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14. ABSTRACT

Purpose: To inventory and assess existing research on military women's health issues and care with the goal of identifying significant research gaps and inform the Military Health System (MHS) and Department of Defense decision-making processes with evidence-based results. **Design:** Systematic review of peer-reviewed research articles meeting 4 inclusion criteria: 1) the study related to US military personnel; 2) the study involved women servicemembers, compared men and women service members, compared military women with civilian women, or analyzed women separately; 3) the study involved active duty/reservist/National Guard military personnel eligible for health care in the MHS; and 4) the topic was relevant to MHS care of the delivery of MHS care to military women. **Sample:** A total of 1411 research articles published between 2000 and 2010 were screened; 317 that met the inclusion criteria were assessed and included in the systematic review. **Analysis:** The articles were initially categorized into 8 topics: 1) readiness/health protection/ illness prevention; 2) gynecological health; 3) psychological health; 4) deployment health; 5) environmental and occupational exposures; 6) obstetrics/postpartum issues/fertility; 7) chronic disease; and 8) interpersonal violence/sexual trauma. The 317 articles included in the systematic review were read and assessed by a TriService Nursing Research Program (TSNRP) Military Women's Health Research Interest Group (MWHRIG) Core Leader and a subject matter expert using a pre-formatted screening form that included the study question, study design, data collection strategies, overall and gender-specific findings. Articles were also rated using a hierarchy of evidence based on study design as well as quality of evidence. **Findings:** The preponderance of the literature on military women's health research is related to readiness and health promotion, followed by psychological health and gynecological health. Because the review is limited to the years 2000-2010 and the gaps in existing research may have been addressed in research published since 2010, a new research initiative will use this report as a foundation for a comprehensive literature search and systematic review of peer-reviewed research on military women's health published between 2000 and 2015. **Implications for Military Nursing:** The findings of the systematic review can identify areas where military nurse researchers may make the greatest impact in areas of women's health care research. Ultimately, the results of quality research have the potential to offer nurses new and effective health promotion, risk reduction, and disease prevention interventions and health care practices for use with their patients.

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A Systematic Review of the Literature on Military Women's Health, 2000-2010

PREPARED FOR

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A Systematic Review of the Literature on Military Women's Health, 2000-2010

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PREFACE

The TriService Nursing Research Program (TSNRP) has been the leading military nursing research program in the country for the past 22 years. TSNRP is the only program that focuses exclusively on funding and supporting rigorous scientific military nursing research and evidence-based practice. In addition, TSNRP offers professional development and educational opportunities for all military nurses. Since its inception, TSNRP has awarded more than 400 grants; this support has directly led to the publication of more than 165 articles in peer-reviewed nursing journals. TSNRP has also provided countless military nurses across all services and components access to an unprecedented level of educational resources and support. In recognition of TSNRP's contributions to and support of military nursing, the Defense Health Agency recently identified and cited TSNRP as a program of "best practice."

Thanks to support from TSNRP, military nurse researchers who seek to advance military nursing science through research can pursue this goal by forming and developing research interest groups (RIGs). RIGs are organized around specific topics of interest; current TSNRP RIGs include anesthesia, biobehavioral health, en route care, and military women's health.

Core Leaders Colonel Lori Trego (USA), Captain Jacqueline Rychnovsky (USN), Lieutenant Colonel (ret) Nancy Steele (USA), and Lieutenant Colonel Candy Wilson (USAF) founded the TSNRP Military Women's Health Research Interest Group (MWHRIG) in 2009. By design, MWHRIG is a collaborative, triservice community of research scientists and clinicians who aim to expand the foundation of knowledge about military women's health. The goals of the MWHRIG are to develop a military women's health research agenda, foster the formation of multidisciplinary study teams on topics of common interest and expertise, create a web-based repository for the MWHRIG community's resources (biographies, reference lists, abstracts, studies, publications), and focus MWHRIG community members' efforts on the established military women's health research agenda. Multidisciplinary members include research scientists and expert clinicians from the Department of Defense, Department of Veterans Affairs, and academia.

In their sentinel publication, the Core Leaders identified the need for a well-defined, empirically supported military women's health research agenda.[1] MWHRIG was created to address this significant research gap. With project support provided by TSNRP beginning in 2010, the Core Leaders initiated a systematic review of peer-reviewed research articles published between 2000 and 2010 that focused on military servicewomen's health.

