize each question based on whether the results of future research could reduce suicide-related mortality, morbidity, and/or improve health-related outcomes in the DoD. Each research gap was to be rated from lowest to highest priority (from 1 to 10). In the second section, respondents were asked to rank the CPG suicide research gaps categories based on how much future research in that category could reduce suicide-related mortality, morbidity, and/or improve health-related outcomes in the DoD. Categories were to be rank-ordered from 1 (highest importance) to 6 (lowest importance).

2.4 Stakeholder Gap Prioritization

In the research gaps prioritization phase, suicide subject matter experts (Stakeholders) were solicited to complete the suicide gap prioritization form. Stakeholders were identified from among employees of the DoD, the Department of Veteran Affairs (VA), or academic institutions, who were involved in suicide research sponsored by the DoD or VA. Twenty-nine stakeholders were invited via emails to participate. Stakeholders were emailed the suicide gap prioritization form and asked to complete it within a 2-month time frame. Reminder emails were sent out two times to those stakeholders who had not completed the form within the designated period.

2.5 Examine In-progress Research Investments

During the gaps evaluation process, a high-level summary of in-progress suicide prevention research that was funded by the DoD was obtained in order to assess how existing research investments aligned with the identified CPG research gaps categories. The suicide research portfolio of the Military Operational Medicine Research Program (MOMRP) was utilized for this effort. Two study members reviewed the titles and abstracts of included studies and categorized each study according to the CPG categories.

2.6 Data Analysis

A Q factor analysis (Brown, 1993) was conducted in order to examine the results of the research gap ratings and category rankings. For both analyses, the number of factors to extract was determined based on the initial eigenvalues, the number of subjects with strong loadings on each factor after a principal axis factoring with an oblimin rotation, and the interpretability of the resultant factor solutions. Factor scores and summary scores were calculated using the sum of factor scores weighted by the proportion of variance explained based on the distribution of the rotated eigenvalues. Missing data were singly imputed using the respondent-specific arithmetic mean from items with valid data. For the MOMRP portfolio review, the percentage of total award amount categorized across the 2019 CPG categories was calculated.

3.0 Results

The research gap analysis resulted in a total of 35 research gap questions across six CPG categories (See Appendix E). Nineteen stakeholders (65.5% response rate) completed a research gap prioritization rating form. Characteristics of the 19 suicide experts are listed in Table 1. Approximately half (48%) held an executive-level title (professor, director, chief) related to psychological or suicide-related services in VA (47%), DoD (26%), or academic (26%) settings. The majority were PhDs (63%), while the remainder, with one exception, had advanced clinical degrees (PsyD, MD, MD-PhD). Most reported that they had clinical (89%) and/or research (84%) involvement in suicide-related issues, whereas fewer endorsed involvement in suicide-related policy or funding decisions. Nearly three-quarters had prior involvement in VA/DoD suicide research and 68% planned to apply for future funding in this area. Several respondents (16%) acknowledged current or prior military service.

Table 1. Stakeholder Demographics (n = 19)

	n	%
Position titles*		
Professor	6	26%
Psychologist Clinical/Research	6	26%
Director/Chief (Suicide Prevention, Clinical Services)	5	22%
Investigator (Senior, Core)	3	13%
Staff (Fellow, Coordinator)	2	9%
Psychiatrist	1	4%
Current work setting		
Veteran's Administration (VA)	9	47%
Department of Defense (DoD)	5	26%
Academic (universities, research institute)	5	26%
Academic degrees		
PhD	12	63%
PsyD	3	16%
MD, MD/PhD	3	16%
Other	1	5%
Areas of current suicide-related work*		
Clinical	17	89%
Research	16	84%
Policy	8	42%
Funding	5	26%
Past involvement in DoD/VA suicide research	14	74%
Plan to apply for DoD/VA suicide research funding	13	68%
Prior/current DoD	3	16%

*Category total exceeds 19 due to multiple responses per person

The highest rated research gap topic was: *Are lethal means safety interventions effective in increasing safety behaviors and/or reducing suicide-related outcomes?* This topic was rated 1.4 standard deviations (SDs) above the average rated topics. The next highest rated gap highlighted a need to evaluate the *effectiveness of crisis response plans/safety planning* (0.74 SDs above the average). Third in importance was whether *cognitive-behavioral therapy (CBT) for suicide prevention can be effectively implemented and sustained within the Military Health System* (0.69 SDs above the average). Lowest ranked were research gaps pertaining to risk factors for suicidal behaviors (e.g., gender identity or sexual orientation, and physical health conditions), and to the effects of pharmacological interventions on suicide outcomes. The full list of prioritized research gaps is provided in Table 2.

The results on general categories of suicide prevention research indicated that stakeholders ranked non-pharmacological interventions highest and pharmacological interventions lowest. Table 2 presents the prioritized list of suicide research gaps; Table 3 presents the results of the general category rankings.

The MOMRP database included 47 active suicide research studies. The highest proportion of active MOMRP suicide research funding was dedicated to screening, evaluation, and risk determination (45%), followed by non-pharmacologic (33%), and community-based (16%) interventions (Figure 1).

Table 2. Standardized Summary Scores for the 35 Research Gaps (this table contains abbreviated descriptions of the full research gaps which are included in their entirety in Appendix G: The Stakeholder Rating Form)

Domain/Item*	Study Topic	Standardized Score
E3	Lethal means safety interventions	1.45
F1	Crisis response plans/safety planning	0.74
C6	Cognitive-behavioral therapy implementation	0.69
C4	Technology-based behavioral interventions	0.66
C5	Technology-based adjuncts to treatment	0.63
C3	Dialectical behavior therapy	0.6
C1	Inpatient psychiatric interventions	0.59
F2	Caring contacts	0.55
C7	Standardized case management/care facilitation	0.52
B5	Access to lethal means other than firearms	0.45
E7	Peer-support to reduce suicide outcomes	0.44
A3	Risk stratification	0.24
E6	Peer-support to increase treatment engagement	0.23
A4	Machine learning algorithms	0.21
A2	Screening and improved behavioral health care	0.19
C2	Problem-solving therapies	0.19
B7	Effects of protective factors	0.17
E1	Suicide prevention public health campaigns	0.16
D4	Feasibility, dose, and duration of ketamine infusion	0.1
E5	Crisis hotlines	0.06
F3	WHO brief intervention	0
B3	Effects of psychosocial stressors	–0.03
B1	Preparatory behaviors, intent, self-directed violence associated with suicide	–0.13
A1	Accuracy of screening tools	–0.19
E4	Screening modes and risk monitoring	–0.36
A5	Gatekeeper interventions	–0.36
E2	Postvention strategies	–0.44
D5	Medication-assisted treatment for substance use disorders	–0.54
D2	Effects of polypharmacy	–0.58
D1	Effects of antidepressants	–0.88
D3	Effects of naloxone distribution	–0.9
B4	Effects of physical health conditions	–1.07
D6	Gender identity/sexual orientation	–1.08
B6	Clozapine for schizophrenia/schizoaffective disorder	–1.08
B2	Effects of psychiatric signs/symptoms	–1.24

*Domains: A: Screening, Evaluation, Risk Determination; B: Risk and Protective Factors; C: Non-pharmacologic Interventions; D: Pharmacologic Interventions; E: Community-based Interventions; F: Post-acute Care Approaches

Table 3. Ranking of Categories of Research Gaps (Highest to Lowest)

Domain/category	Standardized Score, Reversed
Non-pharmacologic interventions (C)	0.50
Screening, risk determination (A)	0.34
Community-based interventions (E)	0.32
Risk and protective factors (B)	–0.04
Post-acute care approaches (F)	–0.32
Pharmacologic interventions (D)	–0.79

Figure 1. Active Military Operational Medicine Research Program Funding on Military Suicide Prevention Research Broken Down by CPG Categories

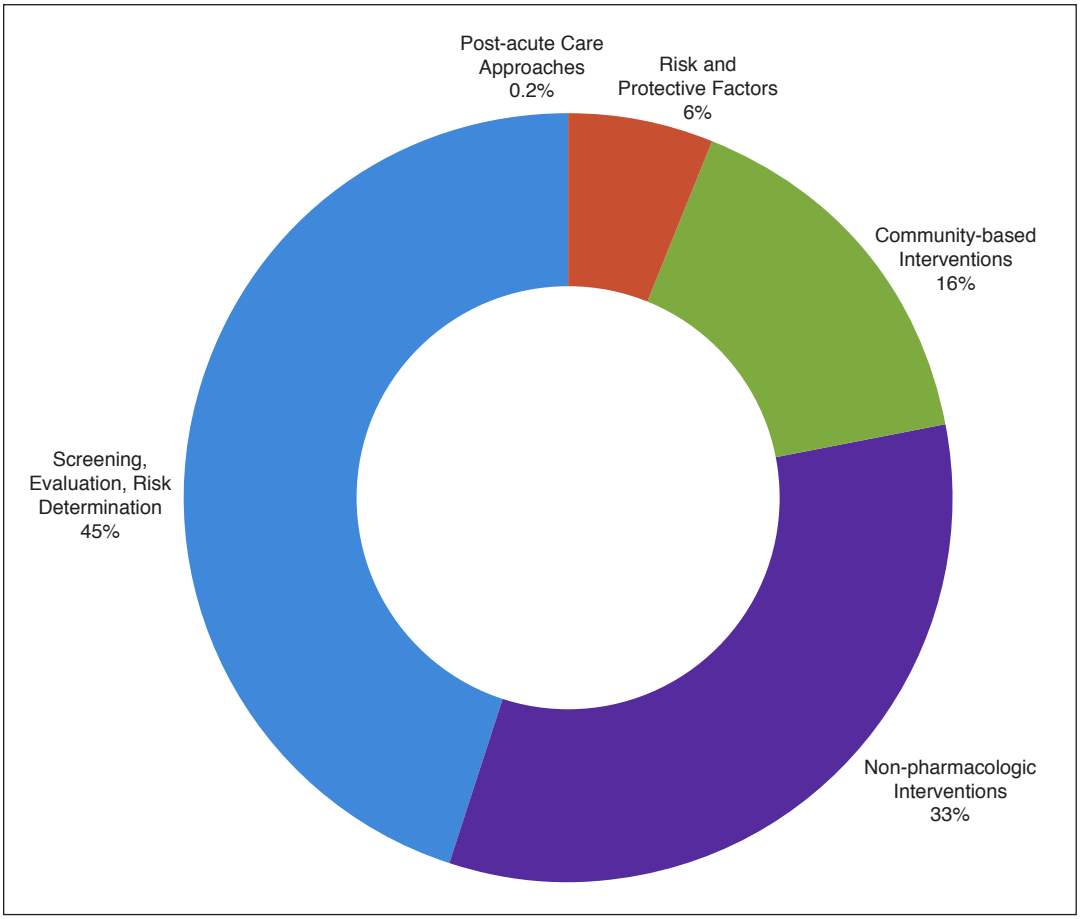

Figure 1 presents a summary of active suicide related research funding (47 studies) in the Military Operational Medicine Research Program (MOMRP) portfolio. The categories are based on the 2019 Suicide Clinical Practice Guideline (CPG) categories. The figure indicates that most of the current funding portfolio (45%) focuses on screening and evaluation.

4.0 Discussion

The goal of the current gap analysis is to assist DoD funding agencies in optimizing investment of future research on suicide prevention and to guide the future efforts of researchers in addressing the most important research needs. Results indicated that research evaluating the effectiveness of lethal means safety interventions was endorsed as the highest priority research gap. Research evaluating the effectiveness of crisis response planning was endorsed as the second most important research gap. Developing and testing interventions to improve the uptake of CBT for suicide was also rated highly, as was evaluating the efficacy of telehealth technologies to improve suicide prevention care. Consistent with the specific research gaps, the category of non-pharmacological interventions for suicide prevention was ranked highest, followed by screening/risk determination and community-based interventions.

The highest proportion of active MOMRP suicide research funding was dedicated to screening, evaluation, and risk determination (45%), followed by non-pharmacologic (33%), and community-based (16%) interventions. These three categories of research were also the highest ranked among stakeholders in the current gaps analysis, although the highest priority was non-pharmacologic, followed by screening/evaluation and community-based interventions. The lowest percentages of current suicide research funding was invested in risk and protective factors (6%), post-acute care (0.2%), and pharmacologic interventions (0%). These three categories of research were also rated as lowest priority by stakeholders. The concordance between funding priorities and research investments is notable and may reflect an independent validation of our prioritization results and the procedures used to allocate research funding.

