QUERI

An Evidence Map of the Women Veterans' Health Research Literature (2008 – 2015)

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PREFACE

The VA Evidence-based Synthesis Program (ESP) was established in 2007 to provide timely and accurate syntheses of targeted healthcare topics of particular importance to clinicians, managers, and policymakers as they work to improve the health and healthcare of Veterans. QUERI provides funding for four ESP Centers, and each Center has an active University affiliation. Center Directors are recognized leaders in the field of evidence synthesis with close ties to the AHRQ Evidence-based Practice Centers. The ESP is governed by a Steering Committee comprised of participants from VHA Policy, Program, and Operations Offices, VISN leadership, field-based investigators, and others as designated appropriate by QUERI/HSR&D.

The ESP Centers generate evidence syntheses on important clinical practice topics. These reports help:

- Develop clinical policies informed by evidence;
- Implement effective services to improve patient outcomes and to support VA clinical practice guidelines and performance measures; and
- Set the direction for future research to address gaps in clinical knowledge.

The ESP disseminates these reports throughout VA and in the published literature; some evidence syntheses have informed the clinical guidelines of large professional organizations.

The ESP Coordinating Center (ESP CC), located in Portland, Oregon, was created in 2009 to expand the capacity of QUERI/HSR&D and is charged with oversight of national ESP program operations, program development and evaluation, and dissemination efforts. The ESP CC establishes standard operating procedures for the production of evidence synthesis reports; facilitates a national topic nomination, prioritization, and selection process; manages the research portfolio of each Center; facilitates editorial review processes; ensures methodological consistency and quality of products; produces "rapid response evidence briefs" at the request of VHA senior leadership; collaborates with HSR&D Center for Information Dissemination and Education Resources (CIDER) to develop a national dissemination strategy for all ESP products; and interfaces with stakeholders to effectively engage the program.

Comments on this evidence report are welcome and can be sent to Nicole Floyd, ESP CC Program Manager, at Nicole.Floyd@va.gov.

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EXECUTIVE SUMMARY

INTRODUCTION

Women currently comprise approximately 10% of all living US Veterans. This proportion is projected to rise to 15% by 2035 as the number and proportion of women serving in the US Military continues to increase. The demographics and life experiences of women Veterans are distinct from those of both non-Veteran women and male Veterans. Consequently, women Veterans face multiple unique health and healthcare concerns that were historically underserved by the Veterans Health Administration (VHA). In the past several decades, the provision of high-quality, evidence-based, accessible healthcare for women Veterans has become an increasingly vital strategic priority within VA. A growing body of literature addresses the health and healthcare concerns of women Veterans. The VA Women's Health Research Network, established in 2010, seeks to systematically improve women's healthcare and reduce sex/gender disparities by filling critical knowledge gaps in the evidence base related to women Veterans' health and healthcare needs.

Previous reviews have identified the literature related to women Veterans' health published through 2008. We created an evidence map of the literature published from 2008 through 2015. Topic stakeholders were interested in a broad overview of the growth and depth of research on health and healthcare for women Veterans. We framed our evidence map around healthcare topics of interest according to key study characteristics in order to facilitate planning of future VA research, policy, and clinical activities in women Veterans' health. The population of interest was US women Veterans. We included all interventions, comparators, outcomes, and settings. Due to the breadth of research included, we did not extract, evaluate, or present study findings.

METHODS

Data Sources and Searches

We searched MEDLINE (Ovid), CINAHL, and the HSR&D database for articles published between 2008 and December 2015. The search included the MeSH terms Women; Women's Health; Women's Health Services; Veterans; Veterans Health; and Hospitals, Veterans.

Study Selection

Our exclusion criteria were as follows:

- Studies that were not relevant to health/ healthcare
- Studies that did not include women US Veterans
- Studies that only included active duty members of the military
- Case reports, letters, meeting abstracts, dissertations, editorials, narrative or systematic reviews, conceptual frameworks, and protocols
- Studies that included a very small proportion or absolute number of women Veterans
    - If total n < 100, excluded if proportion women < 10%
    - If total n = 100-1000, excluded if proportion women < 5%
    - If total n > 1000, accepted studies with any proportion of women
- Studies in which the proportion of Veterans is less than 75% and the article does not explicitly address the results of the study for Veterans

- Studies in which the proportion of women is less than 75% and the article does not explicitly address the results of the study for women

Abstracts (2,276) were independently reviewed by a trained investigator or research associate and 20% were dual-reviewed with good agreement. We excluded 1,092 studies at the abstract level. Full-text reports of 1,184 studies identified as potentially eligible were obtained for further review using the exclusion criteria described above. Each article was independently reviewed by an investigator or research associate and reasons for excluding a study at full-text review were noted. A second reviewer independently reviewed a random sample of studies and any additional studies that the original reviewer had questions about. If the 2 reviewers disagreed, a group arbitration system was used to determine eligibility.