The Naval Health Research Center's Consortium for the Health and Readiness of Servicewomen (CHARS), which promotes the health, readiness, and well-being of servicewomen through empirical research, accepted the MWHRIG invitation in September 2014 to assist with the project's remaining tasks. Like the TSNRP MWHRIG, CHARS researchers are scientists and clinicians from all military services, as well as from academic, governmental, and private organizations. This team, led by Stephanie McWhorter, M.A., Director of CHARS, assisted with coordinating subject matter expert reviews, technical writing, and manuscript preparation.

Comments on this report are welcome and can be sent to TSNRP@usuhs.edu.

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EXECUTIVE SUMMARY

BACKGROUND

Women comprise 15% of the active-duty military population and filled 10% of all positions among deployed forces in recent conflicts.[2] As military services continue to repeal sex restrictions on military occupations that previously excluded women, servicewomen will increasingly staff difficult military billets alongside their male colleagues. Whether in a deployed combat setting or during mandatory training, military leaders and policy makers will order men and women alike to accomplish the mission in the most austere environments and physically challenging conditions. The medical research community has engaged in male-centric studies for decades, and the military research community mirrored that until a concerted effort was directed at military women's health issues in 1994 with the Defense Women's Health Research Program.[1] However, following this finite effort, the majority of military research continued to focus on men, particularly with the advent of the military conflicts in the twenty-first century. Continuing with the status quo will fail the military's current and future operational needs. To address this significant research gap, the TriService Nursing Research Program Military Women's Health Research Interest Group (MWHRIG) engaged in a systematic review of all peer-reviewed research published between 2000 and 2010 that focused on military women's health issues and care. This effort was designed specifically to inventory and assess existing relevant research, provide recommendations to address significant research gaps, and inform the Military Health System (MHS) and Department of Defense (DoD) decision-making processes with evidence-based results. Military health care professionals and leaders need an evidence-based understanding of women's health issues in order to ensure equally the well-being and readiness of servicewomen and servicemen.

METHODS

Given the MWHRIG's focus on research relevant to the health and well-being of women who serve in the Armed Forces, only articles that examined the health of military servicewomen were eligible for inclusion in the systematic review of peer-reviewed research articles published between 2000 and 2010. The project employed a 4-level process to screen the articles and determine final disposition of each article; the MWHRIG Core Leaders directed this process and invited subject matter experts from the DoD, Department of Veterans Affairs, and academic institutions to participate in the effort. A structured hierarchy of evidence was used to grade the strength of the literature, and a defined system for evaluating the quality of the research was employed. MHS utilization data compiled by the Armed Forces Health Surveillance Center was compared with the body of literature. Findings from the literature and the MHS utilization data informed the MWHRIG's gap analysis and recommendations for future research.

RESULTS

Three hundred and seventeen articles were selected for inclusion and categorized by the Core Leaders across the following 8 topics (not mutually exclusive): readiness/health protection/illness prevention, gynecological health, psychological health, deployment health, environmental and occupational exposures, obstetrics/postpartum issues/fertility, chronic disease, and interpersonal violence/sexual trauma. The majority of the reviewed military women's health research literature is related to readiness, health protection, and illness prevention, followed by psychological health, and gynecological health. This distribution of articles across the topics is not surprising, considering the demographics of servicewomen and the health care needs of reproductive-aged women. Single descriptive studies predominate in the reviewed literature, which is unfortunate since this methodological

approach yields a relatively weak level of scientific evidence. Overall, however, the Core Leaders and subject matter experts determined that three quarters of the studies reviewed were of good quality.

CONCLUSIONS

This report identifies research gaps for each of the 8 topics that collectively represent the reviewed literature in its entirety. Empirical findings from research efforts designed to address these significant research gaps could benefit the military in many practical and meaningful ways. While military women would certainly benefit from military medical research that routinely includes a sex-specific focus, spillover effects from rigorous scientific research would likely benefit all military personnel and improve the military forces' overall readiness. This new knowledge base could promote the development of evidence-based health services and policies that will ensure the health of American servicewomen.