The current results reflect the need for stronger empirical validation for many of the activities that clinicians regularly engage in to prevent suicide (lethal means restriction; crises response planning). There are many challenges to bringing suicide prevention interventions up to the standards that modern medicine requires. One of the inherent difficulties in studying suicidal behaviors is the low base rate of death by suicide. However, the large beneficiary populations in the DoD and the VA accumulated over lifetimes (and often generations) may provide a unique opportunity to develop research and program evaluation protocols that can answer some of the fundamental questions that are included in this gaps analysis.

DoD funding agencies also need to take into account other agency initiatives to fund suicide prevention research so as not to duplicate efforts. For instance, the Centers for Disease Control and Prevention (CDC) released a funding opportunity announcement for research to understand and prevent fire-arm violence to include firearm suicides (CDC, 2020). The National Institute of Mental Health (NIMH) recently put out a Notice of Special Interest to Highlight Research Priorities for Risk Algorithms Applications in Healthcare Settings to Improve Suicide Prevention (NIHM, 2020). Advancements in suicide prevention will require coordination among these major funding agencies, national and international suicide experts, clinical providers, and the patients and families who have first-hand experience dealing with this public health priority. These results can help advance discussion and decisions on suicide prevention research.

4.1 Limitations

The research gap analysis was limited to the content in the recent VA/DoD Suicide Prevention CPG, and there may be relevant research gaps that were not included in that document or in our analysis. In addition, external researchers and clinicians within the DoD and VA research community were selected who are known as subject matter experts in suicide prevention. This selective process may have introduced bias. For example, the majority of stakeholders who responded to our request to rate the gaps were psychologists (79%). This may, in part, explain why non-pharmacological interventions were rated highly and pharmacologic interventions were considered lowest priority. In addition, 68% of our stakeholders said that they planned to apply for future DoD/VA suicide prevention research funding and 74% reported past involvement with DoD/VA suicide research. Although our external reviewers were encouraged to be objective and even handed in their judgments, their personal research interests also introduced another source of bias. While stakeholders who are involved in community-based interventions were invited to participate, the low response rate from individuals involved in community-based suicide prevention and low number of physicians recruited may have contributed to underrepresentation of those segments of stakeholders.

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6.0 Acronyms

Terms	Description
Buddy- and peer-delivered support programs	Support provided and received by those who share similar attributes or types of experience. Peer support can be an informal process between individuals and/or can be provided through formalized interventions in which peer supporters seek to promote health and/or build people's resilience to different stressors.
Caring contacts	An intervention that periodically reaches out to suicidal individuals by letter or other brief contact with non-demanding expressions of care, concern, and interest over one or more years.
CBT	Cognitive behavioral therapy (CBT) for suicide is one of the most researched psychotherapy treatments for suicide prevention.
Clozapine	An antipsychotic medication that has been shown to decrease hallucinations and reduce suicidal behaviors in persons with schizophrenia and schizoaffective disorders.
Crisis hotlines and Chat Lines	Telephonic and online resources to aid individuals in distress with appropriate access to information, and on-the-phone interventions to help address an immediate crisis and for contacting emergency services if needed.
DBT	Dialectical behavior therapy (DBT) is a specific type of cognitive-behavioral psychotherapy developed to treat borderline personality disorder.
Evaluation/Assessment	The process of determining imminent risk of harm for persons who are indicated as possibly being at risk.
Gatekeeper training	An individual in a community who has face-to-face contact with large numbers of community members as part of their usual routine. They may be trained to identify persons at risk of suicide and refer them to treatment or supporting services as appropriate. Examples include clergy, first responders, pharmacists, caregivers, and those employed in institutional settings, such as schools, prisons, and the military.
Indicated intervention	Intervention designed for individuals at high risk for a condition or disorder or for those who have already exhibited the condition or disorder.
Ketamine	A medication commonly used as an anesthetic. In recent years, single-intravenous infusion of ketamine has demonstrated rapid antidepressant effects in patients with treatment-resistant major depressive disorder.
Lethal means safety interventions	Population-level and community-based techniques, policies, and procedures designed to reduce access or availability to means and methods of deliberate self-harm. Such interventions for suicide prevention include firearm restrictions, reducing access to poisons or medications used for overdose, barriers to jumping from lethal heights, and reducing access to any other lethal means.
Lethal means other than firearms	Examples include poison, prescription medications, illicit drugs or alcohol, etc.
Lithium	One of the most widely used and studied medications for treating bipolar disorder.
Naloxone (Narcan, Evzio)	A narcotic antagonist used to treat opioid overdose that can quickly reduce the effects of opioids
Postvention	Response to and care for individuals affected in the aftermath of a suicide attempt or suicide death.
Screening	Administration of an assessment tool to identify persons in need of more in-depth evaluation or treatment.
TBI	Traumatic brain injury (TBI) is an acquired injury to the brain caused by an external force.
Universal intervention	Intervention targeted to a defined population, regardless of risk
WHO BIC	The World Health Organization (WHO) has developed a Brief Intervention and Contact (BIC) protocol for providing brief education about suicide and follow-up contact for 6 months following discharge from hospitalization.

Terms derived from U.S. Department of Health and Human Services (HHS) Office of the Surgeon General and National Action Alliance for Suicide Prevention. 2012 National Strategy for Suicide Prevention: Goals and Objectives for Action. Washington, D.C. and other sources.

Appendix A: CPG Gaps and Recommendations

	CPG Recommendations (Weak for, Weak Against, Neither for nor Against)	CPG Gaps	Other CPG-relevant text
SCREENING	(1) With regard to universal screening, we suggest the use of a validated screening tool to identify individuals at risk for suicide-related behavior. (2) With regard to selecting a universal screening tool, we suggest the use of the Patient Health Questionnaire-9 item 9, to identify suicide risk.	1.a. Assessing and improving temporal accuracy of screening and assessment tools. This includes development and evaluation of screening tools to predict suicide behaviors occurring across various outcome timeframes (e.g., less than one month versus long-term risk) 1.d. Further assessment of alternative methods for administering suicide screening questions 1.e. Determination of the appropriate frequency of screening; this topic includes evaluation of whether over-screening has impact on positive and negative predictive value of the instrument, as well as on patient satisfaction, trust, and engagement	Given the high rate of false-positives with the validated screeners currently in use, studies should incorporate various secondary assessment instruments/processes with cost-benefit analysis as a primary objective.
EVALUATION	(3) We recommend an assessment of risk factors as part of a comprehensive evaluation of suicide risk, including but not limited to: current suicidal ideation, prior suicide attempt(s), current psychiatric conditions (e.g., mood disorders, substance use disorders) or symptoms (e.g., hopelessness, insomnia, and agitation), prior psychiatric hospitalization, recent bio-psychosocial stressors, and the availability of firearms. (5) While it is an expected standard of care, there is insufficient evidence to recommend for or against the use of risk stratification to determine the level of suicide risk. (4) When evaluating suicide risk, we suggest against the use of a single instrument or method (e.g., structured clinical interview, self-report measures, or predictive analytic models).	1.b. Identification of suicide risk subtypes (e.g., acute versus chronic risk). 2.b. Use of screening and assessment results to stratify risk and determine treatment that is tailored to the predicted level of risk. 1.c. Development and testing of strategies to predict and stratify risk that integrate multiple risk prediction methods and data sources, for example combinations of self-report, predictive analytics models which use data from the electronic health record, and/or other data sources. 3.f. Novel means of identifying and assessing risk and protective factors in combination (e.g., using machine learning algorithms) 7.h. Benefits, harms, and ethics of predictive modeling to identify high-risk individuals 2.a. Determination of the extent to which screening leads to comprehensive suicide risk evaluation, treatment referral and engagement, receipt of high-quality treatment, and improvement in health outcomes	Studies should include multiple settings (e.g., primary and specialty care), and should have a sufficient sample size, adult cohort of relevance to military (age, gender, etc.), with a follow-up period of at least 12 months, and mortality as a primary outcome. Studies could utilize strategies that stratify Service members according to known risk factors (e.g., exposures, occupation, SES, relationship status, access to lethal means), develop predictive algorithms from existing data sets, or consider novel strategies for developing predictive models. Studies should include as comparators existing models in use by specific Services to predict at risk behaviors.
RISK & PROTECTIVE FACTORS		3.a. Impacts of transitions in setting and care on suicide risk 3.b. Protective factors, including reasons for living and religion/spirituality 3.c. Demographic factors 3.d. Racial/ethnic, age, and gender disparities in suicide prevention detection processes and treatment	Effects of: Self-directed violence (preparatory behaviors, past or present suicidal intent, non-suicidal self-directed violence behaviors) on suicide risk Psychiatric symptoms (decreased psychosocial functioning, and hallucinations) on suicide risk Recent psychosocial stressors (financial problems, barrier to accessing care) on suicide risk Physical health conditions (history of moderate to severe TBI, cancer diagnosis) on suicide risk Access to lethal means (particularly to lethal means other than firearms) on suicide risk

	CPG Recommendations (Weak For, Weak Against, Neither for nor Against)	CPG Gaps	Other CPG-relevant text
TREATMENT: Non-pharmacological	(8) We suggest completing a crisis response plan for individuals with suicidal ideation and/or a lifetime history of suicide attempts. (6) We recommend using cognitive behavioral therapy-based interventions focused on suicide prevention for patients with a recent history of self-directed violence to reduce incidents of future self-directed violence. (7) We suggest offering Dialectical Behavioral Therapy to individuals with borderline personality disorder and recent self-directed violence. (9) We suggest offering problem-solving based psychotherapies to: 1. Patients with a history of more than one incident of self-directed violence to reduce repeat incidents of such behaviors, 2. Patients with a history of recent self-directed violence to reduce suicidal ideation, and 3. Patients with hopelessness and a history of moderate to severe traumatic brain injury.	4.f. Further clarify which components of safety and crisis response planning interventions contribute most directly to reduction in risk for suicidal thoughts and behaviors (e.g., dismantling studies) 4.b. Given the recommendation for CBT, more research should be conducted around the dissemination and implementation of CBT for patients 4.d. Assess the effectiveness of DBT in populations other than patients with BPD 4.e. Evaluate strategies to implement protocol-adherent DBT in DoD and VA settings 4.g. Use of other therapies and interventions specific to certain behavioral health diagnoses could be expanded to focus on outcomes related to suicidal thoughts and behaviors 4.a. Non-pharmacologic interventions to mitigate suicide risk should be developed and assessed across varying settings (e.g., outpatient, inpatient, residential) and contexts (e.g., individual, dyad, group), and with different types of clinical providers 2.c. The most appropriate setting of care for patients at risk for suicide; this research will require evidence-based risk stratification processes 2.d. Clarify which evidence-based interventions for suicide prevention are most appropriate in which care settings (e.g., inpatient, intensive outpatient, outpatient) 4.c. Window to Hope (WtoH) should be studied further among more general at-risk populations of Service Members 6.d. Interventions to facilitate treatment engagement (including dose-response) following ED visit or psychiatric hospitalization for suicidal ideation or attempt	Studies should consider measuring both benefits and risks, identify which components are associated with positive effects, and use a wider set of outcome measures. Studies should consider the multiple settings, the different types of providers, and possible uses of technology and/or media to deliver this intervention.
TREATMENT: Pharmacological	(10) In patients with the presence of suicidal ideation and major depressive disorder, we suggest offering ketamine infusion as an adjunctive treatment for short-term reduction in suicidal ideation. (11) We suggest offering lithium alone (among patients with bipolar disorder) or in combination with another psychotropic agent (among patients with unipolar depression or bipolar disorder) to decrease the risk of death by suicide in patients with mood disorders. (12) We suggest offering clozapine to decrease the risk of death by suicide in patients with schizophrenia or schizoaffective disorder and either suicidal ideation or a history of suicide attempt(s).	5.e. Administration feasibility, dose, and duration of ketamine for suicide prevention 5.a. Impact of antidepressants on suicide outcomes in demographic and geographic subpopulations 5.b. Benefits and harms of polypharmacy 5.c. Distribution of naloxone and its impact on suicide outcomes 5.d. Impact of medication-assisted treatment on suicide outcomes for those with SUD	Studies should consider measuring both benefits and risks, identify which components are associated with positive effects, and use a wider set of outcome measures.

