



Systematic Review of Women Veterans Health Research 2004-2008

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PREFACE

HSR&D's Evidence-based Synthesis Program (ESP) was established to provide timely and accurate syntheses of targeted healthcare topics of particular importance to VA managers and policymakers, as they work to improve the health and healthcare of Veterans. The ESP disseminates these reports throughout VA.

HSR&D provides funding for four ESP Centers and each Center has an active VA affiliation. The ESP Centers generate evidence syntheses on important clinical practice topics, and these reports help:

- develop clinical policies informed by evidence,
- the implementation of 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.

In 2009, an ESP Coordinating Center was created to expand the capacity of HSR&D Central Office and the four ESP sites by developing and maintaining program processes. In addition, the Center established a Steering Committee comprised of HSR&D field-based investigators, VA Patient Care Services, Office of Quality and Performance, and VISN Clinical Management Officers. The Steering Committee provides program oversight and guides strategic planning, coordinates dissemination activities, and develops collaborations with VA leadership to identify new ESP topics of importance to Veterans and the VA healthcare system.

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

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INTRODUCTION

BACKGROUND

Women are playing an ever increasing role in the US military, representing about 15% of active military personnel, 17% of reserve and National Guard forces, and 20% of new military recruits. Concurrently, women are one of the fastest growing groups of new users in the Department of Veterans Affairs (VA) Healthcare System, with particularly high rates of utilization among veterans of Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF). Of the more than 100,000 OEF/OIF women veterans, over 44% have enrolled in the VA system for health care². Thus, women veterans represent an integral part of the veteran community.

Women's military experiences and responses to their military experiences are often distinct from those of men, and these differences can affect both their health status and their health care needs as active duty personnel and as veterans. This, together with the rise in the number of women veterans in the VA system, calls for increased understanding of women veteran health issues and areas of potential knowledge deficit in order to guide VA care and VA research efforts. The body of research literature dedicated to women veterans and women's military health and health care issues has significantly grown and expanded in size and scope since the publication of the first systematic review of women veterans research¹. This project updated that review by examining the literature on women veterans' health and health care from 2004 to 2008.

METHODS

TOPIC DEVELOPMENT

This project was nominated by Linda Lipson, HSR&D Equity Portfolio Manager, and the Office of Women's Health.

Because of the broad survey nature of this synthesis, no key questions were developed.

SEARCH STRATEGY

We searched MEDLINE/PubMed, PsycINFO, WorldCat and Web of Science for potentially relevant articles related to women veteran and military health published between January 2004 and September 2008. For each database search, we used the medical subject heading (MeSH) terms *women* and *veterans* to search for relevant literature. We supplemented this search by contacting other sources with expertise in the area of women veteran and military health. The Department of Defense Health Affairs Division provided access to bibliographical reports on general deployment and mental health issues in Operation Enduring Freedom and Operation Iraqi Freedom (OEF/OIF) military personnel from 2002 through 2007³. We received additional articles from a direct request to experts in the field via a VA research list service and personal contact with approximately 15 VA women's health researchers. We also identified additional articles by reviewing bibliographies from articles identified through our search. The search strategy is listed in Appendix 4.

STUDY SELECTION

All titles identified through our search were screened for relevance by the members of the team. Each article deemed potentially relevant was reviewed by two physician reviewers with backgrounds in women's health working independently (BB, FB, CH) using a standardized, one page screening form (Appendix 1) and these assessments were compared and reconciled. Disagreements in ratings were resolved through consensus resolution with the help of at least one senior member of the review team. To be included, articles had to meet criteria (a), plus at least one of criteria (b), (c), or (d). The criteria were: (a) study relates to U.S. veterans or military personnel; (b) study includes women veterans, compares men and women, or analyzes women separately; (c) study involves active duty military and involves a health condition or functional status that requires medical intervention; and (d) topic is relevant to VA healthcare or to how VA care is delivered to women (Appendix 3). An article was excluded if it was defined as a non-systematic review, editorial, commentary, or an unclear publication type.

DATA ABSTRACTION

After the initial screening process, articles meeting inclusion criteria were further evaluated and abstracted using a structured abstract form (Appendix 2). The following data were abstracted: year(s) of study or sampling timeframe; purpose of study, outcomes reported; study population description; whether the article was women-focused or had women as a subset population, or neither; brief summary of methods; and main findings. Additional data collected covered basic information about each article: study design, sample size (both female and male), study setting (from where the study population was drawn), military period of service studied (if specified), women's health research topic area, specific condition(s) studied and study funding.

QUALITY ASSESSMENT

For the few clinical trials identified, we used Jadad criteria for quality assessment⁴. For the descriptive studies, which are by far the largest number of studies, no simple standardized assessment of quality exists, and therefore, a quality assessment protocol is not included in this review.

DATA SYNTHESIS

We identified 5 key focus areas for the Women's Health Evidence Synthesis Project, using high priority areas identified by the 2004 review by Goldzweig and associates¹, and the VA Health Services Research and Development Service (HSR&D) funding priorities. The areas were the following:

- Deployment and post-deployment health
- Organizational research
- Quality of care
- Access to care and utilization
- Psychiatric conditions.

Below we briefly describe the relationship between these categories and those in the baseline

review. We then summarize the findings of articles in each of area and highlight their significance.

CROSS WALK BETWEEN BASELINE REVIEW AND UPDATED REVIEW

The baseline review grouped the available literature into four categories; the update review groups literature into 5 categories, reflecting the growth in the scientific literature in the areas of access, utilization, and quality of care. Figure 1 shows the cross walk between the categories for each review and provides explanatory notes.

Figure 1 Category Cross Walk

Categories in updated review (2004 – 2008)	Categories in baseline review (1978 - 2004)	Comments
Deployment and post-deployment health	Stress of military life	A substantial body of work now focuses on OEF/OIF veterans as well as on women's health issues in the theatre
Organizational research	Health services research	Formerly included in the general health services research category. More focused literature has emerged examining how organizational factors affect women's health care delivery environment and the overall practice environment
Quality of care	Health services research	The literature on quality of care is now substantially expanded, including patient perceptions of quality and satisfaction and general quality of care processes and outcomes
Access/utilization	Health services research; Health and performance of military or VA women	The new category reflects the volume of work on determinants of access/utilization especially for special cohorts of veterans
Psychiatric conditions	Psychiatric conditions; Health and performance of military or VA women	New work describes prevalence of mental health conditions in different settings and for different subgroups and addresses non-trauma related health problems

PEER REVIEW

A draft version of this report was sent to seven peer reviewers, of which five responded. Their comments and our responses are presented in Appendix 10.

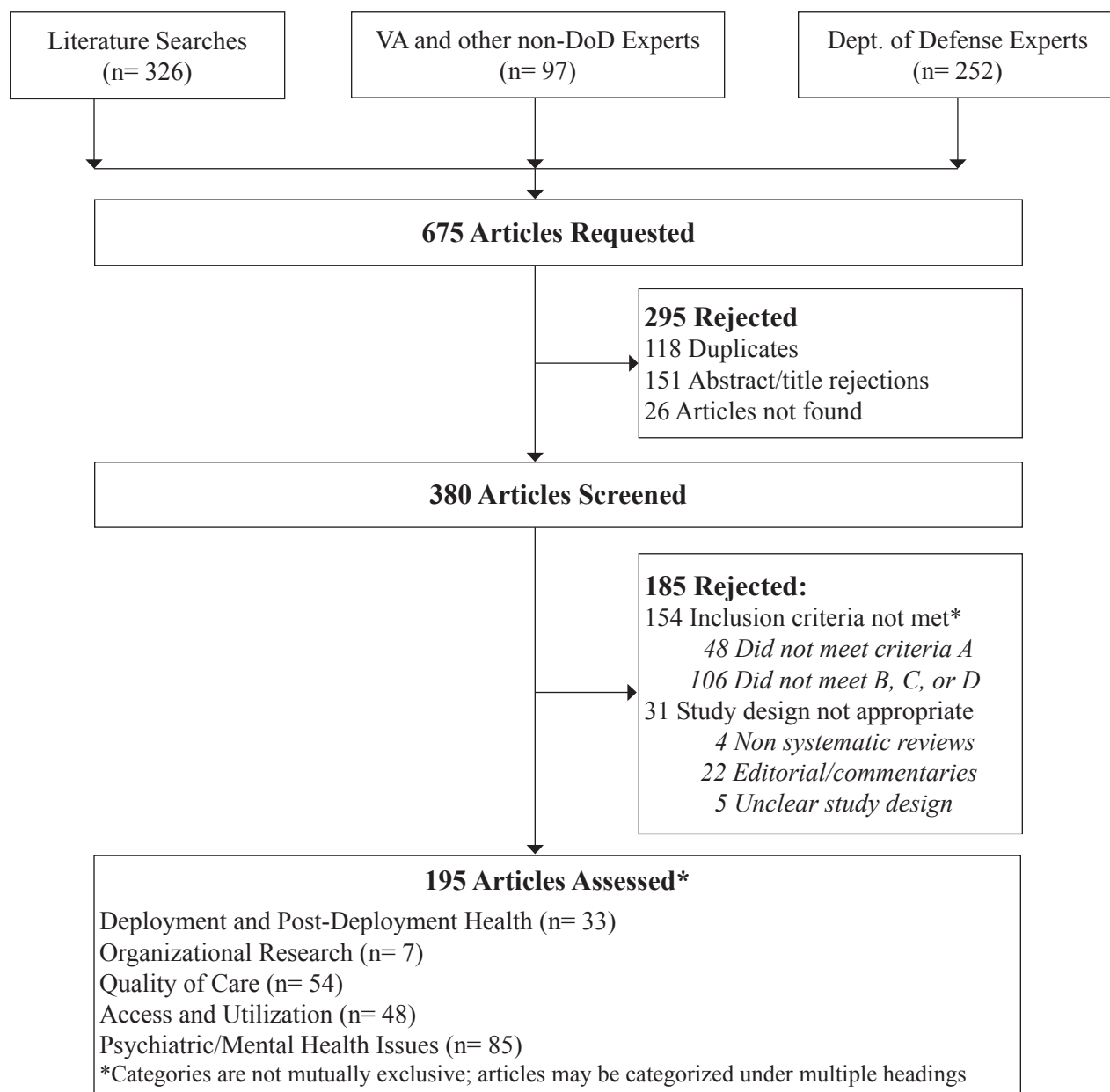
RESULTS

LITERATURE FLOW

Our search identified 675 titles of potential relevance. Of these titles, 118 were duplicate references to a study, 151 were rejected as not being relevant to the topic, and 26 could not be retrieved. Of the remaining 380 articles that were evaluated as full-text articles by at least two physician reviewers independently, 154 were rejected because they did not meet our inclusion criteria; 48 did not relate to U.S. veterans or military personnel; and 106 failed to meet at least one of the following additional criteria. Thirty-one articles were excluded because the study design was not appropriate: 4 articles were non-systematic reviews, 22 were editorials or commentaries, and 5 articles had unclear design.

Further data abstraction was performed on the remaining 195 articles, and all were categorized into the following 5 areas, which were not mutually exclusive: deployment and post-deployment health issues (n=33); organizational research (n=7); quality of care (n=54); access and utilization (n=48); and psychiatric conditions (n=85) (See Figure 2).

Figure 2 Literature Flow



DESCRIPTION OF EVIDENCE

As in the baseline systematic review¹, the majority of articles discussed observational or descriptive studies. Nearly half of the research articles focused on psychiatric issues (e.g., screening for mental health conditions or for post traumatic stress disorder (PTSD)).

Only five studies were identified as experimental studies or clinical trials. Of these, three focused on women veterans or military personnel with PTSD diagnosis or symptoms⁵⁻⁷, one on VA employees' perceptions about women veterans⁸ and one on improving mammography screening among women veterans⁹. Compared to the initial systematic review, these trials highlight a few key advances in methods by including the first VA multi-site randomized controlled trial on women veterans using the cooperative study program, and a moderately large sized mental health patient sample (N=284)⁶.

Due to the broad scope of research contained in this report, each study has to be interpreted subject to its own limitations, and it is not feasible to include all the caveats and constraints within this document. Before citing specific findings, the reader should refer to the source article to understand the context of the research methods and findings.

DEPLOYMENT AND POST-DEPLOYMENT HEALTH

Thirty-three articles covered deployment and post deployment-health issues, with the majority of studies (n=23) addressing health issues specific to OEF/OIF veterans¹⁰⁻³². The OEF/OIF topics focused on mental health screenings, general women's deployment health issues, validation of the deployment risk and resilience inventory (DRRI), and psychiatric diagnoses associated with medical evacuation from the combat theatre. The remaining articles consisted of deployment studies in non-OEF/OIF cohorts (n=10)³³⁻⁴².

Studies Specific to OEF/OIF

Twenty-three studies addressed post-deployment health issues specific to OEF/OIF veterans; most focused on general mental health screening/utilization, PTSD symptoms, or access to services while deployed or upon return post-deployment.

Mental Health Screening and Utilization

The bulk of articles focused on mental health issues and OEF/OIF deployment. In this group (n=14), the majority of studies focused on mental health screening before, during, or after deployment among military personnel or recently returning veterans^{10-13, 15, 17, 20-25, 27, 28}. Four themes are prominent in these studies: (1) high rates of screen positive PTSD symptoms (range 10-19%)^{10, 11, 13, 15, 23, 28} or other mental health disorders^{11, 12, 15, 17, 20-22, 24, 28} occur among OEF/OIF returning military women; (2) women in the military who recently returned from OEF/OIF deployments are disproportionately or more affected by symptoms of PTSD, symptoms of depression, other mental health issues or more likely referred for mental health care compared with men in the military who were recently deployed^{11, 20, 22, 28}; (3) younger age and separated or divorced marital status tend to place military members at risk for more mental health symptoms^{21, 22, 25}; and (4) a greater number of OIF deployments appears to be associated with screening positive for mental health problems^{17, 20, 22}.

PTSD Symptoms in OEF/OIF

Two studies assessed general assault history or Military Sexual Trauma (MST) history^{10, 16}. The first by Smith and associates identified a doubled rate of new onset PTSD symptoms among combat military women (22% vs 10%) who had been exposed to assault prior to combat vs not, and also among military men (12% vs 6%)¹⁰. The second by Katz et al evaluated a small group of women (n=18) previously deployed who were referred for mental health care and compared their readjustments to civilian life and experiences in war compared with men. Over half the group (56%) were identified as having a MST history, based on a 3-item screen¹⁶. The two major study findings were that (1) of three types of events (MST, being injured, and witnessing others injured or killed), only MST was significantly related to the severity of clinical symptoms and difficulty with readjustment to civilian life, and (2) women who had MST had more symptoms and more difficulties with readjustment to civilian life than those without MST.

Access to Services

A salient finding by Seal and associates related to managing mental health symptoms and diagnoses was that mental health visits occurring within 90 days of screening were more likely to occur in veterans seen in VA community clinics versus the medical center (aOR 6.08; 95%CI 1.56, 23.6) or seen in any VA primary care clinic compared with other VA outpatient settings (aOR 19.4; 95%CI 1.30, 290)²⁴. One small study captured potential barriers to mental health treatment reported by OIF National Guard soldiers, including stigma associated with seeking mental health treatment, pride, not being able to ask for help, and not being able to admit to having a problem²⁷.