INTRODUCTION

Military Women's Health Research Interest Group (MWHRIG) researchers argued in 2010 that the current state of operationally relevant medical knowledge specific to women serving in the military was woefully inadequate. In particular, the lack of empirically based information, derived through rigorous scientific research, compromised essential preventive medicine and interventions to improve military women's health, safety, and performance.[1] The MWHRIG Core Leaders led a multi-year research effort designed to advance the science of military women's health, with funding provided by the TriService Nursing Research Program (TSNRP). The primary objectives were to conduct a comprehensive search and systematic review to identify all relevant peer-reviewed research articles published between 2000 and 2010; to examine how Military Health System (MHS) health care utilization data aligned with the relevant research; and to use these results to identify gaps in knowledge and research about military women's health issues. Findings from this multi-faceted research effort provide the foundation for the MWHRIG to develop a military women's health research agenda.

METHODS

TOPIC DEVELOPMENT

A primary objective of the MWHRIG's systematic literature review was to identify the gaps in knowledge and past research studies about military women's health issues in order to develop a research agenda to remedy the deficiencies. The MWHRIG utilized the 4-step agenda-setting model established by the Health Services Research & Development (HSR&D) Center of Excellence Research Agenda Planning Group of the Department of Veterans Affairs (VA) Greater Los Angeles Healthcare System. With guidance provided by the HSR&D experts, the MWHRIG adopted the research methodology successfully used by VA researchers in 2006 to generate the VA Women's Health Research Agenda.

To meet the MWHRIG's specific objectives, the research methodology was refined to identify research that specifically examined health issues of women serving in the Armed Forces, rather than veteran women. By doing so, the MWHRIG consciously avoided duplicating VA's work on veteran women; refer to the *Systematic Review of Women Veterans Health Research 2004–2008*[3] for the VA's findings and research recommendations.

SEARCH STRATEGY

The MWHRIG searched MEDLINE/PubMed for potentially relevant peer-reviewed research articles on servicewomen and military health published between January 2000 and December 2010. Four different searches were conducted. In the first search, the medical subject heading (MeSH) terms "military personnel" and "medicine" were utilized. This returned 523 articles. Other MeSH term searches included "delivery of health care" and "military personnel" (N=302) and "military personnel" and "medicine" (N=47). A final query was performed on the journal Military Medicine to search for relevant literature, using MeSH terms "women" or "female" or "gender" (N=837).

The MWHRIG Core Leaders supplemented this search by reviewing the extensive list of publications by MWHRIG members who were recognized subject matter experts at the DoD and academic institutions. See Appendix 1 for an excerpt from the Military Women's Health Researcher Guide, 6th edition, that includes a list of members of the MWHRIG.

STUDY SELECTIONS

Articles were selected for inclusion in the systematic review through a 4-level screening process. During Level 1 screening, the Core Leaders reviewed the full list of all potential articles equally among the 4 members. If the title did not immediately reveal its relevance to military women's health research, the Core Leader searched the abstract for inclusion keywords "woman/women," "gender," and "female." Level 1 exclusion criteria were invoked if the article clearly was (1) not sex specific, (2) about medical, nursing, or allied health education, (3) research on a foreign military population, (4) about US veteran women, or (5) research about adolescent/pediatric care. All titles that passed the Level 1 screening were retained for subsequent consideration during the Level 2 abstract screening process.

The abstract of each article screened as potentially relevant during Level 1 was subsequently reviewed by all 4 Core Leaders using the Level 2 form (Appendix 2). To successfully advance from Level 2 into Level 3, each article had to meet all 4 inclusion criteria: (1) the study related to US military personnel; (2) the study involved women service members, compared men and women service members, compared military women with civilian women, or analyzed women separately; (3) the study involved active duty/reservist/National Guard military personnel who were eligible for health care in the MHS, and involved a health condition or functional status that required health service; and (4) the topic was relevant to MHS care or the delivery of MHS care to military women. Articles defined as a nonsystematic review, editorial, case study or series, or an unclear design were excluded from further consideration. During the Level 2 screening process, the Core Leaders collected basic information about each article: military service (if known), study design, setting of research, women's health research topic area, and specific condition(s) studied.

The Core Leaders independently reviewed each article's abstract and completed the Level 2 abstract screener. If the abstract contained insufficient information to answer the screener questions, the full text article was reviewed for clarification. Each Core Leader labeled the article "to be reviewed" or "saved for background." In the event the Core Leaders disagreed about an article's disposition in the Level 2 screen, the Core Leaders would read the article and each member would present her rationale for retaining the article or saving it as background. The article's final disposition was based on the best rationale and required agreement from all members.