Data Abstraction and Risk of Bias Assessment

Study characteristics (category of healthcare, study design, number of participants, proportion women, population characteristics reported, presence of special populations, follow-up/duration, research setting, use of administrative database, period of service, Veteran engagement, population, outcomes reported, and funding source) were extracted onto evidence tables by one investigator or research associate. Extraction was verified by a second researcher for a randomly selected 10% sample of included studies. Discrepancies were infrequent and when present were resolved by group discussion. To ensure consistency in selection of categories within a characteristic, a research associate independently evaluated all included studies in categories that were inherently subjective (particularly "other" categories) and these were then reviewed by a second researcher. The principal investigator also performed additional checks while summarizing the findings by extracted categories. We did not rate the risk of bias of individual studies.

Data Synthesis and Analysis

We summarize studies by category of healthcare, study design, year of publication, sample size, proportion of women in the study sample, and funding source. We did not analyze strength of evidence. We present our analysis as a map of the existing body of literature without commenting on the results or findings of individual studies.

RESULTS

Results of Literature Search

We reviewed 2,276 abstracts: 2,125 from MEDLINE, 65 from CINAHL, and 86 from the HSR&D database. We excluded 1,092 abstracts and reviewed the full-text of 1,184 references. During full-text review we excluded 750 articles leaving 434 eligible for inclusion. In addition, we reviewed the original studies cited in 11 systematic reviews and identified 5 references that were eligible but not identified by our literature search. During peer review of the draft of this report, one more reference was identified. The total number of included references was 440.

Overview of Extracted Data

With input from the topic stakeholders, we established 36 healthcare categories of interest (Executive Summary Table 1). Each included study was designated by one primary category.

For studies that crossed multiple healthcare categories, we attempted to identify the primary focus of the study and categorize it under a single topic. If a study clearly did not belong to a single category, it was placed in one of 3 "multiples" categories. The 3 "multiples" categories are distinct from the 3 "Other" categories (Other Mental Health Topics, Other Medical Conditions, and Other), which were reserved for single-topic studies that did not fit into any of our identified categories.

Studies of prevention or screening were categorized as Prevention/Screening rather than by medical condition. Similarly, studies that related to medical or mental health topics but primarily addressed issues of healthcare organization and delivery, access and utilization, homelessness, or post-deployment health were placed in the latter groupings.

Summary of Results

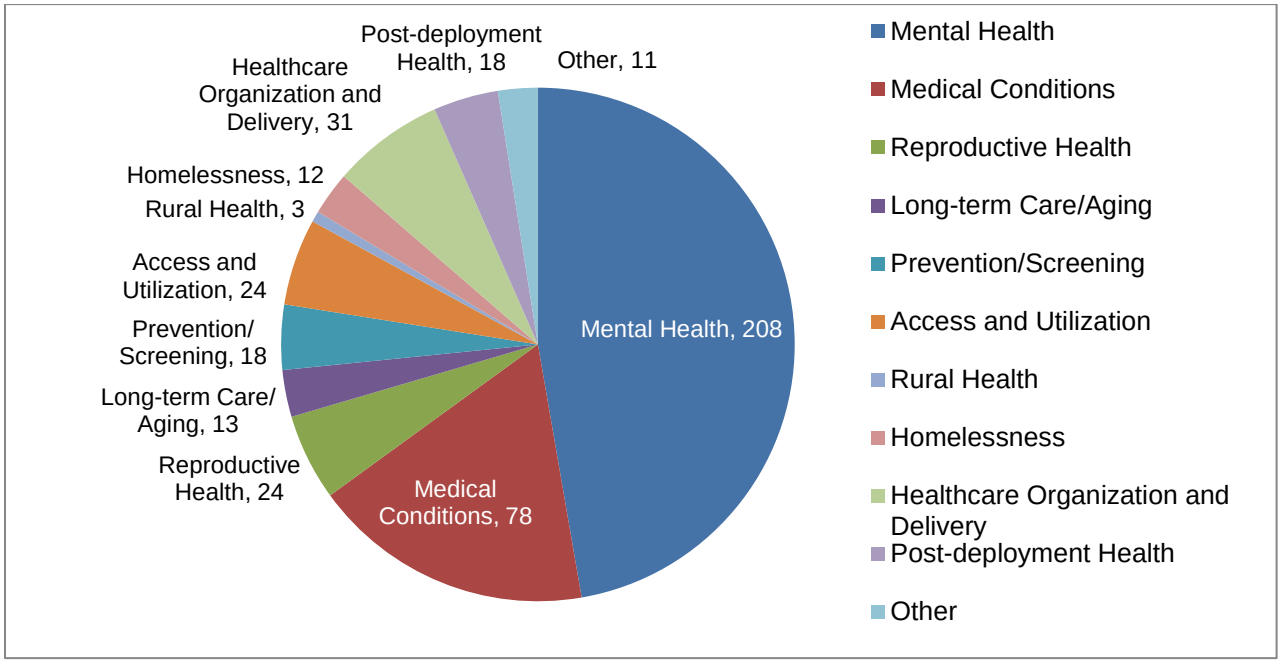
Of the studies identified in our search, most related to mental health (208/440 studies, 47%) or medical conditions (78/440 studies, 18%) (Executive Summary Table 1, Executive Summary Figure 1).