Two additional studies analyzed the psychiatric diagnoses associated with medical evacuation from the theatre of combat^{18, 19}. Stetz et al. analyzed the characteristics and diagnoses of medical evacuees from combat theatres during 2001-2003¹⁸. Women represented 16 and 18% of OIF and OEF evacuees respectively, and psychiatric diagnoses were the 2nd most common reason for evacuation from OEF and the 4th most common reason in OIF for the group overall. Rundell et al. found that psychiatric evacuees were more likely to be women, African-American or Hispanic, under the age of 31, and enlisted in the National Guard Reserve, as opposed to active duty military¹⁹. The most compelling finding was that women were overrepresented as psychiatric evacuees by a factor of 2.

A single study by Pierce on pregnant women³² with recently deployed partners showed that these women often reported higher stress levels than those with homeland partners (39.6% and 24.2%; p<0.01). Regression analyses revealed that having a partner deployed, being active duty, advanced gestational age, and having >1 child at home (OR 2.30, 95% CI 1.12-4.73) all predicted higher stress reporting. However, having a support person present was protective against stress (OR 0.40, 95% CI 0.20-0.78). These data included both military and nonmilitary pregnant women living on base and obtaining obstetric care at Naval Hospital.

General Deployment Health Issues

Two studies focused on military women in the field of duty^{29, 30}. The Farley and colleagues document the number of gynecologic visits to a far forward combat support

hospital at Bagram Air Force Base in Afghanistan compared with transport out of the regional area to Germany and the average number of work hours lost²⁹. Over 90% of women (57 of 62) were seen in theatre at the Air Force Combat Support Hospital (CSH). Most patients had abnormal cervical cytology and colposcopies; other diagnoses included pregnancy, dysfunctional uterine bleeding and pelvic pain. The average work time loss during in theatre treatment was 6 woman-hours per patient compared with 216 hours per patient with travel to Germany. This paper underscores the benefits of providing far forward gynecology care (or gender-specific care) in the theatre of operations in order to maintain military readiness.

The second study by Thomson and colleagues anonymously surveyed women in the military deployed to Iraq or Kuwait for at least 3 months to assess their perceptions of health care delivery in OIF at the front line and aid stations³⁰. Irregular bleeding (26%) and changes in hormonal contraception (23%) were the most common complaints among soldiers. Additionally, 21% of soldiers experienced some type of gynecological problem, and nearly one-half of patients (44%) did not meet the cervical cytology screening practice guidelines.

These studies highlighted the need to (1) complete routine gynecological screening at least 6 months before deployment to account for any abnormal results and allow for follow up, (2) educate non-gynecologic medical personnel on gender-specific issues, especially related to cycle control and contraception, and (3) provide at least a 3 month and preferably 6-12 month supply of hormonal contraception for women deployed. Each of these issues affects the military readiness of women soldiers.

Deployment Risk and Resilience Inventory

A single study by Vogt and associates validated 9 scales of the Deployment Risk and Resilience Inventory (DRRI) among a sample of OIF active duty soldiers who participated both before and after deployment³¹. In general, all DRRI scales demonstrated reasonable to excellent values for internal consistency and reliability (coefficient alpha or cronbach's alpha ranged from 0.77 to 0.90) suggesting that the item sets converged on a common construct. Only one construct had a lower cronbach's alpha (alpha = 0.55), and it was related to post deployment life stressors. Significant gender differences emerged for 5 of the DRRI scales. Men reported greater exposure to combat and aftermath of battle and more often reported being well prepared for deployment, and women reported greater perceived threat and less preparedness for battle compared with the men.

Other Studies

The remaining studies covered a sundry of topics ranging from environmental and physical health exposures reported by veterans (e.g., burning of trash and feces in OIF, genito-urinary concerns)¹⁴, to case reports on the use of aripiprazole with sertraline or cognitive behavioral therapy for the treatment of PTSD symptoms such as sleep disorders in returning combat veterans²⁶.

General Deployment Issues - Non OEF/OIF

OEF/OIF deployment and mental health findings are described above in Studies Specific to OEF/OIF. The remaining ten deployment and mental health articles are not specific to the OEF/OIF cohorts³³⁻⁴². A study on Bosnian peacekeeping veterans showed that longer deployments and first time deployments were associated with increased distress scores for male soldiers specifically; longer deployments did not show this effect in women veterans³³. Among a sample of Vietnam veteran females, those who had a history of PTSD symptoms were susceptible to greater distress after the onset of Operation Desert Storm across all PTSD symptoms of re-experiencing, avoidance/numbing, and hyperarousal³⁷. In contrast, risk of a mental health related hospitalization was lower among women in combat support occupations compared to women in non-combat support (HR0.64, 95% CI 0.53, 0.77) in a study occurring prior to the onset of OEF/OIF³⁵. Among a mixed gender group of Gulf War I veterans, lower levels of social support resulted in increased depression symptoms for women, and increased levels of sexual harassment resulted in increased depression symptoms for men but not women suggesting that social support was a greater risk factor for depression in women and sexual harassment was a stronger risk factor for men³⁴. Even in a small mixed gender case series of World War II veterans, 25% still had some PTSD symptoms 50 years after war³⁶. The authors of this study suggest that studies of high functioning female and male veterans who have survived combat experiences and other trauma may be needed to provide more insight to veteran experiences and resiliency.

The baseline health status (physical and mental health component scores) of a large population-based military cohort is slightly more favorable than that of the same-age, same-sex U.S. general population, especially among older age groups, and also much higher than levels reported in VA populations presenting for care³⁸. Deployment experiences were not associated with either decreased overall health status or mental well being^{38,39}. However, after adjustments for socio-demographics, deployment experience in SW Asia, Bosnia, or Kosovo (from 1998-2000), and deployment to the 1991 Gulf War, active-duty women health care specialists were significantly more likely to report witnessing death or trauma when compared to combat specialists⁴⁰. In addition, Air Force women deployed to theatre during the Gulf War reported significantly more general as well as gender-specific health problems than did women deployed elsewhere³⁹. Common health problems included: skin rash; cough; depression; unintentional weight loss; insomnia; and memory problems and a significant increase in gender-specific problems compared to women deployed elsewhere (e.g., abnormal pap, breast problems).

Two additional studies covered deployment related reproductive and pregnancy issues^{41,42}. The most prevalent gender-specific problems among an active duty sample (from Persian Gulf War) were problems during pregnancy (41%), urinary tract infection (34%), headache (33%), menstrual irregularities (32%) and abnormal Pap smear (27%)⁴². In this group, 76% reported using military health care, 41% used civilian health care, and only 3% reported using the VA. Overall, satisfaction ratings were higher for civilian care, and too few patients attended the VA to provide satisfaction ratings.

Another study⁴¹ compared conceptions and pregnancy loss among Gulf War exposed conceptions and non-deployed conceptions among veterans and found similar outcomes. Sepa-

rately, GW veteran postwar conceptions were at increased risk for ectopic pregnancies and spontaneous abortions, but the study was limited due to lack of information on risk factors for and documentation of fetal loss.

Summary

The large number of studies focused on the health issues of OEF/OIF soldiers reflects the growing participation of women in these conflicts. More than half of the OEF/OIF articles underscore the need to screen for PTSD and other mental health symptoms among recently returning soldiers who might have multiple risk factors. A key finding is that psychiatric diagnoses were common for both OEF and OIF evacuations, suggesting the need for DOD and VA to ensure that military personnel evacuated from the field for mental health issues receive ongoing care.

Two other salient issues arose in this section. First, both women and men with assault histories prior to combat had double the rates of new onset PTSD symptoms. Second, military readiness for women includes field access to gynecological services. These issues will be key for both DOD and VA in post-deployment health care settings.

ORGANIZATIONAL RESEARCH

The seven studies in this category all examined organizational characteristics of clinics delivering services to women in a national or regional sample of VA sites for primary care⁴³⁻⁴⁹.

Services Available to Women

A national survey of VA facilities delivering primary care documented that 61% had established women's health clinics (WHC) for primary care; the main factor significantly related to the presence of WHCs was separate primary care leadership (OR 3.62, 95% CI 1.45-9.05)⁴³. Three papers evaluating VA sites across the country serving 400 or more women veterans defined the presence of emergency services for women and the breadth and depth of gynecological services in the VA. Washington and colleagues assessed whether women's health care specialists for emergency gynecological problems or for emergency mental health conditions were available during and after clinic hours⁴⁶. They found that while most sites had a specialist available for gynecologic and mental health emergencies during clinic hours, rates dropped for after-hour emergencies. Predictors of specialist availability were presence of a separate WHC for gynecological emergencies and lower local managed care penetration for mental health emergencies.

Cope and colleagues evaluated the availability of different forms of contraception in VA⁴⁷. While 97% of VA sites provided hormonal contraception, only 60% offered intrauterine devices (IUDs). Factors related to IUD service availability were hospital-based facility (in contrast to community-based outpatient clinic), on site gynecologist, and availability of a women's health clinician who trained other clinicians. Seelig and colleagues built on this work by assessing availability of gynecologic services across VA⁴⁴. They found that availability of endometrial biopsy, IUD, infertility evaluation, infertility treatment, and general gynecologic surgery were directly related to routine availability of an Ob/Gyn physician.

Practice Environment

Hall et al. presented an assessment of organizational factors impacting the MST practice environment and perceived organizational support using key surveys of MST health providers in a VA geographical region⁴⁸. Wide variability in the perception of organizational support existed among facilities even with a small sample size. Ethical conflicts, burnout, vicarious trauma experiences (i.e., from counseling), and isolation had negative correlations with perceived organizational support while workload, organizational culture, leadership, and MST resources were positively correlated with perceived organizational support.

Two studies focused on the organizational features associated with the adoption of women's health centers into VA sites^{43, 49}. The first⁴³ examined primary care organizational features influencing the development of women's clinics in primary care (VAMCs or CBOCs) and found that nearly two-thirds of VAMCs had women's clinics (64%), but the only factor significantly associated with their presence was separate strong primary care leadership (OR 3.62, 95% CI 1.45, 9.05). Separately, Yano and colleagues⁴⁹ identified the degree to which VA medical centers had adopted women's clinics as an organizational innovation by comparing their structure and services to the 8 original Comprehensive Women's Health Centers (CWHCs) in VA. Gender specific service availability was comparable to the CWHCs with the exception of onsite mammography, osteoporosis assessment, and availability of separate mental health clinics⁴⁹. While the general WHCs were less likely to have same gender providers, women's health training programs, separate space, or adequate privacy, they also were *less likely* to experience educational program closures or staffing losses.

The final study compared the original 8 VA Comprehensive Women's Health Centers with the Department of Health and Human Services (DHHS) National Centers of Excellence in Women's Health⁴⁵. These prototype women's health centers had many parallel organizational characteristics (e.g., training or fellowship programs, quality monitoring activities, and extended hours or same gender providers) and uniformly provided preventive cancer screening, and general reproductive services. However, DHHS sites had more extensive reproductive care on site, and VA centers had more on-site mental health care.

Summary

Two issues are salient in this area. Presence of an Ob/Gyn physician in the VA or a separate gynecology or women's clinic in the VA improves the availability of IUD contraception, advanced gynecologic services, and emergency gynecologic services after hours. Separately, organizational culture and leadership showed positive associations with the practice environment for MST providers and with sites reporting separate women's clinics delivering primary care, indicating that key role of VA local leadership in women veteran care.

QUALITY OF CARE

Our summary of the quality of care literature on women veterans included fifty one studies that covered the following areas: patient perceptions of quality and ratings of satisfaction⁵⁰⁻⁵⁸, general quality of care processes and outcomes⁵⁹⁻⁶⁸, surgical outcomes⁶⁹⁻⁷², prescription medication issues⁷³⁻⁷⁷, cardiovascular risk factors and health disparities^{59, 60, 62, 63, 69, 70, 78-80}, gender-specific and reproductive care^{32, 41, 42, 81-91}, other quality of care issues⁹²⁻⁹⁸, and two clinical trials^{8, 9}.

Patient Perceptions of Quality and Satisfaction

Patient preferences in VA care among women veteran users and non-users were explored through a qualitative study by Washington and colleagues, which demonstrated knowledge gaps about VA eligibility and services⁵¹. These gaps included a general lack of information about VA eligibility and available services; nonusers often assumed that the VA did not provide women's health care. Separately, both users and nonusers identified the availability and accessibility of physicians and treatments, gender specific knowledge and sensitivity, and quality expertise and knowledge among the physicians/providers as expectations for their care. However, users and nonusers differed in perceptions of VA quality, and VA environment and quality concerns led many women to limit their VA use to women's clinics.

In a regional study of women veterans, Bean-Mayberry and associates examined patient race and primary care ratings in VA⁵⁰. Race had no association with any of four primary care domains or with overall satisfaction with VA care. Separately, patients who reported that they received routine gynecological care from VA providers gave high ratings on preference for provider (OR 2.0, 95% CI 1.3, 3.1) and satisfaction (OR 1.6, 95% CI 1.2, 2.3).

Women's Clinics Versus Traditional Clinics

In a comparison of women veterans using women's clinics versus traditional primary care clinics, Bean-Mayberry et al. found that female veterans who were seen in the women's clinics were more likely to report excellent satisfaction compared with those seen in traditional clinics ($p < .05$, OR 1.42, 95% CI 1.00, 2.02)⁵². Similarly, for every domain in the original version of the Primary Care Satisfaction Survey for Women, patients seen in women's clinics were significantly more likely to report the highest satisfaction rating: getting care (OR 1.69, 95% CI 1.14, 2.49); privacy and comfort (OR 1.63, 95% CI 1.11, 2.39); communication (OR 1.66, 95% CI 1.16, 2.37); complete care (OR 1.69, 95% CI 1.17, 2.43); and follow up care (OR 1.70, 95% CI 1.16, 2.47).

Inpatient/Outpatient Satisfaction

Wright and associates compared patient satisfaction among male and female veterans in inpatient and outpatient settings in the VA nationally⁵³. They found that in adjusted analyses, overall quality perceptions and most dimensions of satisfaction with outpatient care were not different for females compared with males. However, women were less satisfied than men for inpatient settings in multiple domains. Men reported higher scores for inpatient quality, after adjustment for transitions (68 vs. 65, $p = 0.0009$), physical comfort (82 vs. 80, $p = 0.0003$), involvement of family and friends (74 vs. 71, $p = 0.0024$), courtesy (88 vs. 86, $p = 0.0001$), coordination (77 vs. 74, $p = 0.0000$), and access (80 vs. 76, $p = 0.0000$).

Gender and Gynecological Services

Bean-Mayberry and colleagues determined whether the separate or combined effects of provider gender, gynecologic services from the provider, and women's clinic setting improved patient ratings of primary care⁵⁴. Each combination was compared to a baseline of male provider, no gynecologic care from provider and no women's clinic setting. Having a female provider was significantly associated with the highest ratings for

communication (OR 2.9, 95% CI 1.4, 5.8) and coordination (OR 3.7, 95% CI 1.5, 9.0). Male providers who provided gynecologic care or had patients enrolled in women's clinic had a higher rating of coordination (OR 3.0, 95% CI 1.2, 7.0) (compared with male providers who did not). Female providers who performed gynecological services also had significant positive associations in 3 of 4 domains: continuity (OR 4.0, 95% CI 1.8, 8.7); communication (OR 2.7, 95% CI 1.3, 5.5); and coordination (OR 2.8, 95% CI 1.1, 7.1). Similar findings occurred for patients who had all 3 factors (female provider, received gynecologic services, and used a women's clinic setting).