DATA ABSTRACTION

After the initial screening process (Levels 1 and 2), articles meeting inclusion criteria advanced to Level 3 and were further evaluated and abstracted using a structured abstract form (Appendix 3). The following data were abstracted: study question, study design, sample size (both female and male), data collection, main findings, and limitations as stated by the author(s).

Each article was assigned to a MWHRIG Core Leader for Level 3 review according to individual expertise/experience, if possible. Additionally, subject matter experts in military health research or women's health care from the DoD, VA, and academic institutions were consulted for an external Level 3 review of each article (see Appendix 4 for a list of subject matter experts who participated). In the event of a Core Leader/subject matter expert discrepancy, the 4 Core Leaders conducted a thorough review of the article and reconciled the differences. The Core Leader was then responsible for "blending" the 2 reviews into a final Level 3 review.

GRADING THE EVIDENCE

Included in the Level 3 review was as assessment of both the level and quality of evidence presented in each article. A hierarchy of evidence was used to grade the literature included in this systematic review. There are several hierarchies from which to choose; given the potential to change practices in military health care with evidence-based results, the team utilized the evidence-based practice approach and the Hierarchy of Evidence of Intervention Studies developed by Melnyk and Fineout-Overholt (2005). According to this rating system, systematic reviews or meta-analysis of randomized controlled trials (Level I) provide the strongest evidence, while reports of expert committees and opinions of authorities (Level VII) generate the weakest possible evidence (see Table 1).

Table 1. Hierachy of Evidence of Intervention Studies

Hierarchy of Evidence Rating System		
I	Evidence from a systematic review or meta-analysis of all relevant randomized controlled trials, or evidence-based clinical practice guidelines based on systematic reviews of RCT's	Strongest
II	Evidence obtained from at least 1 well-designed RCT	
III	Evidence obtained from well-designed control trials without randomization	
IV	Evidence from well-designed case control and cohort studies	
V	Evidence from systematic reviews of descriptive and qualitative studies	
VI	Evidence from a single descriptive or qualitative study	
VII	Evidence from the opinion of authorities and/or reports of expert committees	Weakest

Modified from Melnyk and Fineout-Overholt, 2005.[4]

Studies that provide the strongest evidence possible would ideally inform best clinical practices and interventions, but randomized controlled trials across myriad women's health topics and practices represented in the literature are neither possible nor practical. Results from study designs that must necessarily be accepted as "weaker" than results from randomized controlled trials still serve an important purpose for clinicians, researchers, and policy makers. The evidence levels in this review should be interpreted based on the context of the purpose of the reader's inquiry. Complete source citations for each article reviewed are provided to allow the reader to personally examine the full text and interpret presented findings.

Level 3 also included an assessment of the quality of the evidence as presented in each article, using the modified Johns Hopkins Nursing Quality of Evidence Appraisal (2007; see Table 2). Studies with evidence of the highest quality level (grade "A") benefit from a good research design, while major research design flaws tend to result in evidence that is of a low quality level (grade "C"). The Core Leaders chose this rating system because of its relevance and widespread usage in evidence-based practice.

Table 2. Johns Hopkins Nursing Quality of Evidence Appraisal

Level of Quality			
Grade	Level	Research	Non-research
A	High	Consistent results, sufficient sample size, adequate control and definitive conclusions; consistent recommendations based on extensive literature review that includes thoughtful reference to scientific evidence	Expertise is clearly evident.
B	Good	Reasonable consistent results, sufficient sample size, some control, and fairly definitive conclusions; reasonable consistent recommendations based on fairly comprehensive literature review that includes some reference to scientific evidence	Expertise appears to be credible.
C	Low or major flag	Little evidence with inconsistent results, insufficient sample size, conclusions cannot be drawn	Expertise is not discernable or is dubious.