	CPG Recommendations (Weak For, Weak Against, Neither for nor Against)	CPG Gaps	Other CPG-relevant text
POST-ACUTE CARE	(13) We suggest sending periodic caring communications (e.g., postcards) for 12–24 months in addition to usual care after psychiatric hospitalization for suicidal ideation or a suicide attempt. (14) We suggest offering a home visit to support reengagement in outpatient care among patients not presenting for outpatient care following hospitalization for a suicide attempt. (15) We suggest offering the World Health Organization Brief Intervention and Contact treatment modality following presentation to the emergency department for suicide attempt, in addition to standard care.	6.f. Cultural adaptation and modernization of caring communications (e.g., caring texts) 6.e. Effective implementation strategies of WHO BIC in the U.S. 6.b. Case management and care facilitation 6.d. Interventions to facilitate treatment engagement (including dose-response) following ED visit or psychiatric hospitalization for suicidal ideation or attempt	Studies should consider effects of various communication methods, time intervals, specific languaging, and staff timeliness to respond.
TECHNOLOGY-BASED MODALITIES	(16) There is insufficient evidence to recommend for or against technology-based behavioral health treatment modalities for individuals with suicidal ideation. These include self-directed digital delivery of treatment protocols with minimal or no provider interaction and provider-delivered virtual treatment. (17) There is insufficient evidence to recommend for or against the use of technology-based adjuncts (e.g., web or telephone applications) to routine suicide prevention treatment for individuals with suicidal ideation.	8.a. Assessing the equivalence or non-inferiority of real-time virtual clinical encounters versus in-person delivery of established non-pharmacologic suicide prevention interventions (e.g., CBT), including whether the effectiveness of these interventions varies by suicide risk level, population characteristics (patient and provider), and/or treatment type 6.c. Telehealth monitoring following psychiatric hospitalization 8.b. Assessing the equivalence or non-inferiority of self-guided digital receipt versus in-person delivery of established non-pharmacologic suicide prevention interventions (e.g., CBT) including whether the effectiveness of these interventions varies by suicide risk level, population characteristics (patient and provider), and/or treatment type 8.c. Assessing the feasibility, acceptability, barriers, and facilitators to using virtual modalities, including telehealth (e.g., telephone, video) or self-guided digital interventions for both patients and providers 8.d. Assessing the efficacy and effectiveness of adjunctive technology-based interventions (e.g., digital/mobile applications used for symptom monitoring or augmenting treatment) for suicide prevention, including whether the effectiveness of these interventions varies by suicide risk level, population characteristics (patient and provider), and/or treatment type 8.e. Assessing the feasibility, acceptability, barriers, and facilitators to using adjunctive technology-based interventions for both patients and providers	

	CPG Recommendations (Weak For, Weak Against, Neither for nor Against)	CPG Gaps	Other CPG-relevant text
COMMUNITY BASED INTERVENTIONS	(19) There is insufficient evidence to recommend for or against community-based interventions targeting patients at risk for suicide. (20) There is insufficient evidence to recommend for or against community-based interventions to reduce population-level suicide rates. (18) We suggest reducing access to lethal means to decrease suicide rates at the population level. (21) There is insufficient evidence to recommend for or against gatekeeper training alone to reduce population-level suicide rates. (22) There is insufficient evidence to recommend for or against buddy support programs to prevent suicide, suicide attempts, or suicidal ideation.	3.e. Methods for reducing access to lethal means 7.a. Lethal means safety specific to firearms 7.c. Availability of firearms and other weapons 7.b. Lethal means safety specific to poisoning with medications 7.e. Gatekeeper training and tailored education programs (e.g., Suicide Awareness Voices of Education [SAVE], ASIST, and QPR) 6.a. Buddy- or peer-delivered post-discharge support following psychiatric hospitalization on treatment engagement. 7.d. Effectiveness of crisis hotlines and chatlines 7.f. Effectiveness and potential harm of public health campaigns 7.g. Interventions targeting stigma reduction and their impact on help-seeking behavior. 7.i. Interventions to improve belongingness 7.j. Interventions aimed at addressing social determinants to improve care and promote health (e.g., access to housing, employment, healthcare). 7.k. Postvention strategies to address contagion and suicide risk.	Studies should consider types of programs, number of engagements, timing of follow-ups, optimal staffing (clinician vs. peer), and novel forms of assertive outreach for those who are not otherwise engaged in treatment. Studies should include the impact of varying methods of lethal means safety interventions (e.g., blister packaging medications, gun locks, safe storage) and lethal means safety counseling on suicide outcomes.

Appendix B: Literature Review Search Strategy and Results

Question	Hits
Q1: Suicide risk screening programs	203
Q2: Suicide risk screening instruments	120
Q3: Risk stratification	650
Q4: Non-pharmacological interventions	113
Q5: Pharmacologic interventions	64
Q6: Effective treatment approaches	51
Q7: Post-acute care	130
Q8: Risk/protective factors	625
Q9&10: Community based interventions	364
Q11&12: Telehealth modalities/technology	48
Total	2368

Database: MEDLINE
Host: PubMed
Data Parameters: April 11 2018 to present
Date Searched: October 21–23 2019

QUESTION 1

(((((((“Suicide”[Majr:NoExp]) OR sdv[Title/Abstract]) OR “self-directed violence”[Title]) OR “self-directed violent”[Title]) OR “self-inflicted”[Title]) OR suicid*[Title])) AND ((((((((((((“Mass Screening”[Majr:NoExp]) OR “Psychiatric Status Rating Scales”[Majr:NoExp]) OR assessment*[Title]) OR “clinical interview”[Title]) OR “clinical assessment interview”[Title]) OR instrument*[Title]) OR measur*[Title]) OR “predictive analytics”[Title]) OR questionnaire*[Title]) OR scale*[Title]) OR screen*[Title]) OR “structured assessment”[Title]) OR tool*[Title]) OR “unstructured assessment”[Title])
Hits – 203

QUESTION 2

(((((((“Suicide”[Majr:NoExp]) OR sdv[Title/Abstract]) OR “self-directed violence”[Title]) OR “self-directed violent”[Title]) OR “self-inflicted”[Title]) OR suicid*[Title])) AND ((((((((((((((((“4P screener”[Title/Abstract]) OR “Beck Scale”[Title/Abstract]) OR “columbia suicide severity rating scale”[Title/Abstract]) OR “c ssrs”[Title/Abstract]) OR “ec ssrs”[Title/Abstract]) OR “item 9”[Title/Abstract]) OR “phq-9”[Title/Abstract]) OR “concise health risk tracking self-report”[Title/Abstract]) OR “chrt-sr”[Title/Abstract]) OR “Nurses Global Assessment of Suicide

Risk”[Title/Abstract]) OR “rocky mountain mirecc”[Title/Abstract]) OR “SAMHSA/SPRC safety card”[Title/Abstract]) OR “Sheehan Suicide Tracking Scale”[Title/Abstract]) OR “suicide assessment five-step evaluation”[Title/Abstract]) OR “safe-t”[Title/Abstract]) OR “Suicide Intent Scale”[Title/Abstract]) OR “Harkavy Asnis Suicide Survey”[Title/Abstract])) Filters: Publication date from 2018/04/11
Hits – 120

QUESTION 3

(((((((“Suicide”[Majr:NoExp]) OR sdv[Title/Abstract]) OR “self-directed violence”[Title]) OR “self-directed violent”[Title]) OR “self-inflicted”[Title]) OR suicid*[Title])) AND ((((“Risk Assessment”[Majr:NoExp]) OR “Risk Factors”[Majr:NoExp]) OR risk*[Title]) OR stratif*[Title]) Filters: Publication date from 2018/04/11
Hits – 650

QUESTION 4

((((((((((((((((“Suicide”[Majr:NoExp]) OR sdv[Title/Abstract]) OR “self-directed violence”[Title]) OR “self-directed violent”[Title]) OR “self-inflicted”[Title]) OR suicid*[Title])) AND ((((((((((((((((((((((((((((((((“Psychotherapy”[Mesh]) OR “Virtual Reality”[Mesh]) OR “accelerated resolution therapy”[Title/Abstract]) OR ART[Title/Abstract]) OR behavior therap*[Title/Abstract]) OR behaviour therap*[Title/Abstract]) OR behavioral therap*[Title/Abstract]) OR behavioural therap*[Title/Abstract]) OR BEP-TG[Title/Abstract]) OR “brief eclectic psychotherapy”[Title/Abstract]) OR CBCT[Title/Abstract]) OR CBT[Title/Abstract]) OR “cognitive behavioral conjoint therapy”[Title/Abstract]) OR “cognitive behavioral therapy”[Title/Abstract]) OR “cognitive processing therapy”[Title/Abstract]) OR cognitive therap*[Title/Abstract]) OR Ehlers[Title/

Abstract]) OR EMDR[Title/Abstract]) OR “emotional freedom”[Title/Abstract]) OR “exposure therapy”[Title/Abstract]) OR “eye movement desensitization”[Title/Abstract]) OR “imagery rehearsal”[Title/Abstract]) OR mindfulness[Title/Abstract]) OR “narrative therapy”[Title/Abstract]) OR “prolonged exposure”[Title/Abstract]) OR “thought field therapy”[Title/Abstract]) OR “trauma focused”[Title/Abstract]) OR “virtual reality exposure”[Title/Abstract]) OR “written exposure therapy”[Title/Abstract])) OR ((((((((((((((((((((((((((((((“Mind-Body Therapies”[Mesh]) OR “Neurolinguistic Programming”[Mesh:NoExp]) OR “Psychoanalysis”[Mesh]) OR “Relaxation”[Mesh:NoExp]) OR ((acceptance[Title/Abstract]) AND “commitment therapy”[Title/Abstract])) OR “behavioral activation”[Title/Abstract]) OR “couples therapy”[Title/Abstract]) OR “family therapy”[Title/Abstract]) OR “interpersonal therapy”[Title/Abstract]) OR IPT[Title/Abstract]) OR “marital therapy”[Title/Abstract]) OR “marriage therapy”[Title/Abstract]) 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Technol Assess”[Journal] OR “Health Technol Assess (Rockv)”[Journal] OR “Health Technol Assess Rep”[Journal])))))))) Filters: Publication date from 2018/04/11
Hits – 113

QUESTION 5

((((((((((((((“Suicide”[Majr:NoExp]) OR sdv[Title/Abstract]) OR “self-directed violence”[Title]) OR “self-directed violent”[Title]) OR “self-inflicted”[Title]) OR suicid*[Title])) AND ((((((((((((“Drug Therapy”[Mesh]) OR drug therap*[Title/Abstract]) OR drug treatment*[Title/Abstract]) OR pharmacological[Title/Abstract]) OR pharmaco-therap*[Title/Abstract]) OR pharmacotherap*[Title/Abstract])) OR ((((((((((((((((((((“Antipsychotic Agents”[Mesh]) OR “Chlorpromazine”[Mesh]) OR “Fluphenazine”[Mesh]) OR “Haloperidol”[Mesh]) OR “Loxapine”[Mesh:NoExp]) OR “Perphenazine”[Mesh]) OR “Pimozide”[Mesh]) OR “Thioridazine”[Mesh]) OR “Thiothixene”[Mesh]) OR “Trifluoperazine”[Mesh]) OR anti-psychotic*[Title/Abstract]) OR antipsychotic*[Title/Abstract]) OR chlorpromazine[Title/Abstract]) OR fluphenazine[Title/Abstract]) OR haloperidol[Title/Abstract]) OR loxapine[Title/Abstract]) OR neuroleptic[Title/Abstract]) OR perphenazine[Title/Abstract]) OR pimozide[Title/Abstract]) OR thioridazine[Title/Abstract]) OR thiothixene[Title/Abstract]) OR trifluoperazine[Title/Abstract])) OR ((((((((((((((((“Aripiprazole”[Mesh]) OR “Clozapine”[Mesh]) OR “Lurasidone Hydrochloride”[Mesh]) OR “Paliperidone Palmitate”[Mesh]) OR “Quetiapine Fumarate”[Mesh]) OR “Risperidone”[Mesh]) OR aripiprazole[Title/Abstract]) OR asenapine[Title/Abstract]) OR brexpiprazole[Title/Abstract]) OR clozapine[Title/Abstract]) OR iloperidone[Title/Abstract]) OR lurasidone[Title/Abstract]) OR olanzapine[Title/Abstract]) OR paliperidone[Title/Abstract]) OR quetiapine[Title/Abstract])