Fan and associates evaluated the relationship between continuity of care and satisfaction among women and men veterans in primary care at 7 medical centers using the Seattle-based Outpatient Satisfaction Questionnaire which has both a humanistic and organizational scale⁵⁷. The humanistic scale measures satisfaction with communication skills and humanistic qualities of the providers, and the organizational scale measures satisfaction with the delivery of health care services. Higher patient reports of continuity of care were associated with higher patient satisfaction. Patients who reported always seeing the same provider had higher mean humanistic scores and mean satisfaction scores than those who rarely or never saw the same provider. Additionally, female patient gender and increasing age was associated with improved satisfaction and higher humanistic scores.

Mental Health

Two studies assessed the association of mental health with satisfaction in primary care^{55, 58}. The first surveyed women in one VA healthcare system to identify the associations between satisfaction in general medical clinics and trauma-related mental health symptoms. The study found that women with *more* PTSD symptoms appeared to be more satisfied with their overall care and with their provider⁵⁵. Separately, Desai and colleagues, evaluating VA patients with and without psychiatric illnesses who responded to a national VA satisfaction survey, found that patients with mental health diagnoses had lower satisfaction in outpatient primary care⁵⁸. Dissatisfaction was associated with poorer perceptions of access to care and overall coordination of care.

Maternity Care

One study evaluated women's satisfaction with maternity care in 44 military hospitals and found that less than 50% of the respondents would recommend their hospital of care to family or friends due to a higher-than-average rate of problems with care⁵⁶. Although this study had a fairly low response rate (41%), the data identify multiple quality and satisfaction issues: problem rates were significantly higher for these women compared with average Picker scores from patients nationwide. Military women reported worse ratings on satisfaction domains or items covering confidence and trust in provider, treatment with respect and dignity, involvement with medical decision-making, and coordination of care ($p < .0001$ for each). These experiences are directly related to maternity care in military hospitals; however, such experiences may affect expectations about potential VA health care after active duty.

General Quality of Care Prevention, Processes and Outcomes

Ten quality of care studies focused on general prevention and chronic disease processes⁵⁹⁻⁶⁸.

One study, which focused on patterns of colorectal cancer screening in fiscal year 2002, noted that screening was most likely in patients aged 70-80 years. Factors associated with lower screening included: female gender; black race; lower income; infrequent primary care visits; and recent admission to a nursing home setting⁶¹. One salient clinical finding was that 41% of patients with a positive fecal occult blood test were not offered any type of colon examination within a 6-month window. Another study⁶⁶ explored the barriers, attitudes and preferences for colorectal cancer (CRC) screening by gender and found that female and male participants reported similar preferences for CRC screening mode, but women viewed the preparation for endoscopic procedures as a major barrier to screening while men did not. Women also expressed different fears from men (vulnerability vs. pain) and perceived CRC as a male disease thus feeling less vulnerable to CRC. These gender-specific barriers may help explain women's lower rate of screening for CRC. In a separate analyses examining flu vaccination by race among outpatient veterans age 50 and older (in 2003-04) in the VA, gender did not have any effect on vaccination for the 121,738 veterans surveyed⁶⁷. Jha and coworkers evaluated multiple prevention and chronic disease measures in fiscal year 2000 and documented comparable overall care for both men and women overall in VA, although a few quality measures varied by age and sex⁶². Among those less than 65 years, women were more likely to receive hemoglobin A1c testing (OR 1.13, 95% CI 1.03-1.25) and adequate hypertension control (OR 1.09, 95% CI 1.00-1.18) but less likely to receive pneumococcal vaccine (OR 0.78, 95% CI 0.73-0.83). For patients age 65 and older, women were less likely to receive adequate hypertension control (OR 0.82, 95% CI 0.75-0.90) or pneumococcal vaccine (OR 0.92, 95% CI 0.86-0.99).

Tseng and colleagues performed 2 studies with veteran populations with diabetes. The first, which compared older male and female veterans with non-veterans enrolled in Medicare to examine gender differences in process of care measures, found no differences in glycosylated hemoglobin (HbA1c), or low density lipoprotein cholesterol (LDL-C) testing⁵⁹. Women were more likely to have completed eye exams but less likely to have LDL-C under 130mg/dl compared with men.

In a separate diabetes study comparing female veterans with and without service connected disability status, women veterans with service connection were more likely to receive recommended diabetes tests compared with women veterans without service connection, but were less likely to have LDL-C controlled even though they were more likely to be tested⁶⁰. The last study in this section focused on cardiovascular risks in veterans with HIV. Among HIV positive veterans started on protease inhibitors for disease control, 60% achieved the recommended lipid screening guidelines⁶³. Notably, female gender was not a factor associated with receipt of lipid screening in either unadjusted or adjusted analyses.

The remaining three articles^{64, 65, 68} described tobacco use and development of a tobacco cessation program for women veterans. Vander Weg⁶⁸ evaluated use of various tobacco

products among the military by gender and noted use of any type of alternative tobacco products (e.g., bidics, cigars, kretekcs, pipes, and smokeless tobacco) was greater among cigarette smokers compared to non-cigarette smokers, and use of alternative products was consistently higher for males than for females. The qualitative articles described the development process for selecting ideal components of a smoking cessation program for women veterans and uncovered the finding that women veterans wanted both formal and informal support mechanisms (professional and peer support) in addition to *choice* for a smoking cessation program (new vs. traditional alcoholics anonymous style)⁶⁴. When women in these focused groups were given a VA tailored smoking cessation booklet to choose options from, most women selected multiple options for cessation and least often chose the traditional VA program⁶⁵.

Surgical Outcomes

Four research studies focused on surgical outcomes in women patients or diseases predominant in women (e.g., breast cancer surgery)⁶⁹⁻⁷². Johnson and colleagues evaluated post-operative morbidity and mortality among women patients (n=458 VA patients and n=3535 non-VA patients) undergoing vascular surgery at multiple VA and private hospitals⁶⁹. In the stepwise logistic regression models adjusted for clinical and operative characteristics, VA and private sector hospitals showed no difference in mortality; however, VA care was associated with significantly lower morbidity (OR 0.60, 95% CI 0.44-0.81).

Fink and colleagues also evaluated post-operative morbidity and mortality among female surgical patients (n=5157 VA patients and n=27,467 non-VA patients) undergoing general surgery procedures in VA and private sector hospitals⁷¹. They found that risk adjusted morbidity was significantly lower in the VA compared with the private sector (OR 0.80, 95% CI 0.71-0.90), however, risk-adjusted mortality did not differ. The next study focused on surgical morbidity and mortality outcomes for breast surgery (n=1333) performed at VA hospitals over a 6-year period (1991-1997)⁷². Of those diagnosed with breast cancer (n=478), 75% were women. Thirty-day morbidity rates (12%), 30-day mortality rates (1%), and 1-year operation related readmission rates (<1%) were all low for both the women and men in VA. The most common post-operative complications were wound infections for both women and men, and urinary tract infections in women. Women breast cancer patients were more likely to be younger, unmarried, and low income compared with men.

The last study focused on surgical outcomes in VA and non-VA patients of both genders undergoing gastric bypass⁷⁰. This surgical study evaluated 30-day post operative morbidity outcomes and predictors of morbidity in VA and non-VA male and female patients (veterans and non-veterans) undergoing Roux-en-Y gastric bypass surgery. The adjusted odds of post-operative morbidity for the VA versus non-VA female patients was 1.14 (95% CI 0.63-2.05), and for male patients was 2.29 (95%CI 1.28-4.10). Although the VA male subset showed high risk-adjusted postoperative morbidity, both the unadjusted or adjusted findings for VA females were equivalent to those of non-veteran females.

Prescribing Outcomes

We reviewed five studies that focused on prescribing outcomes⁷³⁻⁷⁷. In a VA and Medicare

comparison paper, Barnett and colleagues found that VA users had lower rates of any inappropriate medication prescribed overall (21% vs. 29%, $p < 0.001$), and the rate of inappropriate drug use was lower in VA compared with the private sector for males (21% vs. 24%, $p < 0.001$) and females (28% vs. 32%, $p < 0.001$)⁷⁵.

Three studies focusing only on VA populations showed that inappropriate prescribing was more likely to occur in VA women whether using Beers criteria⁷³, HEDIS 2006 criteria⁷⁴, or Zhan criteria⁷⁶. In addition, gender-stratified analyses found that only geriatric care was protective against inappropriate prescribing for women. An additional study compared antidepressant treatment between the VA and private sector patients and found more than 80% of patients achieved guideline acute phase treatment (i.e., effective antidepressant medication therapy during the first 84 days after depression diagnosis) with little differences between VA and private sector⁷⁷. Predictors of quality treatment included female gender, and comorbid substance abuse or other mental health diagnoses.

Pugh and colleagues identified inappropriate prescribing using multiple criteria (AHRQ, Beers, and Zhan)⁷⁶. The Agency for Healthcare research and Quality (AHRQ) criteria included documentation of certain drugs by the categories of always avoid, rarely appropriate, or some indications while the Beers criteria involved the medications that should be avoided in persons aged 65 and older due to ineffectiveness or high risk to safety and medications that should not be used in older persons with specific conditions⁹⁹. The AHRQ panel further identified situations in which use of rarely appropriate and some-indications drugs are proper (i.e., Zhan criteria). The study found that adjustment for clinical diagnoses decreased inappropriate prescribing practices from 33 to 23% of all veterans and showed that inappropriate drug exposure was prolonged (means not given). Multivariate analyses revealed that women were more likely than men to be prescribed inappropriate drugs using Zhan criteria (OR 1.3, 95% CI 1.2-1.3), and were less likely to receive dose-limited drugs (OR 0.6, 95% CI 0.6-0.7). Other factors associated with either inappropriate drugs or dose limited drugs were white race, psychiatric comorbidity, or receipt of an increasing number of medications.

Busch and colleagues, comparing the quality of pharmacotherapy for patients with major depression in the VA ($n=27,713$) and private sector ($n=4852$), found that over 80% of patients received guideline-level acute phase treatment (antidepressant therapy in first 84 days) in either system⁷⁷. Raw scores showed that VA slightly outperformed the private sector with prescriptions for antidepressants in the initial 84 days (84.7% vs. 81.0%, $p < .001$) and maintenance phase treatment for 181 days (53.9% vs. 50.9%, $p < .001$). In the fully adjusted regression models, women patients were more likely to receive guideline level treatment at both 84 (OR 1.18, 95% CI 1.08-1.29) and 181 days (OR 1.14, 95% CI 1.07-1.22). The association of VA care with initial guideline treatment was lost after inclusion of co-morbid diagnoses. No difference was found between VA and private depression care quality in the fully adjusted model.

Cardiovascular Risk Reduction and Health Disparities

Nine studies possessed data on cardiovascular risk factors for women veterans, most in the form of prevalence of risk behaviors/conditions or comparisons of process and outcome

measures as mentioned above^{59, 60, 62, 63, 69, 70, 78-80}. Frayne et al assessed prevalence of known cardiac risk factors among women veterans who sustained a sexual assault while in the military, and identified obesity, smoking, hazardous alcohol use, sedentary lifestyle, and hysterectomy before age 40 as more common events in women reporting a history of sexual assault in the military compared with women without such a history⁷⁹. Johnson et al identified watching television more than 2 hours per day and snacking/eating as significantly associated with obesity among women veterans after adjusting for patient characteristics and screening positive for depression or PTSD⁷⁸. A study by Cypel and colleagues compared a national population based sample of female Vietnam veterans with non-Vietnam veteran cohorts, and found that women Vietnam veterans showed a significant deficit (ARR 0.78, 95% CI 0.62, 0.98) in circulatory system disease relative to non-Vietnam veterans, but significant deficits were also observed when both cohorts were compared with women in the U.S. population (SMR 0.65, 95% CI 0.54, 0.77; SMR 0.82, 95% CI 0.73, 0.93, respectively)⁸⁰. Additionally, Vietnam veterans were at significantly greater risk of mortality from motor vehicle accidents than non-Vietnam veterans (ARR 2.60, 95% CI 1.22, 5.55) and this appeared to be specific to service in Vietnam based upon comparisons to the U.S. population. While each cardiovascular risk reduction and health disparities study evaluated cardiovascular risk factors or mortality in women veterans, none assessed risk reduction over time or due to specific therapy. The other six articles were mentioned in the sections on general quality of care prevention, processes and outcomes^{59, 60, 62, 63} and surgical outcomes^{69, 70}.

Gender-specific and Reproductive Care

A range of articles of varying quality covered gender-specific and reproductive care issues^{32, 41, 42, 81-91}. Three studies covered deployment related reproductive and pregnancy issues^{32, 41, 42} and are discussed previously.

One narrative report⁸³ of a VA cognitive behavioral therapy program for transgender women veterans (male to female) showed improvement on measures of anxiety and depression from pre- to post-treatment and appeared to reduce transgender related isolation and stigma. Locating the group in the VA system felt supportive to the veterans who had conceptualized being rejected at a systemic level (e.g., by a government organization). Many transgender specific issues were addressed in this CBT framework, and the work may serve as a roadmap for future group and individual therapy.

Two studies involved urological issues in military or veteran patients^{84, 87}. The first study reported that more active duty women with dysuria postponed voiding; reported fluid restriction; were treated for dysuria in the field or after field duty; and used tampons, pads or devices to control urinary incontinence during field duty⁸⁴. The second study⁸⁷ described the prevalence of eight high priority urologic diseases among patients in the VA. While no major findings are reported by gender, interstitial cystitis was almost twice as prevalent among female compared to male VA users (2205 vs. 1311 per 100,000 persons). The etiology or context for this finding was not described.

One retrospective pilot study described pregnancy costs and outcomes at a single VA medical center⁹¹. These investigators found that among the 33 pregnancies reviewed, 31% were

to women with at least one chronic condition (mainly hypertension and asthma), 39% had at least one psychiatric condition, and 36% had an adverse pregnancy outcome (e.g., premature birth, gestational diabetes, etc). The estimated mean total cost of pregnancy care for the entire sample was \$9,359 (range \$5,466 to \$20,279).

A few studies provided information on sexual health, contraception and hormone therapy^{81, 86, 88, 90}. Among a small group of active duty women completing an anonymous survey on sexual health information, responses yielded little desire for information regarding safer sexual practices⁸⁶. However, information requested during normal duty differed from information requested for deployment. Information most frequently requested during deployment included how to abstain or say no to sex (23.5%), how to use safer sex or condoms (10.2%), and how to keep oneself clean or personal hygiene (9.2%), whereas no information (14.4%), how to use safer sex or condoms (9.3%), and how to abstain or say no to sex (9.3%) were the top choices for information requested during normal duty.

During 2004-2006, military facilities filled hormonal contraceptive prescriptions for more than half (54.2%) of all females who served in an active component of the US military⁹⁰. The majority of females who were prescribed hormonal contraceptives were younger than 25 years old (51.2%), white (55%), and not married (56.7%). Females in their twenties were more likely than those younger or older to receive prescriptions for hormonal contraceptives of all types except the IUD with progestin. For latter reproductive years, two studies were present. In a very small study of women at one VA site, over three-quarters stopped taking hormone replacement therapy after the WHI trial reports in 2002, and recurrent vasomotor symptoms were common in those who quit abruptly compared to those who tapered⁸⁸. Tapering did not appear to reduce the recurrence of vasomotor symptoms. A larger national study completed after the pilot, indicated similar findings with nearly two-thirds of women nationally in VA stopping their hormone therapy within two-years after the WHI trial⁸¹.