Modified from Johns Hopkins Nursing Quality of Evidence Appraisal, 2007.[5]

DATA SYNTHESIS

Data were initially categorized a priori based on Veteran Women's Health topic areas that the VAHSR&D Systematic Review of Women Veterans Health Research 2004-2008 identified. These topic areas included:

- Gender-specific care and reproduction
- General health/conditions
- Mental health (including posttraumatic stress disorder [PTSD])
- Substance abuse (including tobacco)
- Trauma (including injury and intimate partner violence [IPV] and domestic violence)

The MWHRIG team categorized the reviewed literature across the 5 topics; the results of this thematic analysis revealed incomplete alignment between the topics and existing research. The Core Leaders revised the topic areas to capture fully the existing research literature focused on health-related issues of women serving in the US military.

RESULTS

LITERATURE FLOW

The literature search identified 1155 titles and subject matter experts suggested an additional 256 titles for inclusion in this systematic review, for a total of 1411. At this point, the Core Leaders performed Level 1 screenings with all the titles; 899 articles were rejected either because they did not meet the title screening criteria, or they were (1) not sex specific, (2) related to medical education (3) related to foreign military personnel, (4) related to US veteran women, or (5) studies with adolescent or pediatric female samples.

The Core Leaders next scrutinized the remaining 512 articles during the Level 2 screening process. They dismissed 195 articles from further review because the articles (1) were not related to US military personnel, (2) did not include military servicewomen in the sample, (3) did not compare servicewomen to servicemen or to civilian women, (4) did not involve a health condition that requires health services, (5) were not relevant

to the US MHS or how care is delivered to servicewomen, or (6) were a nonsystematic review of literature, an editorial or opinion article, a case study or series, or had unclear methods. In the end, 317 peer-reviewed publications met the criteria necessary to be included in the systematic review (see Figure 1).

The Core Leaders further evaluated the remaining 317 articles. All articles were initially categorized into the following 8 topics, which were not mutually exclusive: readiness/health protection/illness prevention (n=119), gynecological health (n=59), psychological health (n=87), deployment health (n=32), environmental and occupational exposures (n=16), obstetrics/postpartum issues/fertility (n=33), chronic disease (n=22), and interpersonal violence/sexual trauma (n=22; see Figure 1).