OR risperidone[Title/Abstract]) OR ziprasidone[Title/Abstract])) OR ((((((((((((((((((“Carbamazepine”[Mesh:NoExp]) OR “Clonidine”[Mesh]) OR “Lithium Carbonate”[Mesh]) OR “Pregabalin”[Mesh]) OR “Valproic Acid”[Mesh]) OR “Anticonvulsants”[Mesh]) OR anticonvuls*[Title/Abstract]) OR carbamazepine[Title/Abstract]) OR divalproex[Title/Abstract]) OR gabapentin[Title/Abstract]) OR lamotrigine[Title/Abstract]) OR lithium[Title/Abstract]) OR mood stabiliz*[Title/Abstract]) OR oxcarbazepine[Title/Abstract]) AND pregabalin[Title/Abstract]) OR tiagabine[Title/Abstract]) OR topiramate[Title/Abstract]) OR valproate[Title/Abstract]) OR valproic acid[Title/Abstract])) OR ((((((((((((((((((“Anti-Anxiety Agents”[Mesh]) OR “Buspirone”[Mesh]) OR “Diphenhydramine”[Mesh:NoExp]) OR “Eszopiclone”[Mesh]) OR “Guanfacine”[Mesh]) OR (“Hypnotics and Sedatives”[Mesh])) OR buspirone[Title/Abstract]) OR diphenhydramine[Title/Abstract]) OR eszopiclone[Title/Abstract]) OR guanfacine[Title/Abstract]) OR 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assessment winchester, england”[Journal] OR “Evid Rep Technol Assess (Full Rep)”[Journal] OR “Evid Rep Technol Assess (Summ)”[Journal] OR “Int J Technol Assess Health Care”[Journal] OR “GMS Health Technol Assess”[Journal] OR “Health Technol Assess (Rockv)”[Journal] OR “Health Technol Assess Rep”[Journal])))))))))) Filters: Publication date from 2018/04/11
Hits – 64

QUESTION 6

((((((((((((((“Suicide”[Majr:NoExp]) OR sdv[Title/Abstract]) OR “self-directed violence”[Title]) OR “self-directed violent”[Title]) OR “self-inflicted”[Title]) OR suicid*[Title])) AND ((((((((((“Hospitalization”[Mesh]) OR “care provider”) OR “care providers”) OR “care setting”) OR “care settings”) OR “delayed treatment”) OR hospitalization) OR “immediate treatment”) OR “intensive outpatient”) OR ((step*) AND care)))))) AND (((((((randomized controlled trial[pt] OR controlled clinical trial[pt] OR randomized[tiab] OR placebo[tiab] OR drug therapy[sh] OR randomly[tiab] OR trial[tiab] OR groups[tiab] NOT (animals [mh] NOT humans [mh])))) OR ((systematic[sb] OR meta-analysis[pt] OR meta-analysis as topic[mh] OR meta-analysis[mh] OR meta analy*[tw] OR metanaly*[tw] OR metaanaly*[tw] OR met analy*[tw] OR integrative research[tiab] OR integrative review*[tiab] OR integrative overview*[tiab] OR research integration*[tiab] OR research overview*[tiab] OR collaborative review*[tiab] OR collaborative overview*[tiab] OR systematic review*[tiab] OR technology assessment*[tiab] OR technology

overview*[tiab] OR "Technology Assessment, Biomedical"[mh] OR HTA[tiab] OR HTAs[tiab] OR comparative efficacy[tiab] OR comparative effectiveness[tiab] OR outcomes research[tiab] OR indirect comparison*[tiab] OR ((indirect treatment[tiab] OR mixed-treatment[tiab]) AND comparison*[tiab]) OR Embase*[tiab] OR Cinahl*[tiab] OR systematic overview*[tiab] OR methodological overview*[tiab] OR methodologic overview*[tiab] OR methodological review*[tiab] OR methodologic review*[tiab] OR quantitative review*[tiab] OR quantitative overview*[tiab] OR quantitative synthes*[tiab] OR pooled analy*[tiab] OR Cochrane[tiab] OR Medline[tiab] OR Pubmed[tiab] OR Medlars[tiab] OR handsearch*[tiab] OR hand search*[tiab] OR meta-regression*[tiab] OR metaregression*[tiab] OR data synthes*[tiab] OR data extraction[tiab] OR data abstraction*[tiab] OR mantel haenszel[tiab] OR peto[tiab] OR der-simonian[tiab] OR dersimonian[tiab] OR fixed effect*[tiab] OR "Cochrane Database Syst Rev"[Journal:__jrid21711] OR "health technology assessment winchester, england"[Journal] OR "Evid Rep Technol Assess (Full Rep)"[Journal] OR "Evid Rep Technol Assess (Summ)"[Journal] OR "Int J Technol Assess Health Care"[Journal] OR "GMS Health Technol Assess"[Journal] OR "Health Technol Assess (Rockv)"[Journal] OR "Health Technol Assess Rep"[Journal])))))))))))))Filters: Publication date from 2018/04/11
Hits – 51

QUESTION 7

((((((((((((("Suicide"[Majr:NoExp]) OR sdv[Title/Abstract]) OR "self-directed violence"[Title]) OR "self-directed violent"[Title]) OR "self-inflicted"[Title]) OR suicid*[Title])) AND ((((((("Aftercare"[Mesh:NoExp]) OR "Patient Discharge"[Mesh]) OR aftercare) OR "follow-up") OR "post-acute care") OR "post-discharge care"))))) AND ((((randomized controlled trial[pt] OR controlled clinical trial[pt] OR randomized[tiab] OR placebo[tiab] OR drug therapy[sh] OR randomly[tiab] OR trial[tiab] OR groups[tiab] NOT (animals [mh] NOT humans [mh])))) OR ((systematic[sb] OR meta-analysis[pt] OR meta-analysis as topic[mh] OR meta-analysis[mh] OR meta analy*[tw] OR metanaly*[tw] OR metaanaly*[tw] OR met analy*[tw] OR integrative research[tiab] OR integrative review*[tiab] OR integrative overview*[tiab] OR research integration*[tiab] OR research overview*[tiab] OR collaborative review*[tiab] OR collaborative overview*[tiab] OR systematic review*[tiab] OR technology assessment*[tiab] OR technology overview*[tiab] OR "Technology Assessment, Biomedical"[mh] OR HTA[tiab] OR HTAs[tiab] OR comparative efficacy[tiab] OR comparative effectiveness[tiab] OR outcomes research[tiab] OR indirect comparison*[tiab] OR ((indirect treatment[tiab] OR mixed-treatment[tiab]) AND comparison*[tiab]) OR Embase*[tiab] OR Cinahl*[tiab] OR systematic overview*[tiab] OR methodological overview*[tiab] OR methodologic overview*[tiab] OR methodological review*[tiab] OR methodologic review*[tiab] OR quantitative review*[tiab] OR quantitative overview*[tiab] OR quantitative synthes*[tiab] OR pooled analy*[tiab] OR Cochrane[tiab] OR Medline[tiab] OR Pubmed[tiab] OR Medlars[tiab] OR handsearch*[tiab] OR hand search*[tiab] OR meta-regression*[tiab] OR metaregression*[tiab] OR data synthes*[tiab] OR data extraction[tiab] OR data abstraction*[tiab] OR mantel haenszel[tiab] OR peto[tiab] OR der-simonian[tiab] OR dersimonian[tiab] OR fixed effect*[tiab] OR "Cochrane Database Syst Rev"[Journal:__jrid21711] OR "health technology assessment winchester, england"[Journal] OR "Evid Rep Technol Assess (Full Rep)"[Journal] OR "Evid Rep Technol Assess (Summ)"[Journal] OR "Int J Technol Assess Health Care"[Journal] OR "GMS Health Technol Assess"[Journal] OR "Health Technol Assess (Rockv)"[Journal] OR "Health Technol Assess Rep"[Journal])))))Filters: Publication date from 2018/04/11
Hits – 130

QUESTION 8

((((((((((((((((("Suicide"[Majr:NoExp]) OR sdv[Title/Abstract]) OR "self-directed violence"[Title]) OR "self-directed violent"[Title]) OR "self-inflicted"[Title]) OR suicid*[Title]))))) AND ((((((((((((((protective factor*) OR "protect against") OR "increase risk") OR "increased risk") OR "increases risk") OR "increase risks") OR "reduce risk") OR "reduced risk") OR "reduces risk") OR "reduce risks") OR "decrease risk") OR "decreased risk") OR "decreases risk") OR "decrease risks") Filters: Publication date from 2018/04/11
Hits – 625

QUESTIONS 9 & 10

((((((((((((((((((("Suicide"[Majr:NoExp]) OR sdv[Title/Abstract]) OR "self-directed violence"[Title]) OR "self-directed violent"[Title]) OR "self-inflicted"[Title]) OR suicid*[Title]))))) AND ((((((((((((((("Health Promotion"[Mesh:NoExp]) OR "Community Mental Health Services"[Mesh]) OR "Health Education"[Mesh:NoExp]) OR "Public Health"[Mesh]) OR "community resources") OR "community support") OR "health literacy") OR "family education") OR "patient education") OR "provider education") OR community intervention*) OR community-based intervention*) OR stigma reduc*)) OR (((((((((("Clergy"[Mesh]) OR "Social Support"[Mesh]) OR clergy) OR chaplain*) OR ((((((family[Title/Abstract]) OR peer*[Title/Abstract]) OR spouse[Title/Abstract]) OR parent*[Title/Abstract])) AND ((program*[Title/Abstract]) OR support[Title/Abstract]))) OR "confidential care") OR "vet centers") OR "be there") OR "social support")))) AND (((((randomized controlled trial[pt] OR controlled clinical trial[pt] OR randomized[tiab] OR placebo[tiab] OR drug therapy[sh] OR randomly[tiab] OR trial[tiab] OR groups[tiab] NOT (animals [mh] NOT humans [mh])))) OR ((systematic[sb] OR meta-analysis[pt] OR meta-analysis as topic[mh] OR meta-analysis[mh] OR meta analy*[tw] OR metanaly*[tw] OR metaanaly*[tw] OR met analy*[tw] OR integrative research[tiab] OR integrative review*[tiab] OR integrative overview*[tiab] OR research integration*[tiab] OR

research overview*[tiab] OR collaborative review*[tiab] OR collaborative overview*[tiab] OR systematic review*[tiab] OR technology assessment*[tiab] OR technology overview*[tiab] OR "Technology

Assessment, Biomedical"[mh] OR HTA[tiab] OR HTAs[tiab] OR comparative efficacy[tiab] OR comparative effectiveness[tiab] OR outcomes research[tiab] OR indirect comparison*[tiab] OR ((indirect treatment[tiab] OR mixed-treatment[tiab]) AND comparison*[tiab]) OR Embase*[tiab] OR Cinahl*[tiab] OR systematic overview*[tiab] OR methodological overview*[tiab] OR methodologic overview*[tiab] OR methodological review*[tiab] OR methodologic review*[tiab] OR quantitative review*[tiab] OR quantitative overview*[tiab] OR quantitative synthes*[tiab] OR pooled analy*[tiab] OR Cochrane[tiab] OR Medline[tiab] OR Pubmed[tiab] OR Medlars[tiab] OR handsearch*[tiab] OR hand search*[tiab] OR meta-regression*[tiab] OR metaregression*[tiab] OR data synthes*[tiab] OR data extraction[tiab] OR data abstraction*[tiab] OR mantel haenszel[tiab] OR peto[tiab] OR der-simonian[tiab] OR dersimonian[tiab] OR fixed effect*[tiab] OR "Cochrane Database Syst Rev"[Journal:__jrid21711] OR "health technology assessment winchester, england"[Journal] OR "Evid Rep Technol Assess (Full Rep)"[Journal] OR "Evid Rep Technol Assess (Summ)"[Journal] OR "Int J Technol Assess Health Care"[Journal] OR "GMS Health Technol Assess"[Journal] OR "Health Technol Assess (Rockv)"[Journal] OR "Health Technol Assess Rep"[Journal])))))) Filters: Publication date from 2018/04/11
Hits – 364