Women with gender-specific and non-gender specific pain reported had high correlations with psychological stress, lower health status and sometimes trauma. For breast pain, women reporting frequent mastalgia, compared to those without mastalgia, were more likely to screen positive for PTSD, major depression, panic disorder, eating disorders, alcohol misuse, or domestic violence, and often reported fibromyalgia, chronic pelvic pain, or irritable bowel syndrome⁸⁹. In a study of women veterans with and without menstrual symptoms, data revealed significantly lower scores for nearly all domains of the SF-36 ($p < .01$), both before and after adjustment for sociodemographic, psychosocial, and comorbidity variables⁸². Results remained unchanged when analyses were limited only to women without a depression or a sexual trauma history.

Finally, a mammogram intervention trial was evaluated for external and internal validity⁸⁵. For internal validity, the five study groups did not differ with respect to any of the covariates. Groups not receiving the intervention showed similar rates of mammogram screening during the 1 or 2 years before or after the baseline survey, indicating that cueing had not occurred. Mammogram screening rates during the 30 months prior to the baseline evaluation for 5 different randomized groups of women showed mildly lower screening in group

5 compared to all other groups combined (82.3% vs 85.1%) which was consistent with changes occurring nationally. (The specific trial is discussed at the end of this quality section within the clinical trials subgroup.)

Other

Seven articles could not be clustered in the categories above⁹²⁻⁹⁸. One study focused on patient perceptions of breast cancer risk susceptibility and found that only breast symptoms and cancer worry predicted greater perceived susceptibility. The models only explained a small amount of variance for each susceptibility measure⁹⁸. For VA patients on ace inhibitor medications, independent of other factors, risk of angioedema among VA patients was higher for blacks, females, and patients with chronic heart failure or coronary artery disease, but substantially lower for diabetics⁹². The five following studies had women in their samples and analyses and had no difference identified by gender^{93, 95-97} and/or did not comment on results or discussions on implications of women in their sample for health status/quality of life comparisons^{94, 95} or cost comparisons^{93, 97}.

Clinical Trials

The last two studies in this section are trials^{8, 9}. One is an educational intervention to improve VA employee perceptions of women veterans. The other is an intervention to increase mammography screening among women veterans.

VA Employee Study

The VA employee study by Vogt⁸ was an educational intervention which evaluated gender role ideology (i.e., “the extent to which a health-care worker does or does not rely on negative stereotypes about women, as they compare to men, to make judgments about different aspects of care”), knowledge, and sensitivity among male and female employees randomly given the educational training then compared with a control group⁸. Initial findings indicated that older age, direct patient contact, and years of VA employment predicted higher gender awareness and suggested a meaningful role for “hands-on” experience with veterans. Analyses revealed significantly greater improvement in sensitivity and knowledge for participants in intervention relative to control setting. Contrary to expectations, the program did not significantly improve gender-role ideology.

Mammography Intervention

This study by Vernon et al⁹ was a randomized controlled trial of two interventions in a population-based, nationally representative sample of women veterans that compared rates of completion of two or more mammograms among women assigned to two types of interventions versus a survey only control group. While the absolute between group differences ranges from 3-6%, depending on analyses, neither was superior to the control group.

Summary

The satisfaction data are mixed. Women veterans who do not use the VA lack understanding of VA care and services. Among VA users, women and men had similar outpatient satisfac-

tion ratings; however, women had consistently lower ratings for inpatient care. Additionally, women veteran satisfaction was affected by access to women's clinics, gynecological care, and overall continuity of care. The VA quality assessment indicated that women in VA may have some comparable outcomes with men; however, overall improvement is needed for lipid and hypertension control and preventive immunizations. Surgical data indicate that women in VA settings have equal or lower surgical morbidity and mortality outcomes compared with the private sector for general and vascular procedures. Pharmacy data indicate that while VA has consistently lower or comparable rates of inappropriate prescription drugs in the elderly, and women in the VA (compared to men) are consistently more likely to be prescribed inappropriate drugs by regardless of the criteria used⁷³⁻⁷⁶.

Separately, the literature on quality of care and cardiovascular risks in women veterans is salient but small. Women appear to have obesity related surgical outcomes equivalent or better than the non-veteran women, but have higher levels of cardiovascular disorders compared to civilian women and lower level of ambulatory care intermediate outcomes (LDL-cholesterol control) compared to men veterans. None of the epidemiologic or quality of care studies focused on cardiac risk reduction over time or with specific therapies. Studies with intermediate outcomes (e.g., controlled lipids or other process measures) and disease outcomes (lower disease-specific morbidity and mortality rates) are desperately needed to understand what improves cardiovascular care for women veterans alone or in mixed populations with men.

Finally, women veterans with a history of MST and PTSD have increased obesity associated risk factors. This subgroup of studies indicates that cardiovascular risk reduction will be a growing and ongoing need in VA with the growing population of women veterans who will age in our system.

ACCESS AND UTILIZATION

Forty-eight articles focused on access and utilization addressed determinants of access, gender and utilization, and utilization among special populations – sexual trauma patients, mental health/PTSD patients, and veterans from different periods of military service. Twelve articles focused on determinants of access^{51, 100-110}; fourteen focused on gender-specific care or gender differences and access^{46, 81, 111-122}. Six articles focused on sexual trauma patients and utilization¹²³⁻¹²⁸; and eleven focused on PTSD or other mental health patients and utilization^{15, 129-138}. Five additional studies focused on access and utilization among specific cohorts of veterans^{20, 25, 139-141}.

General Determinants of Access

The studies on determinants of access to VA care identified knowledge gaps about VA care, incorrect assumptions about services available to women, and difficulty with using VA care as major barriers to women's using the VA^{51, 101, 102}. Other factors influencing women not to use the VA or to use both the VA and private sector care included availability of private insurance or higher income¹⁰²⁻¹⁰⁴. Patient and organizational factors related to low VA and non-VA dual use were no insurance, receipt of general gynecological care from the VA provider or use of women's clinics^{100, 107}. For patients older than 65, availability of Medicare HMOs predicted healthcare use outside the VA¹¹⁰. Among veterans with dual VA-Medicare

eligibility, veteran women were more likely than veteran men to rely solely on VA care^{108, 109}. Additionally, one qualitative study found that veterans reported using VA due to cost issues in addition to more access to services (compared to local community) and quality of care available at VA¹⁰⁶. These veterans voiced similar concerns about cost, access and quality in other settings if VA outsourced care, with the greatest concerns being whether they would be negative effects (e.g., lower quality, harder to obtain appointments or wait time)¹⁰⁶. One last study on utilization after increases in medication copayments among male and female veterans with schizophrenia noted that outpatient visits remained stable, but inpatient admissions increased slightly¹⁰⁵.

Gender-Specific Differences in Access

Compared with male VA users, women who used VA care had more outpatient encounters¹¹¹ and also used more outpatient services if they had medical, mental health, or pain conditions in comparison to men^{111, 112, 115}. Women veterans in a Midwestern regional sample were found to have higher health related quality of life compared with men; however, younger women who had poor mental or physical health functioning had fewer primary care visits compared with men with the same characteristics¹¹⁴. A study of total knee replacement or hip arthroplasty in the VA found no gender difference in rates of these surgical procedures¹¹⁷. A smoking cessation study documented that while women and men were equally likely to be advised to quit smoking and be referred to a cessation program, women less often received nicotine patches (OR 0.50, 95% CI 0.3, 0.9) and were less likely to have successfully quit smoking one year later¹¹⁸. For women veterans requiring emergency gynecological or mental health care, VA sites reported high availability during general clinic hours (64.4% and 82.7% respectively had specialty emergency care); however, this access dropped to half or fewer sites offering after hours emergency care for women⁴⁶. The main predictors for access for a VA site were the presence of a separate women's health clinic or lower local managed care penetration for emergency mental health.

Gender-Specific Differences in Utilization

The gender-specific data covered a broad range of topics. After the Women's Health Initiative data were reported in 2002 and 2004, women veterans nationally discontinued hormone therapy at about the same rate as non-veteran women. However women utilizing VA women's clinics more often stayed on hormone therapy compared with women cared for in other VA settings⁸¹. Women veterans with spinal cord disorders compared with those without showed higher rates of cardiovascular disease, lower health status, and fewer reports of preventive dental care, colon screening, and mammogram screening, indicating areas for improvement. Rates of vaccinations and lipid screening were similar for these two groups¹¹³. With regard to breast disease, image-guided breast biopsies were shown to be more cost-effective compared with traditional open biopsy surgical techniques at one VA site¹¹⁶, and factors inversely affecting demand for mammograms included patient characteristics of older age, poor health and smoking status, and the system factor of increased waiting time for the mammogram¹¹⁹.

LaVela¹²² also described utilization of services by veterans with spinal cord disorders. Females, older, and non-white veterans ($p < .0000$ each), and veterans with a history of medical

problems such as respiratory, kidney/urinary tract, circulatory, or digestive system diseases ($p < 0.005$ for each) were more likely to use outpatient care, and farther distance from VA facilities indicated infrequent use ($p < 0.000$). Homeless female veterans were more likely to receive compensation benefits rather than pension benefits¹²⁰. In the limited number of veterans (15%) who were subsequently awarded benefits; they were more likely to have reported recent use of VA services and a greater number of medical and psychiatric problems at the time of outreach¹²⁰. Finally, a convenience sample of women veterans at one VA site¹²¹ showed that women veterans with pain (vs. without) were more than 6 times as likely to report ≥ 12 medical visits in the past year and twice as likely to report ≥ 12 visits to a mental health provider.

Sexual Trauma and Utilization

The research on sexual trauma and utilization revealed patient difficulties with identifying their emotions¹²⁴, more use of VA services among those with sexual trauma histories^{125, 128}, and more psychological impairment compared with veterans with other forms of trauma^{126, 128}. In addition, women who had experienced more severe forms of sexual violence in the military (i.e., repeated rapes or gang rapes) were severely impaired physically and emotionally compared with women who had no or one such event, and were more likely to use both inpatient and outpatient mental health services¹²⁷. A national study of veterans screened for military sexual trauma showed that both men and women who had a positive screen were more than twice as likely to have a post-screen mental health visit compared with those who screened negative¹²³, a benefit for both genders in the VA.

PTSD and Other Mental Health Issues

Among the eleven PTSD and mental health studies focused on utilization^{15, 129-138}, women with PTSD symptoms and women with other mental health issues were more likely to use VA services compared with women without PTSD symptoms or men, respectively^{129, 138}. Other gender-related findings were that being mistreated as a child did not appear to be associated with increased utilization among women with PTSD¹³³. Both women veterans with PTSD and female partners of Vietnam Veterans with PTSD preferred treatment or support services that were female-only^{135, 136}. One study examined continuity of care and treatment outcomes but was not able to find a significant association between continuity of care factors and PTSD outcomes when analyses were adjusted for multiple comparisons¹³⁷. Compared to men with mental illness, women with mental health issues were less likely to be placed in nursing home settings¹³². Identification of patients by psychiatric criteria on interview indicated that up to 44% of women veterans in primary care may have at least 1 mental health diagnosis¹³⁰, and middle age adults are more likely to have a psychiatric diagnosis compared with younger and older veterans¹³¹. One article noted that patients with mental health diagnoses (compared to those without mental illness) are less likely to be screened for lipid disorders unless they have increased outpatient utilization at the VA¹³⁴. A last study focusing on OEF/OIF veterans with PTSD is discussed in a previous section¹⁵.

Access and Utilization Among Specific Cohorts

Several access and utilization studies focused on specific cohorts of military personnel. One

study noted that active duty Air Force personnel who self-refer for mental health services compared with those referred by supervisors are less likely to have a significant diagnosis, have confidentiality broken, or have career-affecting recommendations made¹⁴⁰. For women Vietnam veterans, physical health problems mediated the relationship between combat exposure and outpatient utilization for physical health, whereas combat exposure only indirectly predicted men's mental healthcare use¹³⁹. The Iowa Gulf War Study identified similar combat and noncombat exposures among men and women but noted that women were more likely to report more than 5 outpatient visits in the prior year, and inpatient hospitalization, and receive VA compensation¹⁴¹. Two other studies focused on OEF/OIF personnel and were discussed previously^{20, 25}.

Summary

Women with positive screens for mental health disorders, trauma, or diagnoses tend to use more healthcare services than women without positive screens or than men veterans. In a few areas, findings are mixed, cautioning us to remain aware of patients who may reduce utilization because of specific mental health issues.

PSYCHIATRIC CONDITIONS

The 85 publications covering mental health and psychiatric issues fell into five broad categories: PTSD^{5-7, 13, 15, 22, 23, 26, 28, 55, 58, 129, 131, 133, 135-137, 142-166}; substance abuse and treatment¹⁶⁷⁻¹⁷¹; general mental health^{130, 132, 134, 138, 140, 172-179}; Trauma^{10, 124, 128, 180-194}; and other^{77, 105, 195-199}. The PTSD focused articles included screening and treatment, descriptors and determinants of diagnosis, quality of life and utilization impacts, and comorbid disorders. General mental health articles included prevention and screening, deployment issues, quality of life, and utilization.

PTSD

Clinical Trials

Three PTSD clinical trials focused on treatment occurred during this period⁵⁻⁷. David evaluated a 12-week open behavioral intervention for PTSD patients⁵. The intervention focused on structured group psychotherapy and self-defense training and measured patient risk perceptions among women veterans with PTSD. Women veterans showed significant and sustained improvement at both 3 and 6 months after completing the program with respect to PTSD avoidance behavior and hyperarousal symptoms. Patients also had decreased depression scores, and increased interpersonal self-efficacy, self defense self-efficacy and willingness to participate in community activities. Schnurr et al. was a multi-site trial that randomized women veterans and female military personnel with PTSD to either prolonged exposure therapy or present-centered therapy by standard protocol for 10 weeks⁶. This study indicated that prolonged exposure therapy was significantly associated with a greater reduction of PTSD symptoms and a lower likelihood of meeting PTSD diagnostic criteria after therapy was completed. A final pilot trial by Butterfield et al. evaluated olanzapine therapy over 10 weeks in a small, double blind, placebo controlled group of patients (predominantly female) with non-combat related PTSD and reported no between-group difference in treatment responses but noted a large placebo effect⁷.

Screening and Symptoms

PTSD screening and treatment included seven articles covering a variety of topics^{26, 28, 135, 137, 142-144}. One study found that a small subset of veterans (2.7%) filing disability benefits for PTSD reported being spontaneously distressed by a survey¹⁴². However, in a Persian Gulf War I cohort, gender analyses revealed that perceived threat was associated with more PTSD type symptoms for National Guard/Reserve men compared with active duty men, but the PTSD symptom associations were greater for active duty women compared with women in guard/reserve units¹⁴³. Another gender related finding was that the most important factor for women veterans and partners of disabled veterans coming to the VA for PTSD treatment was the availability of specialized treatment programs for women¹³⁵.