Executive Summary Table 1. Healthcare Categories

Healthcare Category		Number of Studies[a]
Mental Health **Total: 208 articles**	PTSD and trauma	71
	Military sexual trauma	37
	Substance abuse	20
	Depression and anxiety	4
	Suicide	13
	Intimate partner violence	9
	Disordered eating	5
	Reproductive mental health	4
	Serious mental illness	3
	Personality disorders	0
	Other mental health topics	3
	Multiple mental health diagnoses	16
	Mental health comorbid with non-mental health	23
Medical Conditions **Total: 78 articles**	Cardiovascular disease	11
	Obesity	9
	Chronic pain	7
	Cancer	6
	Traumatic brain injury	5
	HIV/AIDS	5
	Tobacco	6
	Multiple sclerosis	4
	Diabetes	3
	Spinal cord injury	1
	Traumatic amputations	1
	Hypertension	0
	Comorbid medical conditions	7
	Other medical conditions	13
Reproductive Health		24
Long-term Care/Aging		13
Prevention/Screening		18
Access and Utilization **Total: 24 articles**	Barriers and facilitators of care	13
	Healthcare utilization	11
Rural Health		3
Healthcare Organization and Delivery **Total: 31 articles**	Comprehensive and primary care delivery	16
	Mental healthcare delivery	9
	Emergency care delivery	3
	Virtual or telehealth care delivery	3
Homelessness		12
Post-deployment Health		18
Other		11
TOTAL NUMBER OF INCLUDED STUDIES		440

[a] Each study included once

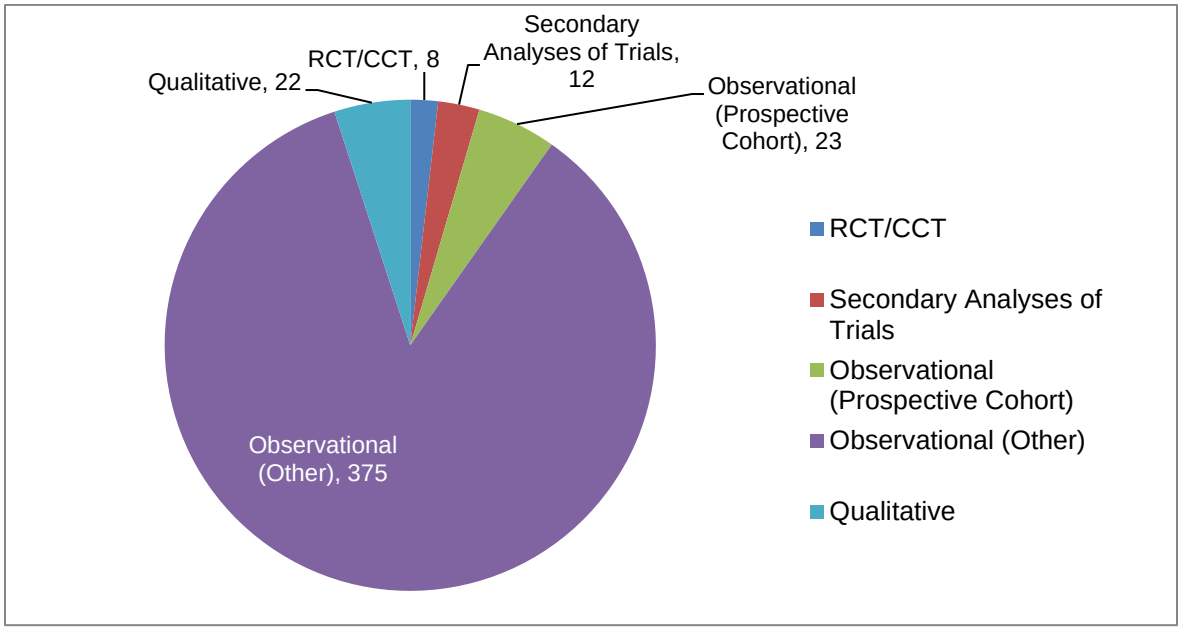
Executive Summary Figure 1. Healthcare Categories[a]



[a] Values on pie chart are numbers of articles

Among eligible studies there were few randomized controlled trials or controlled clinical trials (RCTs/CCTs) (8/440 studies, 2%) or secondary analyses of trials (12/440 studies, 3%) (Executive Summary Figure 2). Five percent of studies (23/440) were prospective cohort studies and 85% (375/440) were other observational studies including retrospective cohort, case-control, cross-sectional, and survey studies. The final 5% (22/440) were qualitative studies.