QUESTIONS 11 & 12

((((((((((((((((((((((((((((("Suicide"[Majr:NoExp]) OR sdv[Title/Abstract]) OR "self-directed violence"[Title]) OR "self-directed violent"[Title]) OR "self-inflicted"[Title]) OR suicid*[Title])))))) AND ((((((((((("Telemedicine"[Mesh]) OR mobile[Title/Abstract]) OR phone[Title/Abstract]) OR remote[Title/Abstract]) OR telemedicine[Title/Abstract]) OR telenursing[Title/Abstract]) OR telehealth*[Title/Abstract]) OR telephone[Title/Abstract]) OR virtual[Title/Abstract])) OR ((((((((((("Cell Phone"[Mesh]) OR "Software"[Mesh:NoExp]) OR "Mobile Applications"[Mesh]) OR "Technology"[Mesh]) OR "Electronic Mail"[Mesh]) OR apps[Title/Abstract]) OR "crisis line"[Title/Abstract]) OR "text line"[Title/Abstract]) OR "caring contact"[Title/Abstract]) OR "technology supported management"[Title/Abstract]) OR "web-based"[Title/Abstract]) OR caring letter*[Title/Abstract])))) AND ((((((randomized controlled trial[pt] OR controlled clinical trial[pt] OR randomized[tiab] OR placebo[tiab] OR drug therapy[sh] OR randomly[tiab] OR trial[tiab] OR groups[tiab] NOT (animals [mh] NOT humans [mh])))) OR ((systematic[sb] OR meta-analysis[pt] OR meta-analysis as topic[mh] OR meta-analysis[mh] OR meta analy*[tw] OR metanaly*[tw] OR metaanaly*[tw] OR met analy*[tw] OR integrative research[tiab] OR integrative review*[tiab] OR integrative overview*[tiab] OR research integration*[tiab] OR research overview*[tiab] OR collaborative review*[tiab] OR collaborative overview*[tiab] OR systematic review*[tiab] OR technology assessment*[tiab] OR technology overview*[tiab] OR "Technology Assessment, Biomedical"[mh] OR HTA[tiab] OR HTAs[tiab] OR comparative efficacy[tiab] OR comparative effectiveness[tiab] OR outcomes research[tiab] OR indirect comparison*[tiab] OR ((indirect treatment[tiab] OR mixed-treatment[tiab]) AND comparison*[tiab]) OR Embase*[tiab] OR Cinahl*[tiab] OR systematic overview*[tiab] OR methodological overview*[tiab] OR methodologic overview*[tiab] OR methodological review*[tiab] OR methodologic review*[tiab] OR quantitative review*[tiab] OR quantitative overview*[tiab] OR quantitative synthes*[tiab] OR pooled analy*[tiab] OR Cochrane[tiab] OR Medline[tiab] OR Pubmed[tiab] OR Medlars[tiab] OR handsearch*[tiab] OR hand search*[tiab] OR meta-regression*[tiab] OR metaregression*[tiab] OR data synthes*[tiab] OR data extraction[tiab] OR data abstraction*[tiab] OR mantel haenszel[tiab] OR peto[tiab] OR der-simonian[tiab] OR dersimonian[tiab] OR fixed effect*[tiab] OR "Cochrane Database Syst Rev"[Journal:__jrid21711] OR "health technology assessment winchester, england"[Journal] OR "Evid Rep Technol Assess (Full Rep)"[Journal] OR "Evid Rep Technol Assess (Summ)"[Journal] OR "Int J Technol Assess Health Care"[Journal] OR "GMS Health Technol Assess"[Journal] OR "Health Technol Assess (Rockv)"[Journal] OR "Health Technol Assess Rep"[Journal])))))))) Filters: Publication date from 2018/04/11
Hits – 48

GENERAL HEDGES

NOT ((((((((((((((((((((((((((address[Publication Type]) OR autobiography[Publication Type]) OR biography[Publication Type]) OR case reports[Publication Type]) OR clinical conference[Publication Type]) OR editorial[Publication Type]) OR lecture[Publication Type]) OR letter[Publication Type]) OR video-audio media[Publication Type]) OR webcasts[Publication Type]) OR congress[Publication Type]) OR consensus development conference[Publication Type]) OR consensus development conference, NIH[Publication Type]) OR dataset[Publication Type]) OR dictionary[Publication Type]) OR directory[Publication Type]) OR expression of concern[Publication Type]) OR festschrift[Publication Type]) OR interactive tutorial[Publication Type]) OR interview[Publication Type]) OR legal case[Publication Type]) OR legislation[Publication Type]) OR news[Publication Type]) OR newspaper article[Publication Type]) OR patient education handout[Publication Type]) OR periodical index[Publication Type]) OR personal narrative[Publication Type]) OR portrait[Publication Type]

AND English[Language]

NOT ("Animals"[Mesh] NOT ("Animals"[Mesh] AND "Humans"[Mesh])) ***Not applied to searches with RCT filter***

Appendix C: Deep Dive Screening Criteria

GENERAL CRITERIA (across all categories)

- Studies must be published in English, and published between April 2018 and the time of the literature search.
- Publication must be original research or systematic review. Exclude letters, editorials, and other publications that are not full-length studies.
- Study must have enrolled at least 20 patients (10 per study group) unless otherwise noted in Key Question Specific Criteria.
- Study must have enrolled at least 85% of subjects who are adults (18 and older)
- Study must have reported on at least one outcome of interest. The outcomes of interest include: suicide related behaviors — self-directed violence with the intent of death, suicidal ideation, suicide attempt. Exclude self-harm without the intent of death, including cutting.

Group 1 — Screening/Assessment Criteria

- Systematic reviews or best evidence studies that evaluated the efficacy of different screening programs, suicide screening instrument, or predictive analytic tool.
- Studies must report on the diagnostic characteristics of the screening instrument (e.g., sensitivity, specificity, repeatability) or other health-related outcomes (i.e., Suicide deaths, Suicide attempts, Overdose, Suicidal ideation, Treatment engagement/withdrawal, Functional status, Health status, QofL, etc.).

Group 2 — Intervention Criteria

- Include: RCTs, interventions and systematic reviews where suicide is the primary outcome of interest.
- Intervention studies must have assessed pharmacologic or non-pharmacologic treatment, care management approach, or community-based interventions and be a prospective, randomized controlled trial with an independent control group. Crossover trials are not included.
- Technology-based interventions can be primary telehealth interventions or care adjuncts to other forms of care with the goal of improved outcomes.

Group 3 - Risk & Protective Factors Criteria

- Include systematic reviews that include longitudinal or comparative observational (RCT, cohort or case-control) studies [*at full text review: calculated or provided a pooled estimate of risk for a given risk factor that was reported as an odds ratio, risk ratio, or hazard ratio*].
  - EXCLUDE systematic reviews of primarily cross-sectional studies or psychological autopsy studies.
- Include longitudinal or comparative observational (RCT, cohort or case-control) studies of high-income, Western militaries (U.S., Canada, United Kingdom, Western Europe, Israel, Australia, Mexico, and New Zealand).
  - EXCLUDE cross-sectional studies.
- Studies must report on the relationship between the factors listed below and suicide attempt, death, and suicidal ideation.
  - EXCLUDE if the following predictor is not examined:
    - Preparatory behaviors
    - Past or present suicidal intent
    - Non-suicidal self-directed violence behaviors
    - Decreased psychosocial functioning
    - Hallucinations
    - Financial problems
    - Transition of care (e.g., discharge from inpatient, change in medication, change in therapist)
    - Barrier to accessing care
    - Access to other lethal means
    - History of moderate to severe TBI
    - Cancer diagnosis
    - Lesbian, gay, bisexual, transgender sexual orientation or gender identity

Group 4 — Post-acute Care

- Post-acute care involves scheduled contacts after a patient has been identified as having suicidal behavior (e.g., discharge from ED, Inpatient psychiatric care, outpatient specialty care, etc.).
- Post-acute care has a goal of increasing engagement (re-engagement) in follow-up care, or preventing suicidal behavior.

Group 5 — Community-based Interventions

- Community is defined as occurring in a setting outside of a healthcare treatment setting, and an intervention for a population.
- Studies must be controlled (experimental).

Appendix D: Deep Dive Literature Flow Diagrams

Figure 1. PRISMA Flow Diagram for Topic 1: Screening and Assessment (Key Questions 1, 2, 3)

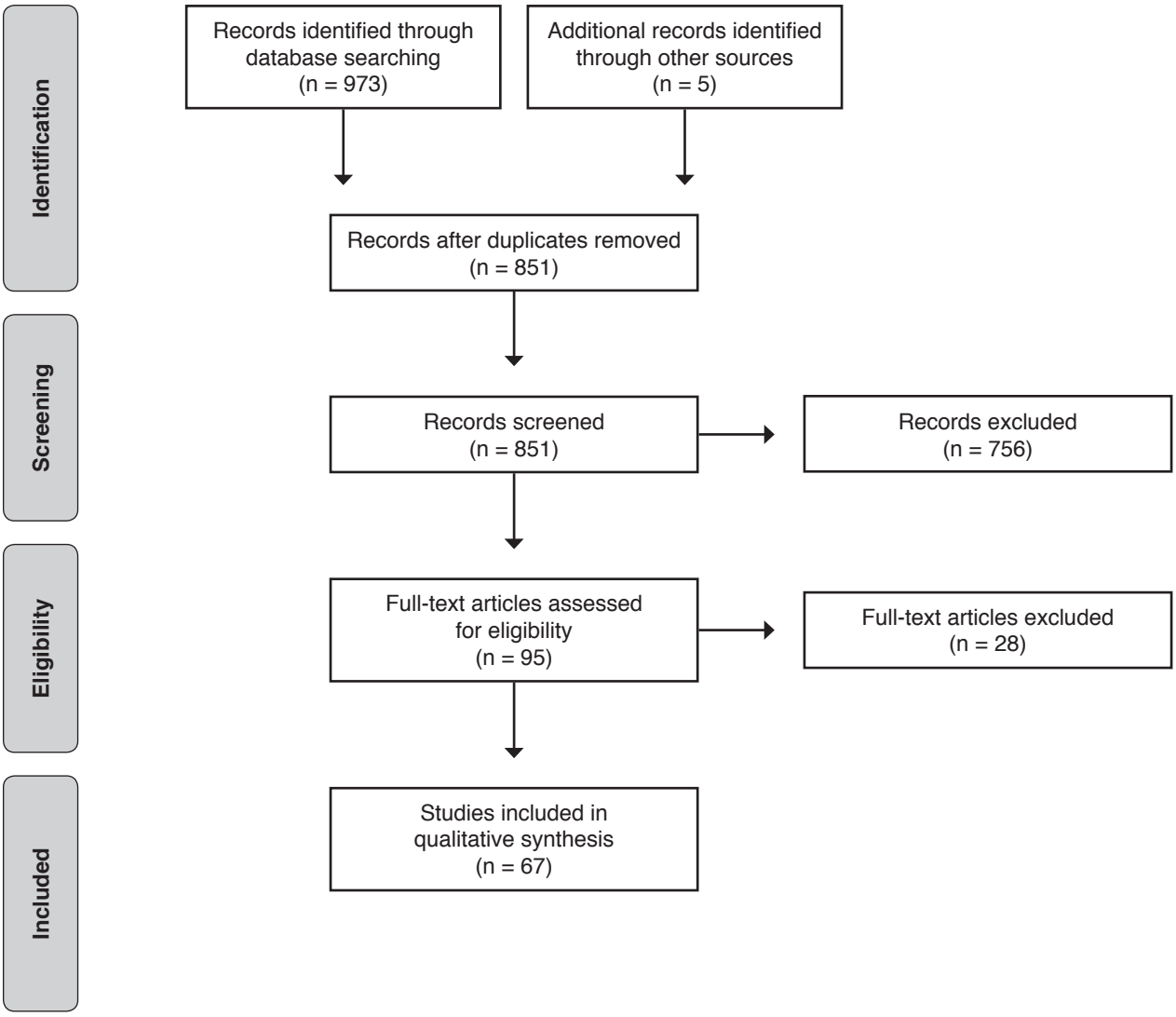


Figure 2. PRISMA Flow Diagram for Topic 2: Pharmacological and Psychological Interventions (Key Questions 4, 5, 6, 11, 12)