Women veterans treated for PTSD with group psychoeducation and self-defense training showed (similar to the David 2006 study⁵) improved use of personal safety skills¹⁴⁴. Lambert's case series on the use of aripiprazole with either sertraline or cognitive-behavior therapy shows some promise in improving symptoms in some patients²⁶. Corrections for multiple comparisons eliminated the relationships between clinical status outcomes and continuity of care in a small sample of women receiving outpatient VA treatment for PTSD¹³⁷. Future clinical trials will be needed to produce clinical evidence for improving PTSD symptoms in women through medication and therapy.

Finally, the findings of the repeat post-deployment screens for PTSD and other symptoms among OEF/OIF veterans are discussed in an earlier section²⁸.

Determinants of Diagnosis

Twelve articles focused on determinants of a diagnosis^{22, 23, 133, 145-153}. In a study of stress and social support among male and female Marine recruits, the negative impact of stress reactions on hardiness (i.e., courage and motivation to cope with stressors in daily life) was strongest when social support was low; however, in women stress reactions predicted enhanced hardiness when social support was high¹⁴⁵. Women who have strong social supports may endure more stressors without negative consequences. In a similar fashion, life experiences and unit cohesion predicted PTSD symptoms in active duty soldiers, with unit cohesion appearing to ameliorate some life experiences and symptoms¹⁵³. A few studies focused on the determinants of PTSD found the following associations: 1) poorer perceptions of health and well being were correlated with increased depression or PTSD symptoms¹⁴⁶; 2) PTSD diagnosis and symptoms were associated with more medical conditions and poorer health related quality of life¹⁵¹, and gender did not moderate the relationship between PTSD and poorer health related quality of life¹⁴⁷; 3) one VA primary care clinic identified PTSD as the best predictor for somatization in women patients¹⁴⁸; and 4) pain related factors¹⁴⁹, childhood non-sexual/physical maltreatment, childhood sexual assault¹⁵² or adult sexual assault^{133, 150} were significant predictors of PTSD symptom clusters among women veterans. Two other studies are discussed previously in the deployment and post-deployment health section^{22, 23}.

Quality of Life and PTSD

Fifteen articles focused on quality of life and mental health^{13, 15, 55, 58, 129, 131, 136, 154-161}. Findings varied in mixed gender versus single gender studies. Among male and female veterans treated for PTSD in the VA, overall quality of life was poor and did not differ between genders, and numbing was uniquely associated with reduced quality of life¹⁵⁴. In contrast, women screening positive for PTSD symptoms (compared to those screening negative) had more mental and physical problems, and poorer health related quality of life¹⁶⁰.

Two studies examined how PTSD-related stress affects the family of veterans^{155, 156}. Severity of PTSD symptoms was negatively correlated with marital adjustment ($r=-.38$), family adaptability ($r=-.40$), cohesion ($r=-.34$) and parenting satisfaction ($r=-.31$)¹⁵⁵. Among women Vietnam veterans, hyperarousal symptoms negatively impacted parenting satisfaction¹⁵⁶. Gahm et al. identified family experiences that may contribute to PTSD risk¹⁶¹. Experiencing combat (OR 2.04), witnessing someone being assaulted or killed (OR 1.88), and number of adverse childhood events (OR 1.25) all emerged as significant risk factors for PTSD symptoms¹⁶¹. In a PTSD disability benefits study, regional differences in PTSD awards are not explained by different PTSD symptom severity or level of disability¹⁵⁹. Separately, no difference in the reporting of low income occurs among women compared to men applying for PTSD disability benefits¹⁵⁷. In addition, a disparity in estimated rates of service connection for PTSD by gender was partially explained by differences in combat exposure¹⁵⁸. A number of related articles were discussed under postdeployment OEF/OIF health^{13, 15} and PTSD symptoms related to access and utilization^{129, 131, 136}.

Satisfaction had mixed associations with PTSD symptoms^{55, 58}. Women veterans with trauma related mental health symptoms reported more satisfaction with overall primary care and their provider⁵⁵. However, in another study patients with PTSD and other co-morbid diagnoses reported lower overall satisfaction with primary care (see Desai (2005) discussion under quality of care and patient satisfaction)⁵⁸.

Comorbid Disorders

A few articles covered co-morbid disorders¹⁶²⁻¹⁶⁶. Women with PTSD had more medical conditions and worse health status than women with only depression or neither diagnosis¹⁶². Among a male and female cohort of Persian Gulf military followed longitudinally, a drug problem or PTSD symptoms at time point 2 was predictive of a positive drug use screen at time point 3 but not predictive of alcohol use¹⁶³. African American female veterans at one VA site had a greater prevalence of prior exposure to violence (childhood or adult sexual abuse, intimate partner violence or sexual harassment) than their Caucasian counterparts, but these levels were not markedly different from other low-income African American women¹⁶⁴. In another single site VA study of women veterans, women with a history of MST had a greater odds of PTSD (OR 4.4, 95% CI 2.4, 8.2), but prior experience of other trauma was not a significant predictor of PTSD (OR 1.3, 95% CI 0.63, 2.5)¹⁶⁵. A similar analysis revealed that the relative risk of women with MST developing PTSD was nearly 2.5 times that of patients without MST (RR 2.40)¹⁶⁶.

Substance Abuse and Treatment

Five studies explored substance abuse issues in military and veteran populations¹⁶⁷⁻¹⁷¹. Two^{169, 170} describe military and veteran characteristics associated with alcohol use, while the others describe predictors for participating in substance abuse treatment programs^{167, 168, 171}.

Gutierrez and researchers¹⁶⁹ assessed alcohol behaviors among deployed soldiers (within and outside of the United States) in 2003 and found that significant predictors of greater alcohol-related consequences, as assessed with the CAGE questionnaire, included less formal education, male gender, not being in an intimate relationship, racial/ethnic minority status, enlisted rank, having been deployed to the continental United States, and greater stress [$\chi^2(8,5,458) = 235.991; p < 0.001$]. Lande et al¹⁷⁰ determined gender based differences in alcohol use among Army soldiers and noted that although men were more likely to engage in “bolus” (binge) drinking, women exceeded established guidelines for safe alcohol consumption (i.e., 7 drinks per week) at a risk-adjusted rate nearly twice that of men. In addition, for individuals whose behaviors were considered unsafe, the severity of reported negative consequences was influenced by gender. Women initially experience greater psychosocial impairment, and—should harmful drinking patterns progress to alcohol dependency – they are at greater risk of injury, morbidity, and mortality than men.

Predictors of admission into a substance abuse treatment program for active duty women include coexisting psychiatric conditions¹⁷¹, primarily concurrent use of alcohol¹⁷¹ and for veteran women in intensive outpatient treatment include cocaine abuse/dependence, greater burden of medical and psychiatric co-morbidities compared to men in intensive treatment and compared to other women veterans not in treatment¹⁶⁷. For homeless veterans, the situation is more complicated. Benda¹⁶⁸ compared readmission rates for substance abuse program by gender among homeless veterans and identified abuse in childhood, during military status or in the recent 2 year period prior to admission were all potent factors for women compared to men. Readmission for women was heightened by increases in depression, suicidal thoughts or traumatic events, while for men it was increased by elevated substance abuse, aggression and cognitive impairment. However, social supports through family, friends, church or other mechanism all lessened readmission rates for women, while employment stability and job satisfaction reduced the readmissions for men.

General Mental Health

The general mental health prevention and screening articles indicated that women in the military had a higher prevalence of mental health disorders such as panic, anxiety and depression compared with men in the military^{175, 176}. The exception is alcohol abuse, where the prevalence among men in active duty cohorts was higher than that of military women¹⁷⁵.

Quality of Life

For veterans responding to the Large Health Survey of Veteran Enrollees in 1999, Physical and mental component scores were similar by gender except among those age 65 or older, where mean MCS was better for women than men (49.3 vs 45.9, $p < .001$)¹⁷⁹. Among women veterans, health related quality of life physical component scores were lower, with more limitations in activities of daily living and more reported

pain than the men¹⁷², and among psychiatric patients, rural veterans had worse physical component scores and mental component scores compared to urban-dwelling veterans¹⁷³. Those with mental health comorbidities also had lower health related quality of life scores¹⁷⁴. Women in the Air Force showed increased levels of family stress, work family conflicts and job distress compared with community samples of women¹⁷⁷, and children of deployed Air Force mothers in Operation Desert Storm were at risk for multiple behavioral and emotional adjustments problems¹⁷⁸.

Utilization

Within VA primary care clinics, a large proportion of women (44%) had at least one mental health diagnosis, and about 40% of these women with a mental health condition received care in a VA specialized mental health clinic¹³⁰. Service members discharged from the military for mental health reasons were more likely to use VA mental health services if they were women, older, or had schizophrenia or bipolar disorder. The women were more likely to contact VA and use VA services compared with the men¹³⁸. Within the military, service members who self-referred for mental health care had better outcomes than those members who had been referred to mental health care by their supervisor¹⁴⁰. Other articles discussed previously included nursing home users were likely to be men, recently hospitalized and with dementia¹³², and lipid screening was low for veterans who used VA mental health services infrequently but increased screening occurred with increased levels of outpatient use¹³⁴.

Trauma

General Sexual Trauma or MST

Key findings from the nine articles on general sexual trauma or MST^{10, 124, 128, 180-185} include the following: Positive MST screens among women and men were associated with greater odds of nearly all mental health comorbidities, including PTSD in women (OR 8.83, 99% CI 8.34, 9.35) and men (OR 3.00, 99% CI 2.89, 3.12), but were almost three times stronger among women¹⁸⁰. These findings were reinforced in an additional study evaluating the various forms of sexual assault and PTSD diagnosis¹⁸³ and in one of the OEF/OIF deployment studies discussed previously¹⁰. In-service sexual harassment severity was also associated with PTSD symptom severity in women, after adjusting for other reported traumas¹⁸⁵. Many active duty women (80%) and men (45%) reported at least one type of sexual stressor in the previous year (i.e., sexual identity challenges, sexual harassment, or sexual assault)¹⁸¹. In addition, women with a history of sexual trauma report significantly higher levels of anxiety for any gender-specific or invasive exams (breast, pelvic, rectal) when the clinician is male ($p < .001$ for each exam)¹⁸². Moreover, women with sexual trauma histories showed evidence of alexithymia (i.e., difficulty identifying one's emotions), and this factor explained variance in both physical health and urgent care utilization among these women¹²⁴. Notably, a small study of women with physical and/or sexual assault histories reported that self-defense training would be an effective addition to traditional treatments for PTSD¹⁸⁴. An additional relevant article is discussed in the access and utilization section¹²⁸.

Trauma from Multiple Sources

Women experiencing multiple traumatic events (sexual, physical or both) during military service, had more severely impacted health status^{190, 194} and more outpatient visits¹⁹⁰. Some women had repeated violent experiences from childhood which were also associated with worse physical and mental quality of life compared to women without the history¹⁸⁹; other childhood events were more frequently perpetrated by parental figures, occurred over longer durations or involved more severe experiences of abuse¹⁸⁶. Prior to entering the military, one-fourth of recruits reported pre-military physical intimate partner violence (IPV) events¹⁹¹ and both physical IPV and history of interpersonal trauma predicted attrition from the military^{187, 191}. Separately, active duty women's perceptions of screening for domestic violence (now called intimate partner violence) in the military was generally supportive, but fewer women thought abuse should be reported to the commanding officer¹⁹².

Multiple workplace factors increased the likelihood of physical assault for women in the military: experiencing unwanted sexual advances or pressure for dates in sleeping quarters (7 fold); experiencing hostile work environments (5 fold); observing heterosexual activities in sleeping quarters (4 fold); and ranking officers making sexually demeaning comments or behaviors (3 fold)¹⁹³. Of note, being quartered in mixed gender barracks was not significantly associated with physical assault. Combat and non-combat exposed veterans had different levels of sexual assault in-service; higher levels occurred among non-combat males (13% vs 6%) and non-combat females (75% vs 63%) for unclear reasons¹⁸⁸.

Other

The other mental health articles focused on other psychiatric conditions not discussed previously. Three articles focused on depression treatment^{77, 197, 199}. The first showed no difference in depression therapy between VA and the private sector⁷⁷, the second identified depression screening rates of nearly 85% in 2002, but only about half the patients received follow up if they screened positive and male gender was a factor¹⁹⁷. The third article found that among depressed veterans, being young, male, and white were the demographic factors associated with higher suicide risks¹⁹⁹. However, the relative risk ratio for suicide among men compared with women was smaller than in the general population. The remaining four articles identified that 60% of veterans with serious mental illness had overwhelmingly poor dental health¹⁹⁵; bipolar disorder patients who were nonadherent to medication were likely to have an active substance use disorder such as alcohol abuse¹⁹⁶, with women showing higher odds of nonadherence¹⁹⁸; and lastly, psychiatric drug refills dropped nearly 25% among schizophrenia patients after copayments for medications increased¹⁰⁵.

The remaining articles from on psychiatric conditions were included in the access and utilization section covering mental health issues, deployment and post-deployment health section for OEF/OIF veterans and non OEF/OIF veterans.

Summary

The section on psychiatric conditions covers a broad spectrum of literature describing issues for women and men veterans. This literature should provide a stable foundation for increasing treatment and outcome pilot and multi-center trial studies among women veterans.

Three points should be emphasized.

- More clinical trials like those of David, Schnurr, and Butterfield are needed to help direct VA providers toward treatment options that are best suited for the female veteran patient.
- The literature confirms the positive relationship between MST and PTSD, and both of these diagnoses have multiple negative health-related associations that both providers and policymakers need to understand. In particular, women with a sexual trauma history reported significant anxiety for any invasive exam and male providers. Such data are critical for managing patients in primary care where repeated invasive exams (breast, pelvic, rectal) will be required to provide evidence-based quality care over the life span; the role of provider type and practice setting (women's clinics) may be a long-term issue.
- A small cluster of studies show that social support (in military or in civilian life) may be a factor for resiliency and quality of life among women and (possibly their children) while performing in the military and when they transition home from deployment.

SUMMARY AND DISCUSSION

The growth in the number of women in the military is reshaping the veteran population, with women now constituting one of the fastest growing segments of eligible VA healthcare users. This trend has been accelerated by the unexpectedly high VA enrollment of women veterans from recent wars in Iraq and Afghanistan. As women veterans have entered the VA healthcare system in increasing numbers, VA managers and providers have been challenged to organize and deliver gender-specific and gender-sensitive services in a system that has otherwise historically focused on treating men. Gender-specific care also imposes considerable training and experience requirements on a VA workforce with limited exposure to female patients.

VA's health services research enterprise has been designed to map to high priority topics, women veterans' health and health care among them. Yano and colleagues led the leadership efforts for the first mapping of VA research priorities to the needs of women veterans with the VA Women's Health Research Agenda Setting Conference in late 2004²⁰⁰. This initial women's health research agenda was the product of a national consensus development meeting, which (a) brought together researchers from various fields (laboratory, clinical science, rehabilitation and health services) to focus on establishing an evidence base for a women's health agenda and (b) to incorporate results of the first VA systematic review of the literature on women veterans¹. That review identified 182 relevant articles published between 1978 and 2004. Most were descriptive in nature, using observational study designs; only 2 were randomized controlled trials. About 45% of the studies were VA funded, with the majority of the literature focusing on women veterans' mental health (mostly risk, prevalence and treatment of PTSD) and general health services research (8 on quality of care, 5 on patient satisfaction, 25 on use and organization of care).