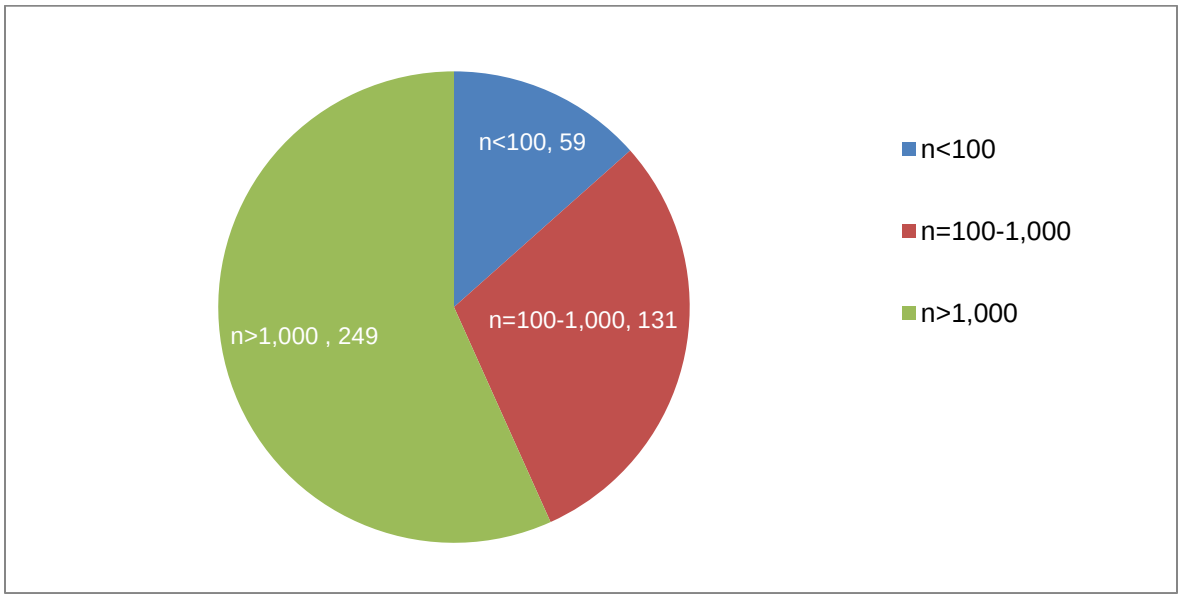
Executive Summary Figure 2. Study Designs[a]



[a] Values on pie chart are numbers of articles

The majority of studies had over 1,000 participants (Executive Summary Figure 3). Of the 249 studies with over 1,000 participants 177 (71%) were administrative database studies.

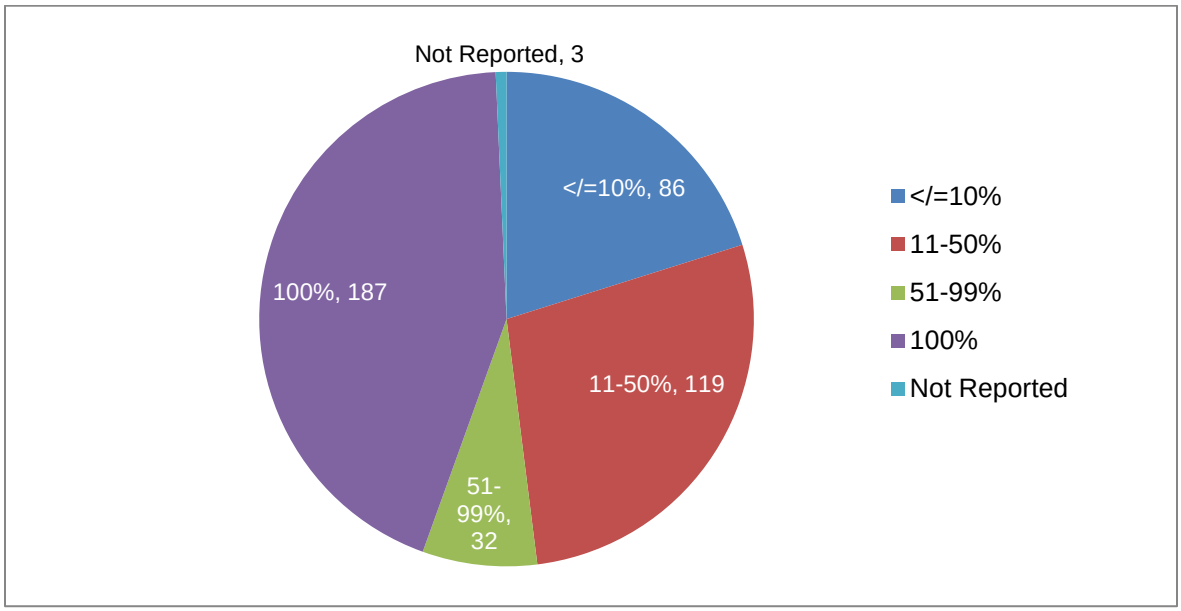
Executive Summary Figure 3. Number of Participants[a]