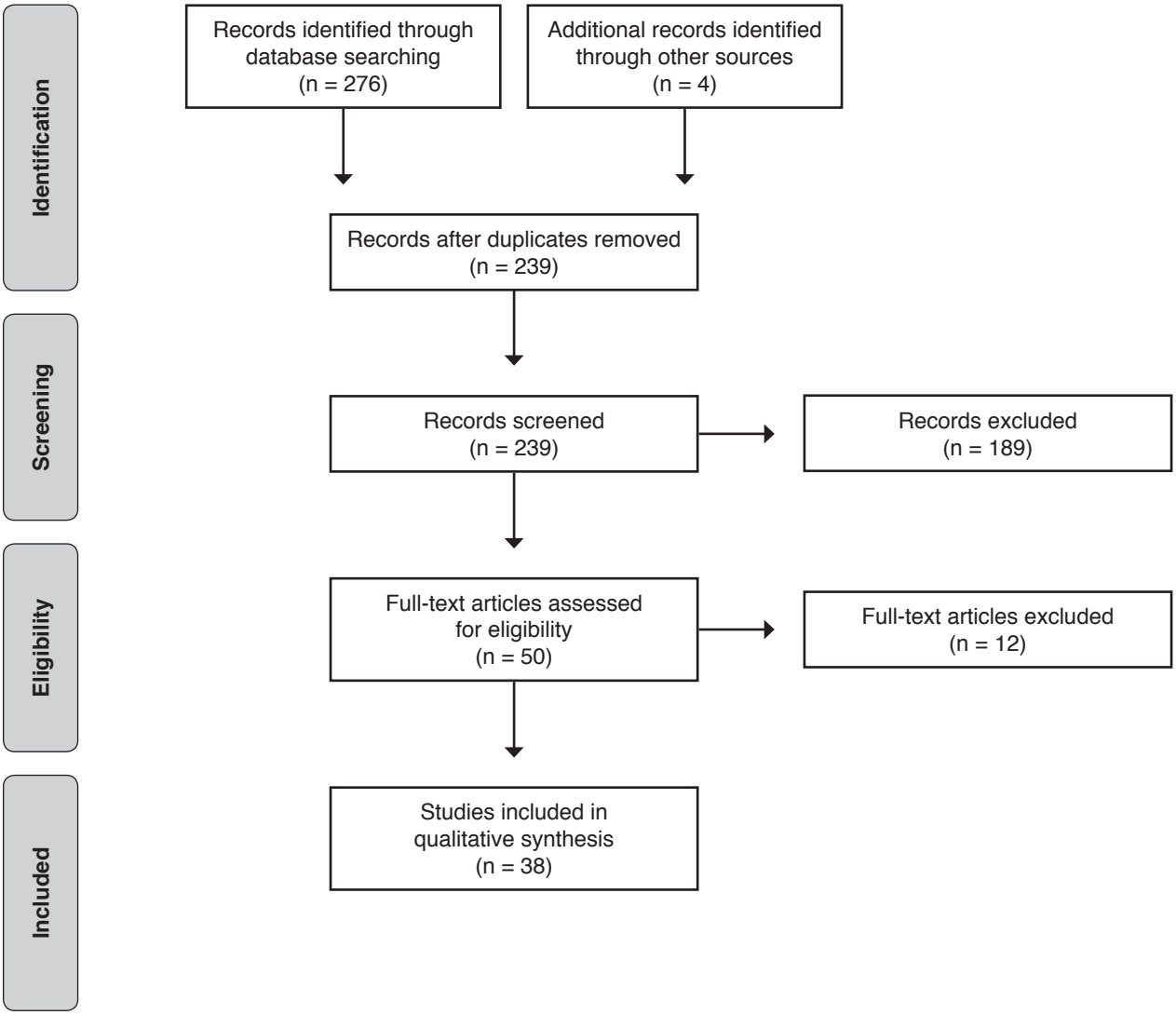


Figure 3. PRISMA Flow Diagram for Topic 3: Risk and Protective Factors (Key Question 8)

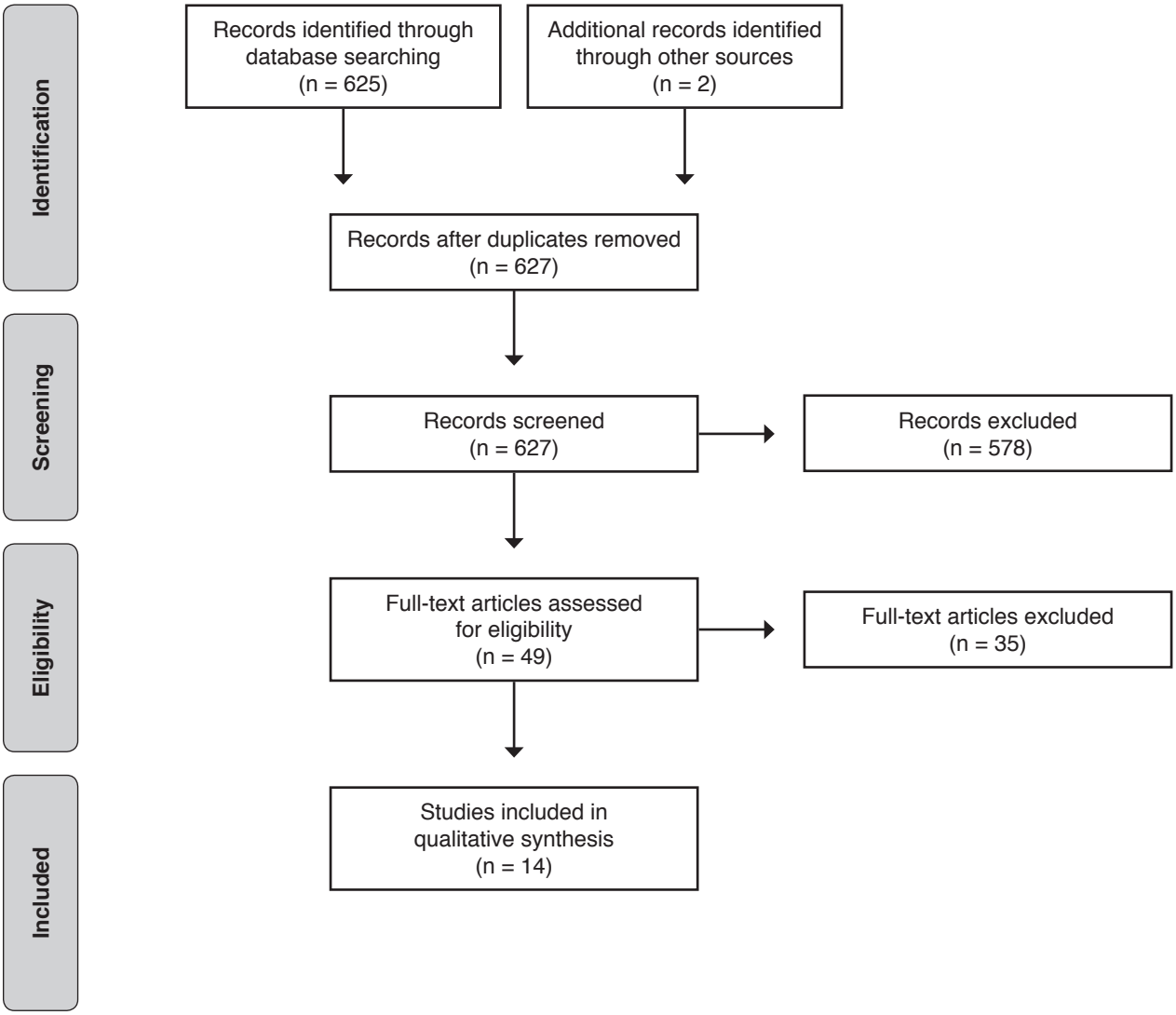


Figure 4. PRISMA Flow Diagram for Topic 4: Post-acute Care (Key Question 7)

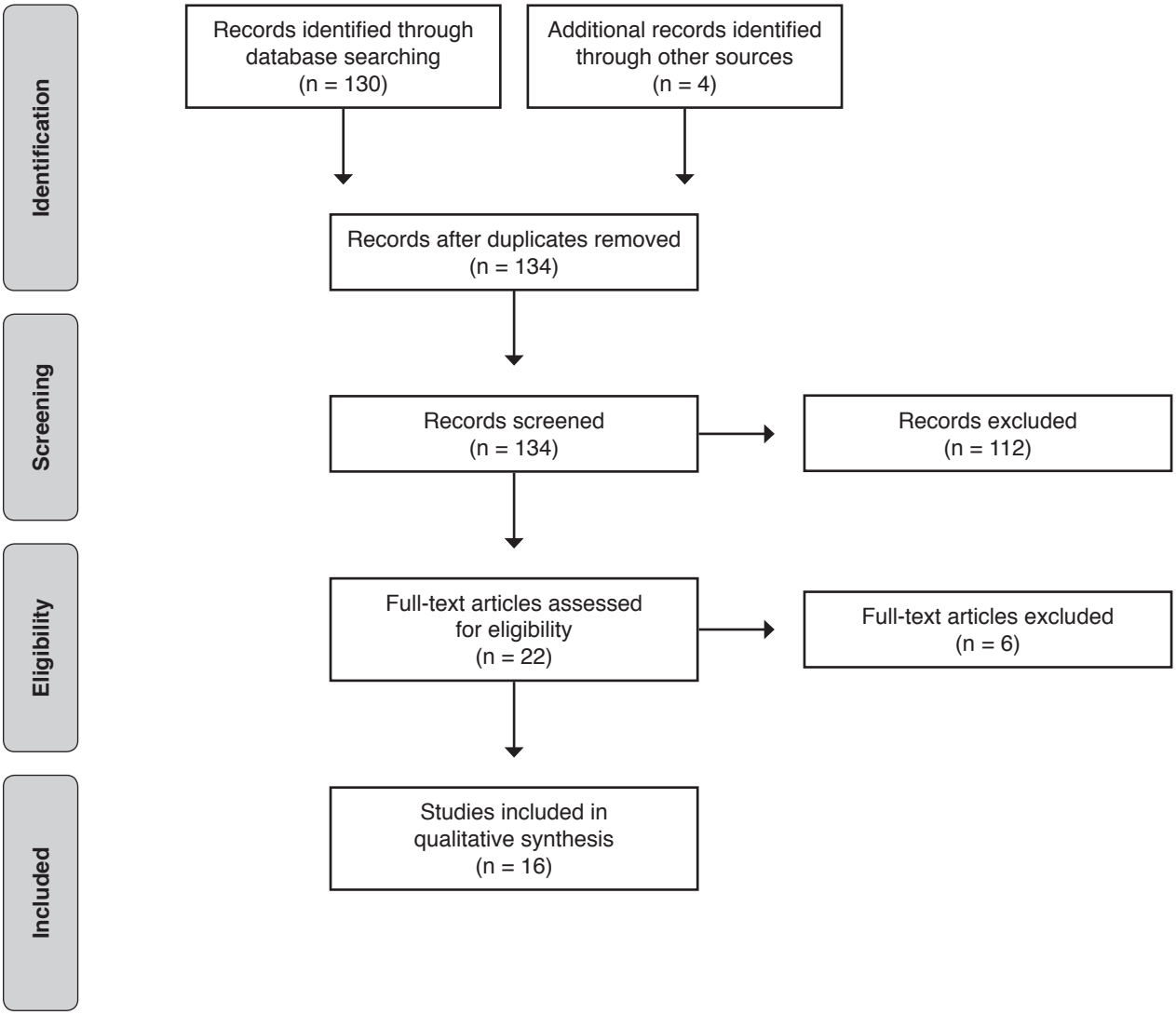
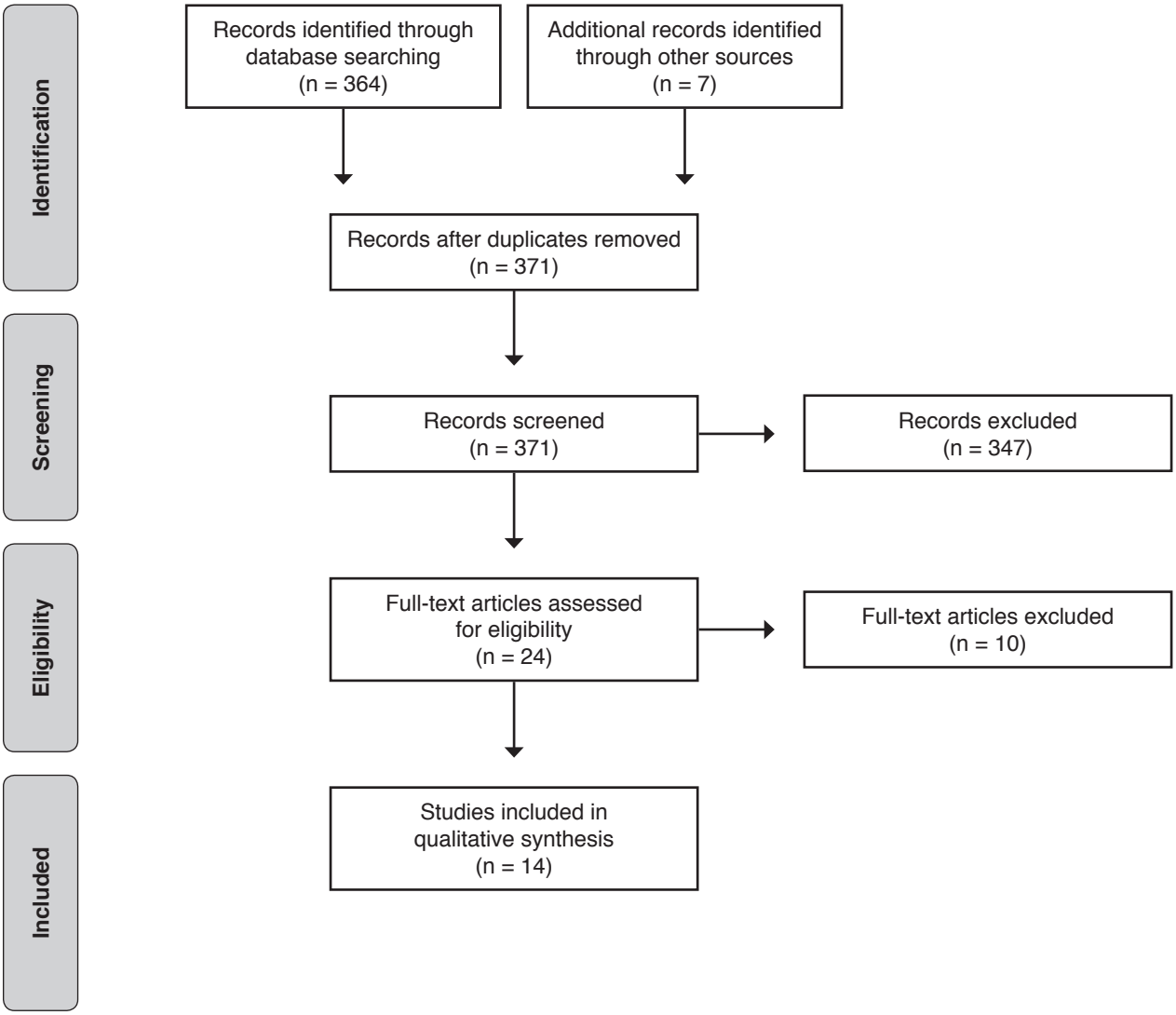