In the current updated systematic review, we identified 195 articles from 2004-2008—more

articles in 5 years than we identified in the previous 25 years. This sharp increase in volume is likely due to VA's increased focus on research funding in these priority areas. Consistent with the previous systematic review, most VA women's health research continues to be observational; however, more articles are shifting from a descriptive to an analytical focus (i.e., determinants of care or health), and there were 5 clinical trials, a modest increase from the first review.

While the focus on mental health among women in the military and women veterans remains high, with a continuing emphasis on PTSD and MST, important new work has been published on prevalence of mental health conditions in different settings and for different subgroups and on non-trauma-related mental health problems (e.g., depression, serious mental illness). Emphasis on access, utilization and quality of care for women veterans has also increased, with a rapidly emerging focus on post-deployment health. These topic areas clearly map to ongoing VA research priorities, demonstrated in part by the fact that about 60% of the articles were VA funded in whole or in part, up from 45% in the review published in 2006.

BUILDING KNOWLEDGE: NOTABLE RESEARCH ADVANCES

To what extent has the more recent literature closed the gaps identified in the previous review? Previous notable gaps included very limited information on the prevalence of chronic diseases, women veterans' preferences and self-reported care needs, research on utilization patterns within and outside the VA health care system, transitions from military to veteran status, studies of the quality of care women veterans receive, and studies on how to improve their quality of care. These gaps served as the basis for more targeted solicitations for new research.

We highlight 3 areas with the noteworthy impact:

- 1) Treatment outcomes in PTSD: The Schnurr study is the first multi-centered, VA funded cooperative trial focused on outcomes of women veterans with PTSD using a comparison of prolonged exposure therapy to a previous standard of care. Due to the quality of the research and significant clinical findings, prolonged exposure therapy is being considered by VA administration as part of the revised guidelines for PTSD standards of care due out later this year, used to train clinical providers, and implemented across the field nationally⁶.
- 2) Access to care: We now know more about barriers, perceptions and utilization of VA care among women veterans, and this information should be used as a foundation to remove barriers and consider methods for restructuring care to meet healthcare needs. Chief barriers include knowledge gaps and incorrect assumptions about VA services among women veterans outside the VA and high use of care once enrolled in VA among women with various co-morbidities. This knowledge should direct us toward potential interventions among subgroups of women veterans to decrease barriers and documented and improved care outcomes among women in VA with significant co-morbidities.
- 3) Organizational determinants of quality care: Advances in research describing how care is organized for women in VA demonstrate variations in service availability and their determinants as well as the importance of practice environment for women veterans care. Better attention to gynecologic access (staff, clinic, services) appears to be important for types of services a woman has access to and a key area for future research in VA. The impact of local leadership on women veteran services also appears essential. Future

quality improvement interventions need to consider the integration of leadership or other diverse stakeholders in care of women.

Separately, the PTSD trial impacts the literature on women veterans in another manner. Few studies had an adequate sample for comparing women to men or VA users to non-users and evaluating outcomes. The Schnurr trial overcame this challenge and future studies should use similar methods (multi-site approach, cooperative study, practice based research network) to achieve adequate patient samples for clinical and health services research Schnurr trial⁶. The Schnurr trial tackles the historical research dilemma of insufficient sampling strategies for performing primary or subgroup analyses of women in VA and demonstrates that it is feasible to conduct robust clinical trials in women veterans²⁰¹.

With the current systematic review, we found increases in the number of articles on access, utilization and quality of care studies. Collectively, this research provides an evidence base for detecting barriers to VA care that women soldiers may encounter, defining optimal women's healthcare delivery arrangements, and adopting best practices. In these areas, the field as a whole is now ready to move toward identifying and implementing interventions to promote best practices. This identification of interventions and promotion of best practices fits within the VA Quality Enhancement Research Initiative (QUERI) model for translational research and quality improvement²⁰². The VA QUERI program promotes the linking of research and clinical practice to improve the quality and outcomes of care among veterans across the VA system by a series of quality improvement steps and interventions that involve researchers, providers, and clinical managers²⁰³. These steps include: (1) identifying high-risk or high burden conditions or problems; (2) identify best practices or clinical guidelines; (3) define variations from best practices and their determinants; (4) identify and implement interventions to promote best practices; (5) assess intervention program feasibility, outcomes and impacts on patient, provider, and system; and (6) assess intervention program impacts on health related quality of life outcomes^{203, 204}. VA women veterans' health research now stands solidly within the VA QUERI framework at steps 3 and 4, where variations can be identified and explicitly understood so that appropriate interventions will be designed for women veterans.

ONGOING GAPS: FUTURE VA RESEARCH TARGETS

In contrast to the growth in the scientific literature on access, utilization and quality, recently funded VA studies have not yet made their mark in the published literature on prevalence of chronic diseases or on transitions from military to veteran status. Additional areas that stand as new or ongoing gaps in the literature for our women veteran population are included below:

- 1) Limited clinical and intervention outcome data for chronic physical or mental health conditions and complex combinations of diseases
- 2) Limited information on transitions from military to civilian life
- 3) Minimal information of military duty and transitions on families
- 4) Health issues for women veterans across the life span (e.g., pregnancy, aging)
- 5) New information on general care or gender differences for veterans with polytrauma or traumatic brain injury
- 6) Challenges and strategies for comanaging mental health and general preventive health

We anticipate that the increases in VA women's health services research funding over the past 5 years will continue to affect the topical coverage and methodological diversity and rigor seen in the coming 5 years. Ongoing efforts to continually update the literature, augmented by interactive search capabilities, will enhance the value and application of this growing evidence base to ongoing care improvements in health care settings within and outside the VA. Separately, we suggest that internal final reports of VA supported research should document if the study contained findings reportable by gender (whether the same or different) even if that was not *one* of the research aims of the study. Such detailing offers insight to unknown areas of disparity or equity in veteran health and healthcare.

The primary limitation of this systematic review, as with any review, is the potential for having missed salient articles. Search terms for our topic area of women veterans' health and health care have not been standardized in such a way that authors routinely select consistent terms. We thus augmented traditional computerized search strategies with contacts among leading researchers in the field in the hopes of enhancing our yield. Now that we have a significant database of relevant articles, we hope that authors not represented herein will forward their articles for inclusion. As with any systematic review, we are also limited by publication bias.

CONCLUSIONS

The areas more fully developed in women veterans' research (access, utilization, and quality of care) will serve as a foundation for future intervention and implementation research in VA. In addition, the already substantial scope of women veteran mental health literature should be expanded with future VA studies on treatment modalities and outcomes and should explore ways in which veteran, provider, or practice settings can incorporate potential treatments.

FUTURE RESEARCH

Continued need exists for clinical trials data involving women veteran health issues and women veteran populations.

REFERENCES

1. Goldzweig, C. L., et al., The State of Women Veterans' Health Research. *Journal of General Internal Medicine*, 2006. 21: p. S82-S92.
2. Hayes, P. and M. Krauthamer, Changing the face of health care for women veterans. *Federal Practitioner*, 2009. 26(2): p. 8-10.
3. Brix, K., RE: Women Veteran Literature Request, B. Bean-Mayberry, Editor. 2008: Los Angeles.
4. Jadad, A. R., et al., Assessing the quality of reports of randomized clinical trials: is blinding necessary? *Control Clin Trials*, 1996. 17(1): p. 1-12.
5. David, W. S., T. L. Simpson and A. J. Cotton, Taking charge: a pilot curriculum of self-defense and personal safety training for female veterans with PTSD because of military sexual trauma. *J Interpers Violence*, 2006. 21(4): p. 555-65.
6. Schnurr, P. S., et al., Cognitive Behavioral Therapy for Posttraumatic Stress Disorder in Women. *JAMA*, 2007. 297.
7. Butterfield, M. I., et al., Olanzapine in the treatment of post-traumatic stress disorder: a pilot study. *International Clinical Psychopharmacology*, 2001. 16(4): p. 197-203.
8. Vogt, D. S., A. A. Barry and L. A. King, Toward Gender-Aware Health Care: Evaluation of an Intervention to Enhance Care for Female Patients in the VA Setting. *Journal of Health Psychology*, 2008. 13(5): p. 624-638.
9. Vernon, S. W., et al., Promoting regular mammography screening II: Results from a randomized controlled trial in US women veterans. *J Natl Cancer Inst*, 2008. 100: p. 347-358.
10. Smith, T. C., et al., Prior assault and posttraumatic stress disorder after combat deployment. *Epidemiology*, 2008. 19: p. 505-512.
11. Felker, B., et al., Characteristics of deployed Operation Iraqi Freedom military personnel who seek mental health care. *Mil Med*, 2008. 173(2): p. 155-8.
12. Seal, K. H., et al., Bringing the war back home: mental health disorders among 103,788 US veterans returning from Iraq and Afghanistan seen at Department of Veterans Affairs facilities. *Arch Intern Med*, 2007. 167(5): p. 476-82.
13. Hoge, C. W., et al., Association of posttraumatic stress disorder with somatic symptoms, health care visits, and absenteeism among Iraq war veterans. *Am J Psychiatry*, 2007. 164(1): p. 150-3.
14. Helmer, D. A., et al., Health and exposure concerns of veterans deployed to Iraq and Afghanistan. *J Occup Environ Med*, 2007. 49(5): p. 475-80.

15. Erbes, C., et al., Post-traumatic stress disorder and service utilization in a sample of service members from Iraq and Afghanistan. *Mil Med*, 2007. 172(4): p. 359-63.
16. Katz, L. S., et al., Women who served in Iraq seeking mental health services: Relationships between military sexual trauma, symptoms, and readjustment. *Psychological Services*, 2007. 4(4): p. 239-249.
17. Hoge, C. W., et al., Combat duty in Iraq and Afghanistan, mental health problems, and barriers to care. *N Engl J Med*, 2004. 351(1): p. 13-22.
18. Stetz, M. C., et al., Psychiatric diagnoses as a cause of medical evacuation. *Aviat Space Environ Med*, 2005. 76(7 Suppl): p. C15-20.
19. Rundell, J. R., Demographics of and diagnoses in Operation Enduring Freedom and Operation Iraqi Freedom personnel who were psychiatrically evacuated from the theater of operations. *Gen Hosp Psychiatry*, 2006. 28(4): p. 352-6.
20. Hoge, C. W., J. L. Auchterlonie and C. S. Milliken, Mental health problems, use of mental health services, and attrition from military service after returning from deployment to Iraq or Afghanistan. *JAMA*, 2006. 295(9): p. 1023-32.
21. Mental health encounters and diagnoses following deployment to Iraq and/or Afghanistan, US Armed Forces, 2001-2006. *Medical Surveillance Monthly Report*, 2007. 14(4): p. 2-8.
22. Lapiere, C. B., A. F. Schwegler and B. J. Labauve, Posttraumatic stress and depression symptoms in soldiers returning from combat operations in Iraq and Afghanistan. *J Trauma Stress*, 2007. 20(6): p. 933-43.
23. Smith, T. C., et al., New onset and persistent symptoms of post-traumatic stress disorder self reported after deployment and combat exposures: prospective population based US military cohort study. *BMJ*, 2008. 336(7640): p. 366-71.
24. Seal, K. H., et al., Getting beyond "Don't ask; don't tell": an evaluation of US Veterans Administration postdeployment mental health screening of veterans returning from Iraq and Afghanistan. *Am J Public Health*, 2008. 98(4): p. 714-20.
25. McNulty, P. A., Reported stressors and health care needs of active duty Navy personnel during three phases of deployment in support of the war in Iraq. *Mil Med*, 2005. 170(6): p. 530-5.
26. Lambert, M. T., Aripiprazole in the management of post-traumatic stress disorder symptoms in returning Global War on Terrorism veterans. *Int Clin Psychopharmacol*, 2006. 21(3): p. 185-7.
27. Stecker, T., et al., An assessment of beliefs about mental health care among veterans who served in Iraq. *Psychiatr Serv*, 2007. 58(10): p. 1358-61.

28. Routine screening and referrals for Post-Traumatic Stress Disorder (PTSD) after returning from Operation Iraqi Freedom in 2005, US Armed Forces. *Medical Surveillance Monthly Report*, 2007. 14(6): p. 2-7.
29. Farley, J. H., et al., Far forward gynecologic care of the female soldier. *J Reprod Med*, 2006. 51(1): p. 31-5.
30. Thomson, B. A. and P. E. Nielsen, Women's health care in Operation Iraqi Freedom: a survey of camps with echelon I or II facilities. *Mil Med*, 2006. 171(3): p. 216-9.
31. Vogt, D. S., Validation of Scales From the Deployment Risk and Resilience Inventory in a Sample of Operation Iraqi Freedom Veterans. *Assessment*, 2008. 15(4): p. 391-403.
32. Haas, D. M. and L. A. Pazdernik, Partner deployment and stress in pregnant women. *J Reprod Med*, 2007. 52(10): p. 901-6.
33. Adler, A. B., et al., The impact of deployment length and experience on the well-being of male and female soldiers. *J Occup Health Psychol*, 2005. 10: p. 121-37.
34. Vogt, D. S., et al., Deployment Stressors, Gender, and Mental Health Outcomes Among Gulf War I Veterans. *Journal of Traumatic Stress*, 2005. 18(3): p. 272-284.
35. Lindstrom, K. E., et al., The mental health of U.S. military women in combat support occupations. *J Womens Health (Larchmt)*, 2006. 15(2): p. 162-72.
36. Cavin, S., World War II Never Ended in My House: Interviews of 12 Office of Strategic Services Veterans of Wartime Espionage on the 50th Anniversary of WW II, in *Psychobiology of posttraumatic stress disorders: A decade of progress (Vol. 1071)*. 2006, Blackwell Publishing, 2006, xxiii, 547 Blackwell Publishing: Malden, MA Malden, MA. p. 463-471.
37. Wolfe, J., P. J. Brown and M. L. Bucsela, Symptom responses of female Vietnam veterans to Operation Desert Storm. *Am J Psychiatry*, 1992. 149(5): p. 676-9.
38. Smith, T. C., et al., The physical and mental health of a large military cohort: baseline functional health status of the Millennium Cohort. *Bmc Public Health*, 2007. 7.
39. Pierce, P. F., Physical and emotional health of Gulf War veteran women. *Aviat Space Environ Med*, 1997. 68(4): p. 317-21.
40. Smith, T. C., et al., The occupational role of women in military service: validation of occupation and prevalence of exposures in the Millennium Cohort Study. *Int J Environ Health Res*, 2007. 17(4): p. 271-84.
41. Araneta, M. R., et al., Conception and pregnancy during the Persian Gulf War: the risk to women veterans. *Ann Epidemiol*, 2004. 14(2): p. 109-16.
42. Pierce, P. F., C. Antonakos and B. A. Deroba, Health care utilization and satisfaction concerning gender-specific health problems among military women. *Mil Med*, 1999. 164(2): p. 98-102.