[a] Values on pie chart are number of articles

In the 427 studies of Veterans and/or non-Veterans as study subjects, we documented the proportion of women (Executive Summary Figure 4). The remaining studies enrolled clinicians or administrators as participants (*eg*, a survey of VHA emergency department directors focused on capacity to meet the needs of women Veterans).

Executive Summary Figure 4. Proportion of Women[a]

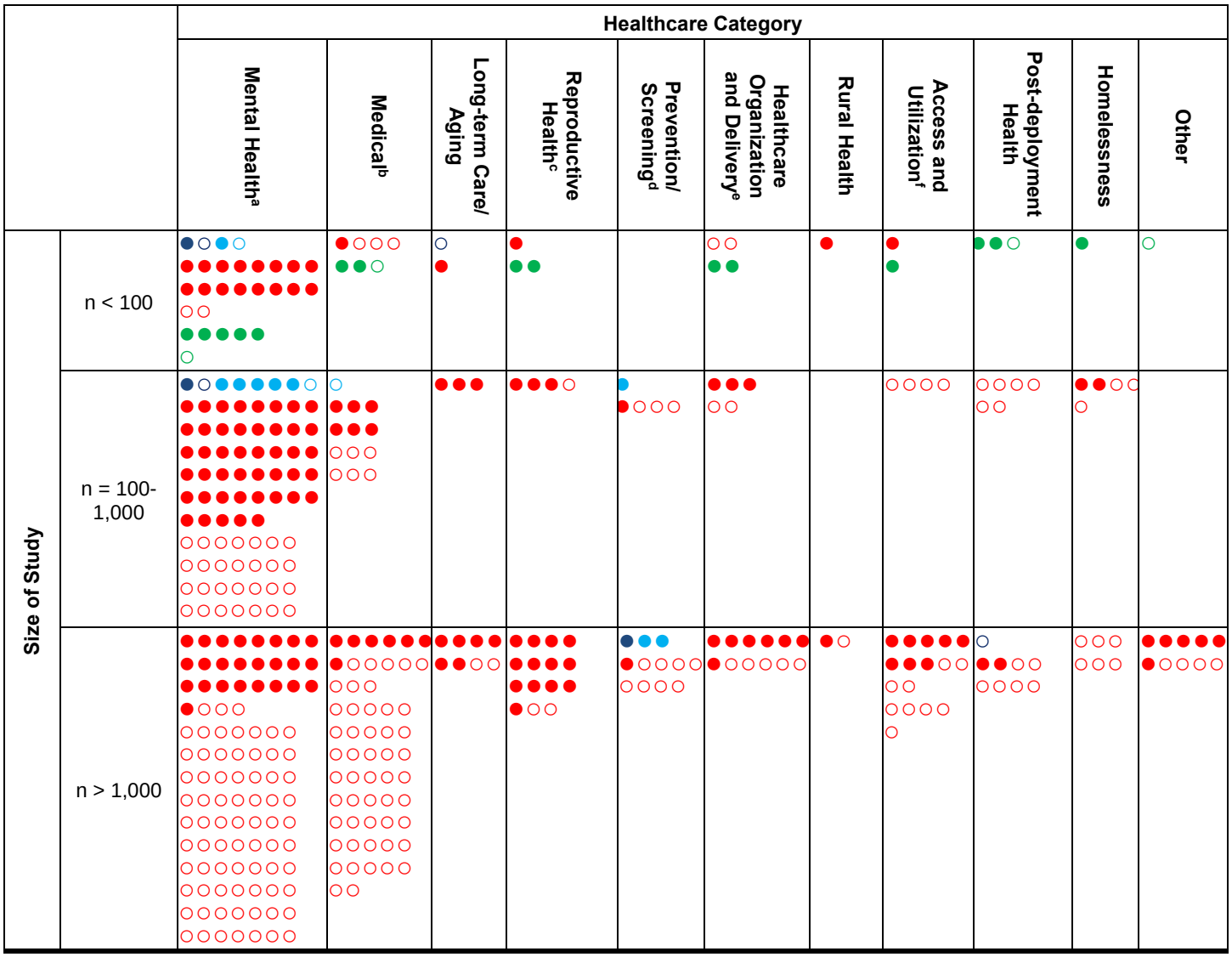


[a] Values on pie chart are number of articles

A summary of the results is presented in Executive Summary Figure 5. Appendix C Tables 1-3 and Figures 1-2 provide more detail. In Executive Summary Figure 5, each dot represents one

study. Studies are categorized by healthcare category (columns) and sample size (rows). The color of the dot indicates the study design (see Figure footnotes). A filled dot indicates that the study enrolled only women; an open dot indicates that the study enrolled fewer than 100% women.

Executive Summary Figure 5. Overview of Included Studies by Healthcare Category, Study Sizes, Study Design, and Proportion of Women



●○ Dark Blue = RCT/CCT; ●○ Light Blue = Secondary Analysis of RCT/CCT; ●○ Red = Observational Study; ●○ Green = Qualitative Study; ● 100% women; ○ < 100% women

[a] One additional observational study of facilities; size of study and % women not applicable

[b] One additional observational study with n > 1,000; % women not reported

[c] Two additional observational studies with n = 100-1,000; % women not applicable

[d] One additional observational study with n < 100; % women not applicable

[e] 10 additional studies: % women not applicable for1 RCT/CCT (n = 100-1,000), 5 observational studies (2 with n = 100-1,000, 3 with n < 100) and 3 qualitative studies (all n < 100); % women not reported for 1 observational study (n > 1000)

[f] One additional observational study with n > 1,000; % women not reported

DISCUSSION

Key Findings

- Nearly half of the included studies were related to mental health. Other specific health conditions or categories were noted in fewer than 10% of studies.

- More than 90% of studies were observational; we identified 8 (2%) RCTs or CCTs and 12 (3%) secondary analyses of trials.

- Of 6 key topic areas established at the 2010 VA Women's Health Services Research Conference, dramatic growth in the number of publications was noted for 4 areas:
  - Access to Care and Rural Health
  - Post-deployment Health
  - Reproductive Health
  - Mental Health

- Two key areas did not much increase in publications: primary care and prevention (except a subtopic area: organization and delivery of primary and comprehensive care for women Veterans) and complex chronic conditions/long-term care and aging