Figure 5. PRISMA Flow Diagram for Topic 5: Community-based Interventions (Key Questions 9, 10)



Appendix E: Development of Final Research Gaps

Research Need Statement	Recommended Changes (Post-literature Review)	PICO/PEO Research Questions (Post SME Review)
Screening for Suicide Risk Evaluation, Determining Level of Risk, and Relationship to Treatment	Merged Screening and Evaluation Categories	A. Screening, Evaluation, Risk Determination, and Referral to Treatment
Which suicide screening instrument is most effective at predicting suicidal behavior in active duty military population?	Additional research has not changed gap. Minor refinements to adhere to PICO guidelines.	A1. Which universal screening tools most accurately identify patients who are at risk for suicide-related outcomes across various timeframes (e.g., less than 1 month versus long-term risk)?
What are effective screening instruments or evaluation methods for classifying Service members identified as possibly at risk for suicidal behavior into subtypes (e.g., risk stratification) in order to inform appropriate level of care for at risk patients?	Additional research has not changed gap. Minor refinements to adhere to PICO guidelines.	A2. Is universal and indicated suicide screening associated with improved behavioral health care (i.e., comprehensive suicide risk evaluation, treatment referral and engagement, receipt of high-quality treatment) and subsequent health outcomes?
What novel methods are most effective at predicting suicidal behavior based on multiple sources of data (e.g., self-report, demographics indicating risk and/or protective factors, machine learning algorithms)?	Additional research has not changed gap. Minor refinements to adhere to PEO guidelines.	A3. Are there clinical decision support tools or other data integration strategies that can accurately stratify patients at risk for suicide?
What are the impacts of suicide screening on subsequent health system utilization and outcomes (i.e., does screening lead to comprehensive risk evaluation, treatment referral and engagement, receipt of high-quality treatment, and improvement in health outcomes)?	Additional research has not changed gap. Minor refinements to adhere to PEO guidelines.	A4. Are machine learning algorithms to predict suicide effective in reducing suicide-related outcomes?
What are the effects of different modes of administration of suicide screening questions (e.g., kiosk, face-to-face)?	Additional research has not changed gap. Merged two gaps since both address methods and frequency of delivering screening for suicide.	A5. How do different modes of suicide screening (e.g., face-to-face, screening via kiosk, other technologies) affect accuracy in suicide risk monitoring?
What effect does the rate of administration of suicide screeners have on their effectiveness (e.g., are there optimal rates for universal screening, indicated screening?)		
Risk & Protective Factors		B. Risk and Protective Factors
N/A	Add to list based on CPG text (weak evidence for: preparatory behaviors, past or present suicidal intent, non-suicidal self-directed violence behaviors). Additional research has not changed gap.	B1. How are suicidal preparatory behaviors, suicidal intent, and/or self-directed violence associated with suicide-related outcomes?
N/A	Add to list based on CPG text (weak evidence for: decreased psychosocial functioning and hallucinations). Additional research has not changed gap.	B2. What are the effects of psychiatric signs, symptoms and conditions (e.g., decreased psychosocial functioning, personality disorders, hallucinations) on suicide-related outcomes?
What are the effects of military transitions, including changes in duty station, status and transitions in care on suicide risk?	Additional research has not changed gap. Reworded to be consistent with CPG language and merged with psychosocial stressors.	B3. What are the effects of psychosocial stressors, including military-specific stressors (e.g., care transitions, duty changes, military culture, deployments, combat exposure) on suicide-related outcomes?
N/A	Add to list based on CPG text (weak evidence for: moderate to severe TBI and cancer diagnoses). Additional research has not changed gap.	B4. What are the effects of physical health conditions (e.g., chronic pain) and diagnoses (e.g., TBI, cancer diagnosis) on suicide-related outcomes?

Research Need Statement	Recommended Changes (Post-literature Review)	PICO/PEO Research Questions (Post SME Review)
N/A	Add to list based on CPG text (weak evidence for: access to lethal means other than firearms). Additional research has not changed gap.	B5. Is access to lethal means other than firearms (i.e., poison, prescription medications, illicit drugs or alcohol) a risk factor for suicide-related outcomes?
What are the effects of racial/ethnic, age, and gender disparities in suicide prevention detection processes and treatment?	Additional research has not changed gap. Reworded to be consistent with CPG language.	B6. Is gender identity and/or sexual orientation associated with suicide-related outcomes?
What are the effects on suicide outcomes of promoting known protective factors, including sense of belongingness, in the military?	Additional research has not changed gap. Minor refinements to adhere to PICO guidelines.	B7. What are the effects of protective factors (e.g., military unit support, resilience, social support, belongingness, religion/spirituality, reasons for living) on suicide-related outcomes?
What effective interventions can address social determinants of improved care in order to promote health (e.g., access to housing, employment, healthcare)?	Additional research has not changed gap. Minor refinements to adhere to PICO guidelines.	[Modified wording, moved to B3]
Non-pharmacologic Interventions		C. Non-pharmacologic Interventions
What adjustments might be made to interventions currently shown to be effective in some settings (e.g., outpatient, inpatient, residential) so that they could be successfully implemented in other settings (e.g., individual, dyad, group)?	Revised: Reworded to be consistent with CPG language. Additional research has not changed gap.	C1. Which inpatient psychiatric interventions are effective in improving suicide-related outcomes for those hospitalized for suicide-related behaviors?
Recommendation to offer PST to patients with self-directed violence to reduce suicidal ideation and other behaviors	Additional research has not changed gap. Minor refinements to adhere to PICO guidelines.	C2. How effective are problem-solving therapies in reducing suicide-related outcomes for patients with hopelessness and/or a history of self-directed violence?
What is the effectiveness of DBT in populations other than patients with BPD?	Additional research has not changed gap. Minor refinements to adhere to PICO guidelines.	C3. Can components of dialectical behavioral therapy (DBT) be used to reduce suicide risk for patients who do not have Borderline Personality Disorder?
What are effective strategies for delivering protocol-adherent DBT in DoD settings for patients at risk for suicide?	Remove: Given the low prevalence of BPD in the MHS based on surveillance, recommend removing the gap.	N/A
What effective interventions for other diagnostic categories might be effective for addressing suicidality?	Remove: This gap is already captured by another gap (what other therapies and interventions could be expanded to focus on patients at higher-risk for suicide)	N/A
What are effective strategies for large-scale implementation and evaluation of CBT for suicidal behavior in the MHS?	Additional research has not changed gap. Minor refinements to adhere to PEO guidelines.	C6. Can cognitive-behavioral therapy (CBT) for suicide prevention be effectively implemented and sustained within the Military Health System?
Recommendation that Window to Hope (WtoH) should be studied further among more general at-risk populations of Service Members	Remove: This gap is already captured by another gap (what other therapies and interventions could be expanded to focus on patients at higher-risk for suicide)	N/A
Technology-based Modalities	Recommend merging Technology gaps into Non-pharmacologic interventions category.	N/A
What is the effectiveness of patient-administered digital treatment protocols (e.g., web-based CBT) on suicidal outcomes in the Military?	Additional research has not changed gap. Recommend moving to non-pharm section.	C4. Are technology-based behavioral interventions (including provider-delivered and self-directed) effective in reducing suicide-related outcomes?

Research Need Statement	Recommended Changes (Post-literature Review)	PICO/PEO Research Questions (Post SME Review)
What is the effectiveness of technology-based adjuncts to treatment on suicide outcomes in the Military?	Merged two gaps into one since both deal with technology-based adjuncts.	C5. Are technology-based adjuncts to treatment (e.g., web or telephone applications) effective in reducing suicide-related outcomes?
What is the feasibility, acceptability, barriers, and facilitators to using adjunctive technology-based interventions for both patients and providers?		
Pharmacologic Interventions		D. Pharmacologic Interventions
What are the effects of antidepressants on suicide outcomes in demographic and geographic subpopulations of the military?	Additional research has not changed gap. Recommend no change.	D1. What are the effects of antidepressants on suicide-related outcomes within demographic and geographic subpopulations?
What are the effects of polypharmacy on suicidal and/or other health outcomes across heterogeneous populations of at-risk individuals?	Additional research has not changed gap. Recommend no change.	D2. What are the effects of polypharmacy, including opioids, on suicide-related outcomes?
What are the effects of naloxone distribution on suicidal outcomes?	Additional research has not changed gap. Recommend no change.	D3. What are the effects of naloxone distribution on suicide-related outcomes?
What are the effects of Ketamine infusion on suicidal behavior or other long term outcomes?	Additional research has not changed gap. Reworded to be consistent with CPG language.	D4. What is the feasibility, and appropriate dose and duration of ketamine infusion for suicide prevention?
What is the impact of medication-assisted treatment on suicide outcomes for those with SUD?	Additional research has not changed gap. Recommend no change.	D5. What are the effects of medication-assisted treatment on suicide-related outcomes for those with substance use disorders?
What is the effectiveness of clozapine in patients with schizophrenia or schizoaffective disorder in reducing suicidal behaviors?	Additional research has not changed gap. Recommend no change.	D6. What are the effects of clozapine on suicide-related outcomes for those with schizophrenia or schizoaffective disorder?
What are the effects of Lithium usage as an adjunctive or primary treatment for bipolar or unipolar depression on suicidal behaviors?	Additional research has not changed gap. Recommend no change.	[Removed: There is moderate QoE to support lithium]
Community Interventions	Community Interventions	E. Community-based Interventions
What is the effectiveness of community-based suicide prevention programs in the Military?	Remove: This gap is not identified in the CPG, but is a general statement about this category of gaps.	N/A
What is the effectiveness and potential harm of public health campaigns? What interventions effectively target stigma reduction and their impact on help-seeking behaviors?	Additional research has not significantly changed gap. Minor refinements to adhere to PEO guidelines.	E1. What are the impacts, both positive and negative, of suicide prevention public health campaigns on suicide-related outcomes?
What are effective postvention strategies for reducing suicide contagion?	Additional research has not significantly changed gap. Minor refinements to adhere to PICO guidelines.	E2. What are the impacts, both positive and negative, of postvention strategies on suicide related outcomes for those exposed to a death by suicide?
What is the effectiveness of lethal means restriction interventions on suicidal outcomes in the military?	Additional research has not significantly changed gap. Minor refinements to adhere to PICO or PEO guidelines.	E3. Are lethal means safety interventions effective in increasing safety behaviors and/or reducing suicide-related outcomes?
What is the effectiveness of gatekeeper training on suicide outcomes in the military?	Additional research has not changed gap. Minor refinements to adhere to PEO guidelines.	E4. Are gatekeeper interventions an effective care engagement strategy to reduce suicide-related outcomes?
What is the effectiveness of crisis/peer counselling lines on suicide outcomes in the Military?	Additional research has not significantly changed gap. Minor refinements to adhere to PEO guidelines.	E5. Are crisis hotlines and chatlines effective services to reduce suicide-related outcomes?