43. Bean-Mayberry, B. A., et al., Organizational characteristics associated with the availability of women's health clinics for primary care in the Veterans Health Administration. *Military Medicine*, 2007. 172(8): p. 824-8.
44. Seelig, M. D., et al., Availability of gynecologic services in the Department of Veterans Affairs. *Womens Health Issues*, 2008. 18(3): p. 167-73.
45. Bean-Mayberry, B. A., et al., Federally Funded Comprehensive Women's Health Centers: Leading Innovation in Women's Healthcare Delivery. *Journal of Women's Health*, 2007. 16(9): p. 1281-1290.
46. Washington, D. L., et al., VA emergency health care for women: condition--critical or stable? *Womens Health Issues*, 2006. 16(3): p. 133-8.
47. Cope, J. R., et al., Determinants of contraceptive availability at medical facilities in the Department of Veterans Affairs. *J Gen Intern Med*, 2006. 21 Suppl 3: p. S33-9.
48. Hall, M. E., et al., Military sexual trauma services for women veterans in the Veterans Health Administration: The patient-care practice environment and perceived organizational support. *Psychological Services*, 2007. 4(4): p. 229-238.
49. Yano, E. M., et al., Diffusion of Innovation in Women's Health Care Delivery: The Department of Veterans Affairs' Adoption of Women's Health Clinics. *Women's Health Issues*, 2006. 16: p. 226-235.
50. Bean-Mayberry, B., C. C. Chang and S. H. Scholle, Brief Report: Lack of a Race Effect in Primary Care Ratings among Women Veterans. *Journal of General Internal Medicine*, 2006. 21(10): p. 1105-1108.
51. Washington, D. L., et al., Women Veterans' Perceptions and Decision-Making about VA Health Care. *Military Medicine*, 2007.
52. Bean-Mayberry, B. A., et al., Patient Satisfaction in Women's Clinics Versus Traditional Primary Care Clinics in the Veterans Administration. *Journal of General Internal Medicine*, 2003. 18: p. 175-181.
53. Wright, S. M., et al., Patient satisfaction of female and male users of Veterans Health Administration services. *J Gen Intern Med*, 2006. 21 Suppl 3: p. S26-32.
54. Bean-Mayberry, B. A., et al., Ensuring high-quality primary care for women: predictors of success. *Womens Health Issues*, 2006. 16(1): p. 22-9.
55. Lang, A. J., et al., Mental health and satisfaction with primary health care in female patients. *Womens Health Issues*, 2005. 15(2): p. 73-9.
56. Harriott, E. M., T. V. Williams and M. R. Peterson, Childbearing in U.S. military hospitals: dimensions of care affecting women's perceptions of quality and satisfaction. *Birth*, 2005. 32(1): p. 4-10.

57. Fan, V. S., et al., Continuity of care and other determinants of patient satisfaction with primary care. *J Gen Intern Med*, 2005. 20(3): p. 226-33.
58. Desai, R. A., E. A. Stefanovics and R. A. Rosenheck, The role of psychiatric diagnosis in satisfaction with primary care: data from the department of veterans affairs. *Med Care*, 2005. 43(12): p. 1208-16.
59. Tseng, C. L., et al., Are there gender differences in diabetes care among veterans? *Journal of General Internal Medicine* 2006. 21(S3): p. S47-53.
60. Tseng, C. L., et al., Diabetes care among veteran women with disability. *Womens Health Issues*, 2006. 16(6): p. 361-71.
61. Etzioni, D. A., et al., Measuring the quality of colorectal cancer screening: the importance of follow-up. *Dis Colon Rectum*, 2006. 49(7): p. 1002-10.
62. Jha, A. K., et al., Quality of ambulatory care for women and men in the Veterans Affairs Health Care System. *J Gen Intern Med*, 2005. 20(8): p. 762-5.
63. Korthuis, P. T., et al., Lipid screening in HIV-infected veterans. *J Acquir Immune Defic Syndr*, 2004. 35(3): p. 253-60.
64. Katzburg, J. R., et al., Listen to the consumer: designing a tailored smoking-cessation program for women. *Substance Use & Misuse*, 2008. 43(8-9): p. 1240-1259.
65. Katzburg, J. R., et al., Combining Women's Preferences & Expert Advice to Design a Tailored Smoking Cessation Program. *Subst Use Misuse*, 2009. 44(14): p. 2114-37.
66. Friedemann-Sanchez, G., J. M. Griffin and M. R. Partin, Gender differences in colorectal cancer screening barriers and information needs. *Health Expect*, 2007. 10(2): p. 148-60.
67. Straits-Troster, K. A., et al., Racial/ethnic differences in influenza vaccination in the Veterans Affairs Healthcare System. *Am J Prev Med*, 2006. 31(5): p. 375-82.
68. Vander Weg, M., et al., Prevalence of alternative forms of tobacco use in a population of young adult military recruits. *Addictive Behaviors*, 2008. 33(1): p. 69-82.
69. Johnson, R. G., et al., Comparison of Risk-Adjusted 30-Day Postoperative Mortality and Morbidity in Department of Veterans Affairs Hospitals and Selected University Medical Centers: Vascular Surgical Operations in Women. *Journal of American College of Surgeons*, 2007. 204: p. 1137-1146.
70. Lautz, D. B., et al., Bariatric operations in Veterans Affairs and selected university medical centers: results of the patient safety in surgery study. *J Am Coll Surg*, 2007. 204(6): p. 1261-72.
71. Fink, A. S., et al., Comparison of risk-adjusted 30-day postoperative mortality and morbidity in Department of Veterans Affairs hospitals and selected university medical centers: general surgical operations in women. *J Am Coll Surg*, 2007. 204(6): p. 1127-36.

72. Hynes, D. M., et al., Breast cancer surgery trends and outcomes: results from a National Department of Veterans Affairs study. *J Am Coll Surg*, 2004. 198(5): p. 707-16.
73. Bierman, A. S., et al., Sex differences in inappropriate prescribing among elderly veterans. *Am J Geriatr Pharmacother*, 2007. 5(2): p. 147-61.
74. Pugh, M. J., et al., Assessing potentially inappropriate prescribing in the elderly Veterans Affairs population using the HEDIS 2006 quality measure. *J Manag Care Pharm*, 2006. 12(7): p. 537-45.
75. Barnett, M. J., et al., Comparison of rates of potentially inappropriate medication use according to the Zhan criteria for VA versus private sector medicare HMOs. *J Manag Care Pharm*, 2006. 12(5): p. 362-70.
76. Pugh, M. J., et al., Potentially inappropriate prescribing in elderly veterans: are we using the wrong drug, wrong dose, or wrong duration? *J Am Geriatr Soc*, 2005. 53(8): p. 1282-9.
77. Busch, S. H., D. L. Leslie and R. A. Rosenheck, Comparing the quality of antidepressant pharmacotherapy in the Department of Veterans Affairs and the private sector. *Psychiatr Serv*, 2004. 55(12): p. 1386-91.
78. Johnson, K. M., K. M. Nelson and K. A. Bradley, Television Viewing Practices and Obesity Among Women Veterans. *Journal of General Internal Medicine*, 2006. 21: p. S76-81.
79. Frayne, S., et al., Sexual assault while in the military: Violence as a predictor of cardiac risk? *Violence & Victims*, 2003. 18(2): p. 219-225.
80. Cypel, Y. and H. Kang, Mortality patterns among women Vietnam-era veterans: Results of a retrospective cohort study. *Annals of Epidemiology*, 2008. 18(3): p. 244-252.
81. Haskell, S. G., et al., Determinants of Hormone Therapy Discontinuation among Female Veterans Nationally. *Military Medicine*, 2008. 173(1): p. 91-6.
82. Barnard, K., et al., Health status among women veterans with menstrual symptoms. *Journal of Women's Health* 2003. 12(9): p. 911-920.
83. Maguen, S., J. C. Shipherd and H. N. Harris, Providing Culturally Sensitive Care for Transgender Patients. *Cognitive and Behavioral Practice*, 2005. 12: p. 479-490.
84. Albright, T. S., et al., Acute Dysuria among Female Soldiers. *Military Medicine*, 2005. 170(9): p. 735-738.
85. del Junco, D. J., et al., Promoting regular mammography screening I. A systematic assessment of validity in a randomized trial. *J Natl Cancer Inst*, 2008. 100(5): p. 333-46.
86. von Sadvoszky, V. and N. Ryan-Wenger, Army women's sexual health information needs. *J Obstet Gynecol Neonatal Nurs*, 2007. 36(4): p. 348-57.
87. Sohn, M. W., et al., Prevalence and trends of selected urologic conditions for VA health-care users. *BMC Urol*, 2006. 6: p. 30.

88. Haskell, S. G., After the Women's Health Initiative: Postmenopausal women's experiences with discontinuing estrogen replacement therapy. *J Womens Health (Larchmt)*, 2004. 13(4): p. 438-42.
89. Johnson, K. M., et al., Frequency of mastalgia among women veterans: Association with psychiatric conditions and unexplained pain syndromes. *Journal of General Internal Medicine Improving health care for women veterans.*, 2006. 21(Suppl 3): p. S70-S75.
90. Hormonal contraceptive use among female service members, active components, U.S. Armed Forces, January 2004-March 2006. *Medical Surveillance Monthly Report*, 2007. 14(7): p. 9-13.
91. Chireau, M. V., et al., Outcomes, costs, and utilization of pregnancy related care. *Federal Practitioner*, 2006: p. 20-30.
92. Miller, D. R., et al., Angioedema incidence in US veterans initiating angiotensin-converting enzyme inhibitors. *Hypertension*, 2008. 51(6): p. 1624-30.
93. Yu, W., T. H. Wagner and P. G. Barnett, Determinants of cost among people who died in VA nursing homes. *Med Care Res Rev*, 2006. 63(4): p. 477-98.
94. Weeks, W. B., et al., Rural-urban disparities in health-related quality of life within disease categories of Veterans. *J Rural Health*, 2006. 22(3): p. 204-11.
95. Mrus, J. M., et al., Health-related quality of life in veterans and nonveterans with HIV/AIDS. *J Gen Intern Med*, 2006. 21 Suppl 5: p. S39-47.
96. McEachrane-Gross, F. P., J. M. Liebschutz and D. Berlowitz, Use of selected complementary and alternative medicine (CAM) treatments in veterans with cancer or chronic pain: a cross-sectional survey. *BMC Complement Altern Med*, 2006. 6: p. 34.
97. Maciejewski, M. L., et al., The performance of administrative and self-reported measures for risk adjustment of Veterans Affairs expenditures. *Health Serv Res*, 2005. 40(3): p. 887-904.
98. McQueen, A., et al., Predictors of perceived susceptibility of breast cancer and changes over time: a mixed modeling approach. *Health Psychol*, 2008. 27(1): p. 68-77.
99. Fick, D. M., et al., Updating the Beers criteria for potentially inappropriate medication use in older adults: results of a US consensus panel of experts. *Arch Intern Med*, 2003. 163(22): p. 2716-24.
100. Bean-Mayberry, B., et al., Comprehensive Care for Women Veterans: Indicators of Dual Use of VA and non-VA Providers. *Journal of American Medical Women's Association*, 2004. 59(3): p. 192-197.
101. Vogt, D. S., et al., Barriers to Veterans Health Administration Care in a Nationally Representative Sample of Women Veterans. *Journal of General Internal Medicine*, 2006. 21: p. S19-S25.

102. Washington, D. L., et al., To Use or Not to Use: What Influences Why Women Veterans Choose VA Health Care. *Journal of General Internal Medicine*, 2006. 21: p. S11-S18.
103. Shen, Y., et al., The impact of private insurance coverage on veterans' use of VA care: insurance and selection effects. *Health Serv Res*, 2008. 43(1 Pt 1): p. 267-86.
104. Ross, J. S., et al., Dual use of Veterans Affairs services and use of recommended ambulatory care. *Med Care*, 2008. 46(3): p. 309-16.
105. Zeber, J. E., et al., Effect of a medication copayment increase in veterans with schizophrenia. *Am J Manag Care*, 2007. 13(6 Pt 2): p. 335-46.
106. Wakefield, B. J., et al., Veterans' use of Department of Veterans Affairs care and perceptions of outsourcing inpatient care. *Mil Med*, 2007. 172(6): p. 565-71.
107. Nelson, K. M., G. A. Starkebaum and G. E. Reiber, Veterans using and uninsured veterans not using Veterans Affairs (VA) health care. *Public Health Rep*, 2007. 122(1): p. 93-100.
108. Mooney, S. E. and W. B. Weeks, Where do women veterans get their inpatient care? *Womens Health Issues*, 2007. 17(6): p. 367-73.
109. Hynes, D. M., et al., Veterans' access to and use of Medicare and Veterans Affairs health care. *Med Care*, 2007. 45(3): p. 214-23.
110. Shen, Y., et al., VA-Medicare dual beneficiaries' enrollment in Medicare HMOs: access to VA, availability of HMOs, and favorable selection. *Med Care Res Rev*, 2005. 62(4): p. 479-95.
111. Frayne, S. M., et al., Gender and Use of Care: Planning for Tomorrow's Veterans Health Administration. *Journal of Women's Health*, 2006. 16(8): p. 1188-1199.
112. Frayne, S. M., et al., Gender Disparities in Veterans Health Administration Care: Importance of Accounting for Veteran Status. *Medical Care*, 2008. 46(5): p. 549-553.
113. LaVela, S., et al., Disease Prevalence and Use of Preventive Services: Comparison of Female Veterans in General and Those with Spinal Cord Injuries and Disorders. MS. *Journal of Women's Health*, 2006.
114. Singh, J. A. and M. Murdoch, Effect of Health Related Quality of Life on Women and Men's Veterans Affairs (VA) Health Care Utilization and Mortality. *Journal of General Internal Medicine*, 2007. 22(9): p. 1260-1267.
115. Kaur, S., et al., Gender differences in health care utilization among veterans with chronic pain. *J Gen Intern Med*, 2007. 22(2): p. 228-33.
116. Hatmaker, A. R., et al., Cost-effective use of breast biopsy techniques in a Veterans health care system. *Am J Surg*, 2006. 192(5): p. e37-41.
117. Borrero, S., et al., Brief report: Gender and total knee/hip arthroplasty utilization rate in the VA system. *J Gen Intern Med*, 2006. 21 Suppl 3: p. S54-7.

118. Sherman, S. E., et al., Gender differences in smoking cessation services received among veterans. *Womens Health Issues*, 2005. 15(3): p. 126-33.
119. Lairson, D. R., W. Chan and G. R. Newmark, Determinants of the demand for breast cancer screening among women veterans in the United States. *Soc Sci Med*, 2005. 61(7): p. 1608-17.
120. Chen, J. H., et al., Receipt of disability through an outreach program for homeless veterans. *Mil Med*, 2007. 172(5): p. 461-5.
121. Haskell, S. G., et al., The prevalence and age-related characteristics of pain in a sample of women veterans receiving primary care. *J Womens Health (Larchmt)*, 2006. 15(7): p. 862-9.
122. LaVela, S. L., et al., Geographical proximity and health care utilization in veterans with SCI&D in the USA. *Soc Sci Med*, 2004. 59(11): p. 2387-99.
123. Kimerling, R., et al., Evaluation of Universal Screening for Military-Related Sexual Trauma. *Psychiatric Services*, 2008. 59: p. 635-640.
124. Polusny, M. A., et al., The Role of Cumulative Sexual Trauma and Difficulties Identifying Feelings in Understanding Female Veterans' Physical Health Outcomes. *Gen Hosp Psychiatry*, 2008. 30(2): p. 162-70.
125. Kelly, M. M., et al., Effects of Military Trauma Exposure on Women Veterans' Use and Perceptions of Veteran Health Administration Care. *Journal of General Internal Medicine*, 2008. 23(6): p. 741-747.
126. Zinzow, H. M., et al., Sexual assault, mental health, and service use among male and female veterans seen in Veterans Affairs primary care clinics: a multi-site study. *Psychiatry Res*, 2008. 159(1-2): p. 226-36.
127. Sadler, A. G., B. M. Booth and B. N. Doebbeling, Gang and multiple rapes during military service: health consequences and health care. *J Am Med Womens Assoc*, 2005. 60(1): p. 33-41.
128. Stein, M. B., et al., Relationship of sexual assault history to somatic symptoms and health anxiety in women. *Gen Hosp Psychiatry*, 2004. 26(3): p. 178-83.
129. Dobie, D. J., et al., PTSD Screening Status is Associated with Increased VA Medical and Surgical Utilization in Women. *Journal of General Internal Medicine*, 2006. 21: p. S58-64.
130. Grubaugh, A., et al., Female Veterans Seeking Medical Care at Veterans Affairs Primary Care Clinics: Psychiatric and Medical Illness Burden and Service Use. *Women & Health*, 2006. 43(3): p. 41-62.
131. Frueh, B. C., et al., Age differences in posttraumatic stress disorder, psychiatric disorders, and healthcare service use among veterans in Veterans Affairs primary care clinics. *Am J Geriatr Psychiatry*, 2007. 15(8): p. 660-72.