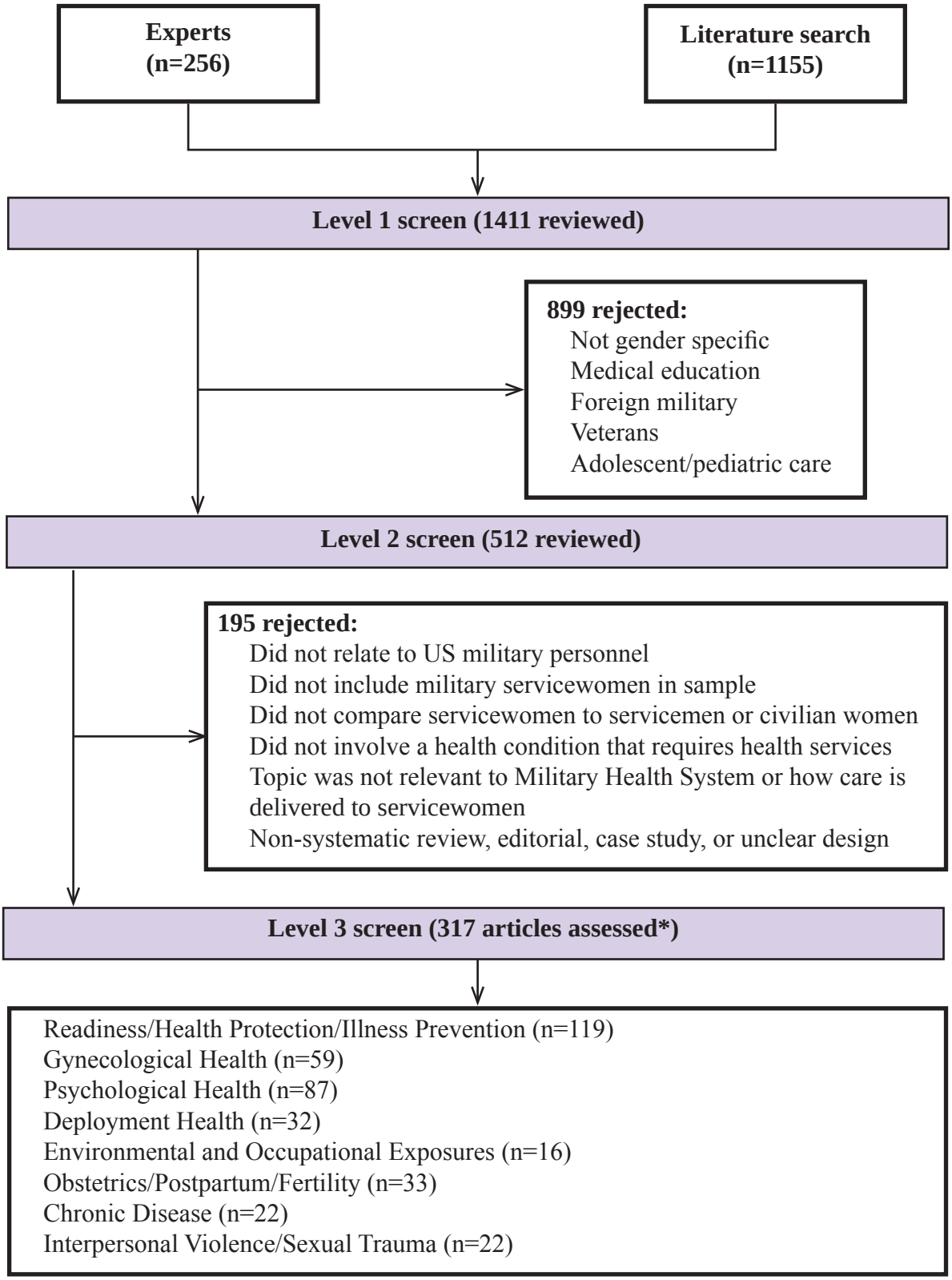

Figure 1. Literature flow. *Categories are not mutually exclusive; articles are categorized across topics.

DESCRIPTION OF EVIDENCE

Across the 317 research articles in the Level III review, nearly 70% described single descriptive studies (Level VI in the evidence hierarchy), with Level IV (primarily cohort) studies constituting another 25% of the total. There were only 12 controlled trials (4%), and of those only 5 were randomized (Level III). There were 6 systematic reviews (Level V), making up only 2% of the literature. Two Level VII (expert opinion) articles were included due to the relevance of the topic or the paucity of existing research that experts of that field consider to be essential. Nearly three quarters of the literature was graded as good quality, with 14% as high quality. Four percent of the evidence was graded as low quality by consensus of the Core Leaders and the subject matter experts (see Figure 2).