Research Need Statement	Recommended Changes (Post-literature Review)	PICO/PEO Research Questions (Post SME Review)
What is the effectiveness of buddy- and peer-delivered support programs on Service members' treatment engagement following hospitalization with suicidal behaviors?	Additional research has not changed gap. Minor refinements to adhere to PEO guidelines.	E6. Are buddy- and peer-delivered support programs effective in increasing treatment engagement for those recently discharged after hospitalization for suicide-related behaviors? E7. Are buddy- and peer-delivered support programs effective in reducing suicide-related outcomes for those recently discharged after hospitalization for suicide-related behaviors?
Post-acute Care	Post-acute Care	F. Post-acute Care
		F1. Are crisis response plans or safety planning interventions effective in reducing suicide-related outcomes after hospitalization for suicide-related behaviors?
What are the effects of periodic caring communications on Service members who have had suicidal behaviors in terms of treatment engagement following hospitalization/ED visit?	Additional research has not changed gap. Suicide-related outcomes, rather than treatment engagement, are more useful for this area of study.	F2. Are caring contacts effective in reducing suicide-related outcomes after hospitalization or ED visit for suicide-related behaviors?
What is the effectiveness of the WHO BIC protocol when implemented with Service members following ED presentation with suicide attempt?	Additional research has not changed gap. Minor refinements to adhere to PICO guidelines.	F3. Is the WHO Brief intervention and contact effective in reducing suicide-related outcomes after hospitalization or ED visit for suicide-related behaviors?
What is the effectiveness of home visits on engagement of Service members in outpatient treatments who have not sought follow-up care after inpatient hospitalization/ED visit for suicidal behavior?	Additional research has not changed gap. Suicide-related outcomes, rather than treatment engagement, are more useful for this area of study.	[Removed: There is moderate QoE and not specifically mentioned as a gap.]
What interventions facilitate treatment engagement (including dose-response) following ED visit or psychiatric hospitalization for suicidal ideation or attempt?	Additional research has not changed gap.	[Moved to C7] C7. Which standardized case management and care facilitation models are effective in reducing suicide-related outcomes for individuals with suicide ideation and/or a lifetime history of suicide attempts?
What is the effectiveness of standardized models for case management and care facilitation following psychiatric hospitalization with suicidal behaviors?	Additional research has not changed gap. Minor refinements to adhere to PICO or PEO guidelines.	[Removed]
N/A	Added to PICO question list.	[Revised: Reworded as E2 and moved to section E]

Appendix F: Final Prioritization Rating Form

2019 Suicide Research Gaps Rating Form

Identifying and Prioritizing Suicide Research Gaps in the Military

As a notable subject matter expert in this field, we would appreciate your assistance in identifying which research questions should have the highest priority for future research in the Military Health System (MHS).

We have collated the research gaps and those recommendations with lower quality of evidence from the 2019 *VA/DoD Clinical Practice Guideline (CPG) for the Assessment and Management of Patients at Risk for Suicide* and have refined them based on a review of the literature released since the completion of the CPG. The result is a list of specific research questions for the categories of gaps described in the CPG.

The form below has two sections. In part one, we ask you to prioritize individual research questions. In part two, we ask you to indicate which more general categories or topics should have highest priority for future research. At the end of the form, there is an opportunity for you to provide feedback about this process and to suggest research gaps or questions that were not included here.

Thank you in advance for your time and expertise!

Section 1: Prioritizing Individual Research Questions for Suicide Prevention

Objective: In this section, we ask you to review a list of individual research questions for potential future study, and to prioritize each one based on whether you think that the **results of future research could reduce suicide-related mortality, morbidity, and/or improve health-related outcomes in the MHS**.

Instructions: First, please scan through the following list of 35 research questions and **rate your highest priority choices for future research as either a 9 or 10**. Next, **rate the remaining items from 1 (lowest priority) to 8 (higher priority)**.

For the purposes of this project, "suicide-related outcomes" refers to any self-directed violence, including suicidal intent, suicide attempt, and/or death by suicide. For your reference, additional terms are described here: Glossary of Terms.

CPG Category	Individual Research Questions Target population (unless otherwise specified): Beneficiaries served by the MHS with a specific focus on those at risk for suicide.	Priority of Future Research for Suicide Prevention										
		N.O.	1	2	3	4	5	6	7	8	9	10
		No Opinion	Lowest Priority		Lower Priority		Moderate Priority		Higher Priority		Highest Priority	
Screening, Evaluation, Risk Determination, and Referral to Treatment	A1. Which universal screening tools most accurately identify patients who are at risk for suicide-related outcomes across various timeframes (e.g., less than 1 month versus long-term risk)?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	A2. Is universal and indicated suicide screening associated with improved behavioral health care (i.e., comprehensive suicide risk evaluation, treatment referral and engagement, receipt of high-quality treatment) and subsequent health outcomes?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	A3. Are there clinical decision support tools or other data integration strategies that can accurately stratify patients at risk for suicide?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	A4. Are machine learning algorithms to predict suicide effective in reducing suicide-related outcomes?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	A5. How do different modes of suicide screening (e.g., face-to-face, screening via kiosk, other technologies) affect accuracy in suicide risk monitoring?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
B. Risk and Protective Factors	B1. How are suicidal preparatory behaviors, suicidal intent, and/or self-directed violence associated with suicide-related outcomes?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	B2. What are the effects of psychiatric signs, symptoms and conditions (e.g., decreased psychosocial functioning, personality disorders, hallucinations) on suicide-related outcomes?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	B3. What are the effects of psychosocial stressors, including military-specific stressors (e.g., care transitions, duty changes, military culture, deployments, combat exposure) on suicide-related outcomes?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

CPG Category	Individual Research Questions Target population (unless otherwise specified): Beneficiaries served by the MHS with a specific focus on those at risk for suicide.	Priority of Future Research for Suicide Prevention										
		N.O.	1	2	3	4	5	6	7	8	9	10
		No Opinion	Lowest Priority		Lower Priority		Moderate Priority		Higher Priority		Highest Priority	
B. Risk and Protective Factors	B4. What are the effects of physical health conditions (e.g., chronic pain) and diagnoses (e.g., TBI, cancer diagnosis) on suicide-related outcomes?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	B5. Is access to lethal means other than firearms (i.e., poison, prescription medications, illicit drugs or alcohol) a risk factor for suicide-related outcomes?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	B6. Is gender identity and/or sexual orientation associated with suicide-related outcomes?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	B7. What are the effects of protective factors (e.g., military unit support, resilience, social support, belongingness, religion/spirituality, reasons for living) on suicide-related outcomes?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
C. Non-pharmacologic Interventions	C1. Which inpatient psychiatric interventions are effective in improving suicide-related outcomes for those hospitalized for suicide-related behaviors?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	C2. How effective are problem-solving therapies in reducing suicide-related outcomes for patients with hopelessness and/or a history of self-directed violence?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	C3. Can components of dialectical behavioral therapy (DBT) be used to reduce suicide risk for patients who do not have Borderline Personality Disorder?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	C4. Are technology-based behavioral interventions (including provider-delivered and self-directed) effective in reducing suicide-related outcomes?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	C5. Are technology-based adjuncts to treatment (e.g., web or telephone applications) effective in reducing suicide-related outcomes?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	C6. Can cognitive-behavioral therapy (CBT) for suicide prevention be effectively implemented and sustained within the Military Health System?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	C7. Which standardized case management and care facilitation models are effective in reducing suicide-related outcomes for individuals with suicide ideation and/or a lifetime history of suicide attempts?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
D. Pharmacologic Interventions	D1. What are the effects of antidepressants on suicide-related outcomes within demographic and geographic subpopulations?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	D2. What are the effects of polypharmacy, including opioids, on suicide-related outcomes?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	D3. What are the effects of naloxone distribution on suicide-related outcomes?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

CPG Category	Individual Research Questions Target population (unless otherwise specified): Beneficiaries served by the MHS with a specific focus on those at risk for suicide.	Priority of Future Research for Suicide Prevention										
		N.O.	1	2	3	4	5	6	7	8	9	10
		No Opinion	Lowest Priority		Lower Priority		Moderate Priority		Higher Priority		Highest Priority	
D. Pharmacologic Interventions	D4. What is the feasibility, and appropriate dose and duration of ketamine infusion for suicide prevention?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	D5. What are the effects of medication-assisted treatment on suicide-related outcomes for those with substance use disorders?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	D6. What are the effects of clozapine on suicide-related outcomes for those with schizophrenia or schizoaffective disorder?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
E. Community-based Interventions	E1. What are the impacts, both positive and negative, of suicide prevention public health campaigns on suicide-related outcomes?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	E2. What are the impacts, both positive and negative, of postvention strategies on suicide related outcomes for those exposed to a death by suicide?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	E3. Are lethal means safety interventions effective in increasing safety behaviors and/or reducing suicide-related outcomes?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	E4. Are gatekeeper interventions an effective care engagement strategy to reduce suicide-related outcomes?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	E5. Are crisis hotlines and chatlines effective services to reduce suicide-related outcomes?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	E6. Are buddy- and peer-delivered support programs effective in increasing treatment engagement for those recently discharged after hospitalization for suicide-related behaviors?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	E7. Are buddy- and peer-delivered support programs effective in reducing suicide-related outcomes for those recently discharged after hospitalization for suicide-related behaviors?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
F. Post-acute Care	F1. Are crisis response plans or safety planning interventions effective in reducing suicide-related outcomes after hospitalization for suicide-related behaviors?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	F2. Are caring contacts effective in reducing suicide-related outcomes after hospitalization or ED visit for suicide-related behaviors?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	F3. Is the WHO Brief intervention and contact effective in reducing suicide-related outcomes after hospitalization or ED visit for suicide-related behaviors?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Section 2: Prioritizing the CPG Research Gaps Categories

Objective: In this section, we ask you to review the research gaps categories previously identified in the CPG and prioritize them by ranking each category as a whole. As you're deciding which rank to assign to a category, please consider how much **future research in that category could reduce suicide-related mortality, morbidity, and/or improve health-related outcomes in the MHS**.

Instructions: Please read through the CPG research gaps categories (Column 1) and their descriptions.

1. CPG Research Gaps Categories	2. Gap Description/ Future Research Needed to:	3. Priority for Future Research (Rank 1 to 6)
A. Screening, Evaluation, Risk Determination, and Referral to Treatment	Develop more accurate screening methods to identify patients at-risk for suicide and improve risk stratification methods to facilitate appropriate referral to treatment	Rank
B. Risk and Protective Factors	Broaden/deepen investigations of risk and protective factors associated with suicide-related behaviors	Rank
C. Non-pharmacologic Interventions	Understand the effectiveness of behavioral and other non-medication-based treatments for suicide-related behaviors	Rank
D. Pharmacologic Interventions	Understand the effectiveness of medication-based treatments (e.g., anti-depressant, anti-anxiety medications)	Rank
E. Community-based Interventions	Test the effectiveness of community-based interventions on individual-level (e.g., peer to peer programs) and on population-level risk (e.g., media campaigns)	Rank
F. Post-acute Care Approaches	Determine the best methods for following up with individuals post-hospitalization or emergency department visit (e.g., post-discharge care, follow-up plan)	Rank

Stakeholder Feedback

Please share any comments or suggestions about this process (e.g., the materials, methods, stakeholder rating form, method of delivery, etc.).

Comments:

Additionally, please feel free to suggest research gaps or questions that were not included in the attached materials.

Recommended research:

Finally, we would appreciate it if you could provide some very brief demographic information about yourself so that we can summarize the range of subject matter expertise that contributed to this prioritization of gaps.

1. Name, Affiliation, Title/Role: Name, Affiliation

2. Had you been involved in research on military or veteran suicide prior to your current work? Yes/No
3. In which professional capacity have you been involved in suicide issues? (please select all that apply):
   - ☐ Clinical
   - ☐ Research
   - ☐ Policy
   - ☐ Funding
   - ☐ Other: _____
4. Have you ever served in the U.S. military? Yes/No
5. Do you plan to apply for any DoD or VA funding for suicide research in the next several years? Yes/No

Thank you very much for sharing your expertise.