132. Miller, E. A. and R. A. Rosenheck, Risk of nursing home admission in association with mental illness nationally in the Department of Veterans Affairs. *Med Care*, 2006. 44(4): p. 343-51.
133. Lang, A. J., et al., Relationships among childhood maltreatment, PTSD, and health in female veterans in primary care. *Child Abuse Negl*, 2006. 30(11): p. 1281-92.
134. Kaplowitz, R. A., et al., Health care utilization and receipt of cholesterol testing by veterans with and those without mental illness. *Gen Hosp Psychiatry*, 2006. 28(2): p. 137-44.
135. Fontana, A. and R. Rosenheck, Treatment of female veterans with posttraumatic stress disorder: the role of comfort in a predominantly male environment. *Psychiatr Q*, 2006. 77(1): p. 55-67.
136. Sherman, M. D., et al., Mental health needs of cohabiting partners of Vietnam veterans with combat-related PTSD. *Psychiatr Serv*, 2005. 56(9): p. 1150-2.
137. Greenberg, G. A., A. Fontana and R. A. Rosenheck, Continuity and intensity of care among women receiving outpatient care for PTSD. *Psychiatr Q*, 2004. 75(2): p. 165-81.
138. Mojtabai, R., et al., Use of VA aftercare following military discharge among patients with serious mental disorders. *Psychiatric Services*, 2003. 54(3): p. 383-388.
139. Maguen, S., et al., Predictors of mental and physical health service utilization among Vietnam veterans. *Psychological Services*, 2007. 4(3): p. 168-180.
140. Rowan, A. B. and R. L. Campise, A multisite study of Air Force outpatient behavioral health treatment-seeking patterns and career impact. *Mil Med*, 2006. 171(11): p. 1123-7.
141. Carney, C. P., et al., Women in the Gulf War: combat experience, exposures, and subsequent health care use. *Mil Med*, 2003. 168(8): p. 654-61.
142. Halek, K., M. Murdoch and L. Fortier, Spontaneous Reports of Emotional Upset and Health Care Utilization Among Veterans With Posttraumatic Stress Disorder After Receiving a Potentially Upsetting Survey. *American Journal of Orthopsychiatry*, 2005. 75(1): p. 142-151.
143. Vogt, D. S., et al., Deployment Stressors and Posttraumatic Stress Symptomatology: Comparing Active Duty and National Guard/Reserve Personnel from Gulf War I. *Journal of Traumatic Stress*, 2008. 21(1): p. 66-74.
144. Westrup, D. A., J. C. Weitlauf and J. Keller, I Got My Life Back! Making a Case for Self Defense Training for Older Women with PTSD. *Clinical Gerontologist Vol 28(3) (2005):*, 2005. 28(3): p. 113-118.
145. Vogt, D. S., et al., Longitudinal Investigation of Reciprocal Relationship Between Stress Reactions and Hardiness. *Personality and Social Psychology Bulletin*, 2008. 34(1): p. 61-73.

146. Mancino, M. J., et al., Quality-adjusted health status in veterans with posttraumatic stress disorder. *J Nerv Ment Dis*, 2006. 194(11): p. 877-9.
147. Ouimette, P., et al., Posttraumatic stress disorder and health status among female and male medical patients. *J Trauma Stress*, 2004. 17(1): p. 1-9.
148. Escalona, R., et al., PTSD and somatization in women treated at a VA primary care clinic. *Psychosomatics*, 2004. 45(4): p. 291-6.
149. Asmundson, G. J., K. D. Wright and M. B. Stein, Pain and PTSD symptoms in female veterans. *Eur J Pain*, 2004. 8(4): p. 345-50.
150. Lang, A. J., et al., Direct and indirect links between childhood maltreatment, posttraumatic stress disorder, and women's health. *Behavioral Medicine*, 2008. 33(4): p. 125-135.
151. Monnier, J., et al., US female veterans in VA primary care: post traumatic stress disorder symptoms and functional status. *Primary Care Psychiatry*, 2004. 9(4): p. 145-150.
152. Becker, M., The impact of childhood adversity factors on posttraumatic stress and other functioning in adult women veterans. *Dissertation Abstracts International Section A: Humanities and Social Sciences*, 2006. 66(8-A): p. 2830.
153. Brailey, K., et al., PTSD symptoms, life events, and unit cohesion in U.S. soldiers: baseline findings from the neurocognition deployment health study. *J Trauma Stress*, 2007. 20(4): p. 495-503.
154. Schnurr, P. S. and C. A. Lunney, Exploration of how gender differences in quality of life relates to posttraumatic stress disorder in male and female veterans. *Journal of Rehabilitation Research and Development*, 2008. 45(3): p. 383-394.
155. Gold, J. I., et al., PTSD Symptom Severity and Family Adjustment Among Female Vietnam Veterans. *Military Psychology*, 2007. 19: p. 72-81.
156. Berz, J. B., et al., Associations Between PTSD Symptoms and Parenting Satisfaction in a Female Veteran Sample. *Journal of Psychological Trauma*, 2008. 7(1): p. 37-45.
157. Murdoch, M., et al., Mitigating Effect of Department of Veterans Affairs Disability Benefits for Post-Traumatic Stress Disorder on Low Income. *Military Medicine*, 2005. 170(2): p. 137-140.
158. Murdoch, M., et al., Gender Differences in Service Connection for PTSD. *Medical Care*, 2003. 41(8): p. 950-961.
159. Murdoch, M., et al., Regional variation and other correlates of Department of Veterans Affairs Disability Awards for patients with posttraumatic stress disorder. *Med Care*, 2005. 43(2): p. 112-21.
160. Dobie, D. J., et al., Posttraumatic stress disorder in female veterans: association with self-reported health problems and functional impairment. *Arch Intern Med*, 2004. 164(4): p. 394-400.

161. Gahm, G. A., et al., Relative impact of adverse events and screened symptoms of post-traumatic stress disorder and depression among active duty soldiers seeking mental health care. *Journal of Clinical Psychology*, 2007. 63(3): p. 199-211.
162. Frayne, S. M., et al., The burden of medical illness in women with depression and PTSD. *Archives of Internal Medicine* 2004. 164(12): p. 1306-1312.
163. Shipherd, J. C., J. Stafford and L. R. Tanner, Predicting alcohol and drug abuse in Persian Gulf War veterans: What role do PTSD symptoms play? *Addictive Behaviors*, 2005. 30: p. 595-599.
164. Campbell, R., et al., The co-occurrence of childhood sexual abuse, adult sexual assault, intimate partner violence, and sexual harassment: A mediational model of posttraumatic stress disorder and physical health outcomes. *Journal of Consulting and Clinical Psychology*, 2008. 76(2): p. 194-207.
165. Yaeger, D., et al., DSM-IV diagnosed posttraumatic stress disorder in women veterans with and without military sexual trauma. *Journal of General Internal Medicine*, 2006. 21: p. S65-S69.
166. Himmelfarb, N., D. Yaeger and J. Mintz, Posttraumatic stress disorder in female veterans with military and civilian sexual trauma. *Journal of Traumatic Stress*, 2006. 19(6): p. 837-846.
167. Stecker, T., et al., Characteristics of women seeking intensive outpatient substance use treatment in the VA. *J Womens Health (Larchmt)*, 2007. 16(10): p. 1478-84.
168. Benda, B., A Study of Substance Abuse, Traumata, and Social Support Systems Among Homeless Veterans. *Journal of Human Behavior in the Social Environment Vol 12(1)* (2005): 59-82, 2005. 12(q): p. 59-82.
169. Gutierrez, C. A., et al., Predictors of aversive alcohol consequences in a military sample. *Mil Med*, 2006. 171(9): p. 870-4.
170. Lande, R. G., et al., Gender differences and alcohol use in the US Army. *J Am Osteopath Assoc*, 2007. 107(9): p. 401-7.
171. Dove, M. B. and H. J. Joseph, Sociodemographic profile of women entering a military substance use disorder treatment center. *Mil Med*, 2007. 172(3): p. 283-7.
172. Teh, C. F., et al., Gender differences in health-related quality of life for veterans with serious mental illness. *Psychiatr Serv*, 2008. 59(6): p. 663-9.
173. Wallace, A. E., et al., Rural and urban disparities in health-related quality of life among veterans with psychiatric disorders. *Psychiatr Serv*, 2006. 57(6): p. 851-6.
174. Forman-Hoffman, V. L., et al., Mental health comorbidity patterns and impact on quality of life among veterans serving during the first Gulf War. *Quality of Life Research*, 2005. 14(10): p. 2303-2314.

175. Riddle, J. R., et al., Millennium Cohort: the 2001-2003 baseline prevalence of mental disorders in the U.S. military. *J Clin Epidemiol*, 2007. 60(2): p. 192-201.
176. Gahm, G. A. and B. A. Lucenko, Screening soldiers in outpatient care for mental health concerns. *Mil Med*, 2008. 173(1): p. 17-24.
177. Vinokur, A., P. Pierce and C. Buck, Work-family conflicts of women in the Air Force: their influence on mental health and functioning. *J Organizational Behav*, 1999. 20: p. 865-878.
178. Pierce, P., A. Vinokur and C. Buck, Effects of war-induced maternal separation on children's adjustment during the Gulf War and two years later. *J Appl Soc Psychol*, 1998. 14: p. 1287-1312.
179. Frayne, S. M., et al., Health status among 28,000 women veterans: The VA Women's Health Program Evaluation Project. *Journal of General Internal Medicine* 2006. 21(S3): p. S40-46.
180. Kimerling, R., et al., The Veterans Health Administration and Military Sexual Trauma. *American Journal of Public Health*, 2007. 97: p. 2160-2166.
181. Murdoch, M., et al., Functioning and Psychiatric Symptoms among Military Men and Women Exposed to Sexual Stressors. *Military Medicine*, 2007. 172(7): p. 718-725.
182. Lee, T. T., et al., Impact of clinician gender on examination anxiety among female veterans with sexual trauma: a pilot study. *J Womens Health (Larchmt)*, 2007. 16(9): p. 1291-9.
183. Suris, A., et al., Sexual assault in women veterans: an examination of PTSD risk, health care utilization, and cost of care. *Psychosom Med*, 2004. 66(5): p. 749-56.
184. David, W. S., et al., Making a case for personal safety: perceptions of vulnerability and desire for self-defense training among female veterans. *J Interpers Violence*, 2004. 19(9): p. 991-1001.
185. Murdoch, M., et al., The Association between In-service Sexual Harassment and Post-traumatic Stress Disorder among Department of Veterans Affairs Disability Applicants. *Military Medicine*, 2006. 171(2): p. 166-73.
186. Schultz, J. R., et al., Child Sexual Abuse and Adulthood Sexual Assault among Military Veteran and Civilian Women. *Military Medicine*, 2006. 171(8): p. 723-728.
187. Wolfe, J., et al., Gender and Trauma as Predictors of Military Attrition: A Study of Marine Corps Recruits. *Military Medicine*, 2005. 170(12): p. 1037-1043.
188. Murdoch, M., et al., Prevalence of In-Service and Post-Service Sexual Assault among Combat and Noncombat Veterans Applying for Department of Veterans Affairs Posttraumatic Stress Disorder Disability Benefits. *Military Medicine*, 2004. 169(5): p. 392-395.

189. Suris, A., et al., Mental health, quality of life, and health functioning in women veterans: differential outcomes associated with military and civilian sexual assault. *J Interpers Violence*, 2007. 22(2): p. 179-97.
190. Sadler, A. G., et al., Life span and repeated violence against women during military service: effects on health status and outpatient utilization. *J Womens Health (Larchmt)*, 2004. 13(7): p. 799-811.
191. Merrill, L. L., et al., Premilitary intimate partner violence and attrition from the U.S. Navy. *Mil Med*, 2006. 171(12): p. 1206-10.
192. Gielen, A. C., et al., Domestic violence in the military: women's policy preferences and beliefs concerning routine screening and mandatory reporting. *Mil Med*, 2006. 171(8): p. 729-35.
193. Sadler, A. G., et al., The military environment: risk factors for women's non-fatal assaults. *J Occup Environ Med*, 2001. 43(4): p. 325-34.
194. Sadler, A. G., et al., Health-related consequences of physical and sexual violence: women in the military. *Obstet Gynecol*, 2000. 96(3): p. 473-80.
195. Kilbourne, A. M., et al., Oral health in Veterans Affairs patients diagnosed with serious mental illness. *J Public Health Dent*, 2007. 67(1): p. 42-8.
196. Sajatovic, M., et al., Self-reported medication treatment adherence among veterans with bipolar disorder. *Psychiatr Serv*, 2006. 57(1): p. 56-62.
197. Desai, M. M., R. A. Rosenheck and T. J. Craig, Case-finding for depression among medical outpatients in the veterans health administration. *Medical Care*, 2006. 44(2): p. 175-181.
198. Copeland, L. A., et al., Treatment adherence and illness insight in veterans with bipolar disorder. *Journal of Nervous and Mental Disease*, 2008. 196(1): p. 16-21.
199. Zivin, K., et al., Suicide mortality among individuals receiving treatment for depression in the Veterans Affairs health system: associations with patient and treatment setting characteristics. *Am J Public Health*, 2007. 97(12): p. 2193-8.
200. Yano, E. M., et al., Toward a VA women's health research agenda: Setting evidence-based priorities to improve the health and health care of women veterans *J Gen Intern Med*, 2006. 21(S3): p. S93-S101.
201. Yano, E. M., et al., Integration of women veterans into VA quality improvement research efforts: what researchers need to know. *J Gen Intern Med*, 2010. 25 Suppl 1: p. 56-61.
202. McQueen, L., B. S. Mittman and J. G. Demakis, Overview of the Veterans Health Administration (VHA) Quality Enhancement Research Initiative (QUERI). *J Am Med Inform Assoc*, 2004. 11(5): p. 339-43.

203. Rubenstein, L. V., et al., From understanding health care provider behavior to improving health care: the QUERI framework for quality improvement. Quality Enhancement Research Initiative. *Med Care*, 2000. 38(6 Suppl 1): p. I129-41.
204. Yano, E. M., The role of organizational research in implementing evidence-based practice: QUERI Series. *Implement Sci*, 2008. 3: p. 29.