- Future directions for women Veteran's research include:
  - Capturing on-going research by reporting outcomes specifically for women Veterans in studies that include both Veterans and non-Veterans
  - Expanding research to address social and cultural shifts within the US military including vulnerable populations and the expanding role of women in combat
  - Engaging Veterans in research
  - Expanded, in-depth reviews of specific topics (*eg*, military sexual trauma, integration/coordination or mental healthcare with primary care, multimorbidity or primary care for racial/ethnic or sexual/gender minority women Veterans, post-deployment health, reproductive health, delivery of care for women Veterans)

This evidence map organizes and describes the broad field of research related to women Veterans' health published between 2008 and 2015. In the past 8 years, this literature base has grown and developed substantially. In 2010, Bean-Mayberry and colleagues published a systematic review of the women Veterans' health research completed between 2004 and 2008. Their review, presented at the 2010 VA Women's Health Services Research Conference, helped outline the existing knowledge gaps and develop directions for future research. In July-August 2011, Women's Health Issues devoted an entire supplemental issue to women Veterans' health and the outcomes of that conference, including an article by Yano et al that set forth an ambitious research agenda. The VA Women's Health Research Network has worked to support and advance this agenda. Whereas many independent researchers from both in and outside of VA contribute to the overall research base in this broad field, our analysis confirms a significant shift in topics and increase in research since 2011.

Advances in Key Research Priorities

The 2010 VA Women's Health Services Research Conference resulted in the development of a research agenda with 6 key topic areas. The link between these key topic areas and the healthcare categories we used to create this evidence map is presented in Executive Summary Table 2. The 6 key topic areas for future research were defined as:

- Access to care and rural health
- Primary care and prevention
- Mental health
- Post-deployment health
- Complex chronic conditions/aging and long-term care
- Reproductive health.

An additional overarching goal was to begin transitioning from observational studies to interventional research. Cross-agency partnerships and collaborations were sought to help expand financial and intellectual resources for women's health research.

Priority Topics

Of these 6 key topic areas, 4 (and a subsection of a fifth) have advanced considerably in the last 8 years. Three small areas, access to care and rural health, post-deployment health, and reproductive health, have grown dramatically in number of publications, with total counts rising up to seven-fold from the first half of our review period to the second half. The largest topic area, mental health research (particularly that related to PTSD and MST), has not only grown in numbers, but has also recently begun to shift from entirely observational to include a few interventional studies. Within the broad area of primary care and prevention, the subsection of research specifically related to the organization and delivery of primary and comprehensive care for women Veterans (categorized under Healthcare Organization and Delivery for the purposes of this evidence map), has also advanced considerably in both publication numbers and scope, including several qualitative studies and an RCT.

Executive Summary Table 2. Mapping of Strategic Priority Areas with Evidence Map Health Care Categories

Women's Health Research Network Strategic Priority Areas	Evidence Map Healthcare Categories
Access to Care and Rural Health	Access and Utilization *Barriers and Facilitators of Care* *Healthcare Utilization* Rural Health
Primary Care and Prevention	Prevention/Screening Obesity Hypertension Tobacco Comorbid Medical Conditions Cancer Other Medical Conditions Healthcare Organization and Delivery *Comprehensive and Primary Care Delivery* *Virtual or Telehealth Care Delivery*
Mental Health	PTSD and Trauma Military Sexual Trauma Substance Abuse Depression and Anxiety Suicide Intimate Partner Violence Disordered Eating Reproductive Mental Health Serious Mental Illness Personality Disorders Other Mental Health Topics Multiple Mental Health Diagnoses Mental Health Comorbid with Non-mental Health Healthcare Organization and Delivery *Mental Healthcare Delivery*
Post-deployment Health	Post-deployment Health (includes readjustment, resilience, and well-being)
Complex Chronic Conditions/Aging and Long-term Care	Long-term Care/Aging (includes osteoporosis and dementia) Homelessness Diabetes Cardiovascular Disease Chronic Pain Spinal Cord Injury (SCI) Traumatic Brain Injury (TBI) Traumatic Amputation Multiple Sclerosis HIV Healthcare Organization and Delivery *Emergency Care Delivery*
Reproductive Health	Reproductive Health
	Other

Priority Populations

Research addressing priority populations has also increased substantially over the past 8 years. Returning Operation Enduring Freedom/Operation Iraqi Freedom/Operation New Dawn (OEF/OIF/OND) Veterans have dramatically shifted the demographics of current US Veterans, particularly for women. Over one-fifth of the articles included in this review specifically targeted Veterans from OEF/OIF/OND or the Persian Gulf conflicts and three-quarters of those studies were published since 2012. We also identified studies of potentially vulnerable sub-populations of women Veterans, including sexual and gender minorities, racial and ethnic minority, and homeless Veterans and found that the majority of those studies were published since 2012.

Research Funding

The majority of included studies (302/440 studies, 69%) reported at least some VA funding. Only a small proportion of studies (94/440 studies, 21%) reported at least some non-VA governmental funding sources such as Department of Defense (DoD) or National Institutes of Health (NIH). However, the number of studies funded by these sources rose steadily throughout the study period. Notably, these funding sources accounted for 4 of the 8 randomized trials we identified.

Shortfalls and Limitations of the Literature

Gaps within Specific Healthcare Topics

Despite the advances in 4 of 6 priority topic areas noted above, 2 of the key areas identified within the future research agenda have failed to show significant growth: (1) primary care and prevention and (2) complex chronic conditions/long-term care and aging. These topic areas were initially difficult to identify within the literature, as most studies about medical conditions could not be clearly classified using these categories. Ultimately, we separated the articles specifically related to prevention, long-term care, or aging from those related to primary care and complex chronic conditions. The number of studies related to prevention and screening or long-term care and aging either remained steady or fell throughout the study period. Aside from the subsection of primary care articles devoted to the organization and delivery of healthcare, whose impressive growth was described above, relatively little research has been devoted to the vast array of medical conditions, specifically chronic diseases that affect women Veterans (*eg,* diabetes, hypertension, chronic pain). There were no randomized trials and few qualitative studies related to medical conditions. In addition, although the field of mental health research continues to grow, studies with primary focus on mental health topics most often encountered by primary care providers, including depression, anxiety, and postpartum depression, were largely absent from the literature.

Shortfalls in Study Design and Presentation

The most obvious study design limitation of the literature base identified in this review is the very small number of experimental studies. We identified only 8 controlled intervention trials over the course of 8 years that related to women Veterans, and 2 of these had already been described in the previous review. Only half of the 8 RCTs were VA-funded and only 3 took place at multiple VA sites.

Another limitation noted in our review was the proportion of studies that address women Veterans solely in comparison to male Veterans. Describing differences or disparities between female Veterans and the remainder of the largely male VA population has been a necessary initial step in establishing this field. Looking forward, however, we encourage further study of the broad range of patient demographic, health condition, and social determinant characteristics that exists within the population of women Veterans. For example, comparing racial or socioeconomic subgroups of women Veterans across or within health conditions may help identify or describe needs of particularly vulnerable populations. This approach parallels that endorsed by the NIH's Office of Research on Women's Health 2010 strategic plan for women's health research. Expanding the outcomes of interest beyond gender differences and disparities will further advance women Veterans' health research.

Finally, a notable finding in our review was the large proportion of studies (1 in 5) that did not report a source of funding. This was a particular problem for the growing categories of post-deployment health and homelessness. Reporting the source of funding and role of the funder is considered a quality standard for both experimental (CONSORT – CONsolidated Standards Of Reporting Trials) and observational (STROBE – Strengthening the Reporting of Observational Studies in Epidemiology) research studies. Though it is possible that much women Veterans' health research remains unfunded, only a small number of studies specifically identified an absence of funding. Far more studies simply did not address funding source within the text. This is an easily remedied shortfall that will strengthen the quality of the research base while providing information for stakeholders reviewing current and potential sources of funding to expand women Veterans' health research.

Future Directions

Capturing Ongoing Research

One of the initial limitations we encountered in developing this literature map was the large quantity of published articles that included women Veterans but did not provide explicit outcome results for women Veterans (instead providing results only for the complete study population). In this situation, study results cannot be directly interpreted and applied by women Veterans' providers and researchers. In fact, we identified over 350 articles that included women Veteran study subjects but were excluded from this review because sex-specific results were not reported. This number approaches the final quantity of included studies in the review. The need for sex-specific reporting of scientific research results has been recognized by both the NIH and the Institute of Medicine. Multiple challenges of sex-specific reporting with respect to study design, statistical analysis, and results reporting exist. Research related to Veterans, which often utilizes the national VA administrative databases, may be more likely to have the statistical power to report subgroup analysis by sex or gender than non-VA health research. Additionally, VA, as a source of research funding, may be positioned to require the inclusion of women and specific results-reporting for women in research studies. Women Veterans' health stakeholders should champion efforts to capitalize on the large body of research in which women Veterans are already participating.

Social and Cultural Transitions

Social and cultural shifts within both the US military and American society will also provide opportunities for expanded research related to women Veterans health. Notable examples include

experiences of LGBT Veterans following the end of the "Don't Ask, Don't Tell" policy (2011) and the more recent move to allow openly transgender service members (2016). The expanding role of women in combat following the lifting of the Combat Exclusion Policy (2013) may have significant implications for research related specifically to women with TBI, SCI, and amputations. Increased combat exposure may also result in a higher burden of and shift in the etiology of PTSD among women Veterans. Finally, a transition in the national discussion of sexual assault, including the proliferation of "Affirmative Consent" policies on college campuses, may filter into future research and policy related to Military Sexual Trauma, which has unfortunately affected so many women Veterans.

Veteran Engagement

VA is increasingly seeking to engage Veterans in research by including Veteran stakeholder perspectives in research processes such as development of study questions, selection of outcome measures, and interpretation of findings. None of our included studies described Veteran engagement as a component of their methods. Although several studies incorporated Veterans' perspectives (*eg*, qualitative input to improve an intervention), they all adhered to a traditional model in which the women were study subjects, rather than research stakeholders or partners.

Opportunities for Expanded Reviews

This broad evidence map identifies and describes 440 articles across 36 healthcare categories and 13 additional elements of study design and presentation. Advancing specific fields of research and the provision of quality healthcare to women Veterans will require additional in-depth reviews of study quality and bias, as well as a synthesis of outcomes, all of which were outside the scope of this review. This evidence map can be used to prioritize additional reviews and meta-analyses of specific determinants of or treatments for specific health conditions or populations.

Conclusions

We reviewed the recent published literature related to all topics in women Veterans' health. This large and varied body of research represents a growing evidence base that can be leveraged to improve the health of women Veterans. Though significant progress has been made toward achieving the ambitious research agenda set forth during the 2010 VA Women's Health Services Research Conference, we have identified several persistent knowledge gaps and research shortfalls. VA research and clinical stakeholders can use this evidence map to help direct the future of women Veterans health research.

ABBREVIATIONS TABLE

CCT	Controlled clinical trial
CINAHL	Cumulative Index to Nursing and Allied Health Literature
DoD	Department of Defense
HSR&D	Health Services Research and Development
LGBT	Lesbian, gay, bisexual, transgender
NIH	National Institutes of Health
OEF/OIF/OND	Operation Enduring Freedom/Operation Iraqi Freedom/Operation New Dawn
RCT	Randomized controlled trial
VA	Veterans Affairs