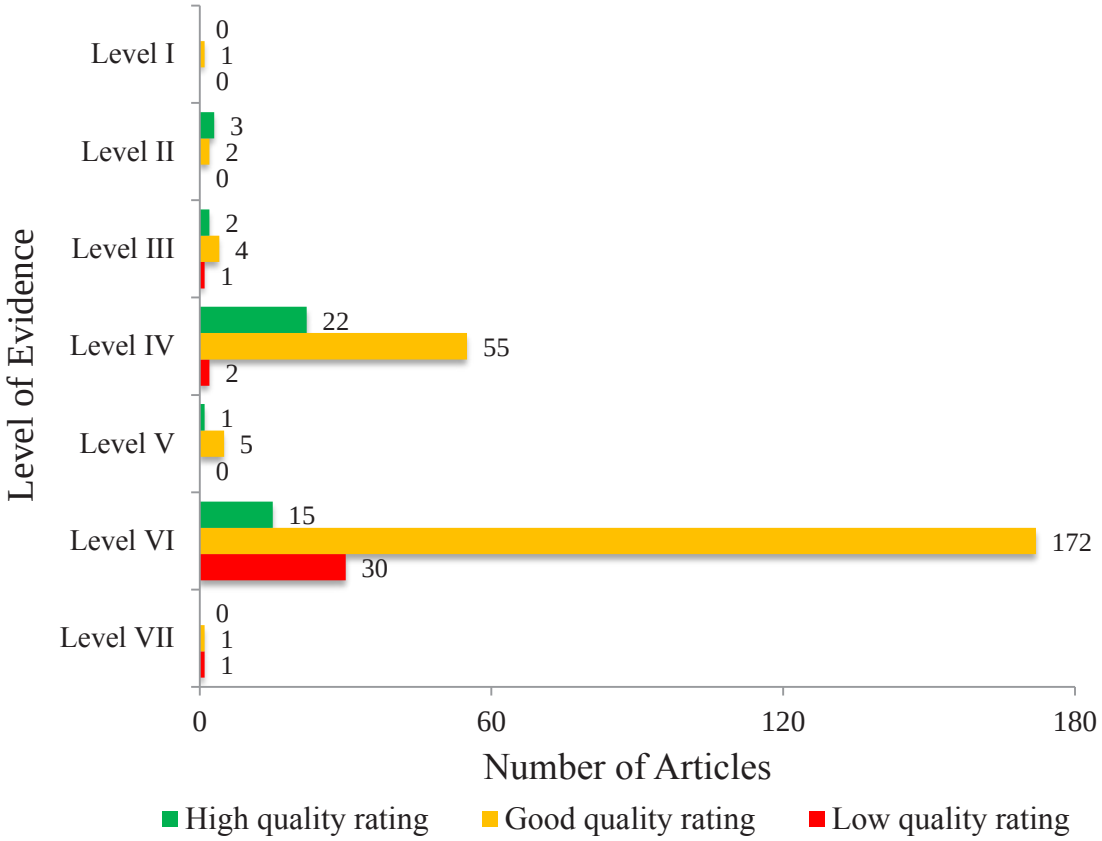

Figure 2. Level of evidence and quality rating across reviewed articles.

READINESS/HEALTH PROTECTION/ILLNESS PREVENTION

A total of 119 readiness, health protection, and illness prevention research articles were identified; more than 30% (n=38) of the articles focused on musculoskeletal issues. Twenty-two articles concerned exercise and fitness, and 25 articles focused on nutrition, energy, and weight. Studies examining health care use (n=11), as well as more focused research on complementary and alternative medicine (CAM; n=2) and eyes, ears, nose, and throat (n=10) topics were reviewed. Other issues surveyed include vaccines (n=7), healthy and risky behaviors (n=12), acute illness (n=5), and nondeployable status (n=2).

Exercise/Fitness

Twenty-two articles investigated exercise and fitness issues. Most were descriptive studies of good (n=12; Level VI-B) or low (n=2; Level VI-C) quality. There were 6 cohort studies with high (n=1; Level IV-A) or good (n=5; Level IV-B) quality. There was a single well-designed controlled trial without randomization (Level III-C) and a systematic review of good quality (Level V-B).

Researchers explored the relationship between physical fitness and body mass index (BMI) in 6 articles. Gender differences were not always significant. For example, the Army Physical Fitness Test (APFT) failure rate was similar between men and women.[6,7] Male and female soldiers who exceeded the body fat standards but passed a study assessment and completed training remained in the Army at the same rate as those who met the body fat/weight standards.[8,9] Weight gain and BMI increased with age despite physical fitness requirements.[6,10,11] Successful Navy physical readiness testing was predicted by sailors who were normal/underweight, BMI within standards, officer rank, and aged 30 years or older.[11] One sex difference noted was that when stratified by sex, the mean BMI for females was normal whereas the mean BMI for males was overweight.[11]

Some studies included female-only samples. Two exercise evaluation studies during and after pregnancy were reviewed. One descriptive study described pregnancy and birth outcomes of military women who exercised.[12] Another descriptive study measured APFT scores after pregnancy.[13] Researchers described the incidence rate and risk factors for stress fracture injuries among female recruits during basic military training.[14,15] A laboratory study with a mixed-sex sample did not find a link between a bone resorption biomarker and stress fracture during Marine recruit training.[16]

Researchers reported results from intervention studies for weight loss and injury or illness during basic military training. One weight loss study reported that during usual outdoor training, women expended less caloric energy than men.[17] Given the military's overall concern with total force fitness, weight loss intervention studies with military personnel targeted men and women.[18,19] Women had a higher injury incidence than men during training.[20-22] Exercise interventions improved final physical fitness scores with reduced injury and attrition.[22-26] Women who completed Marine Corps recruit training had improvement in their overall mood compared with their baseline assessment during initial training and compared with college women.[27]

Complementary and Alternative Medicine

Two articles addressed CAM use. The studies were descriptive with different levels of quality, from good (n=1; Level VI-B) to low (n=1; Level VI-C). In both studies, CAM use was higher among women than men.[28,29]

Vaccines

Vaccines were discussed in 7 articles that evaluated outcomes following the receipt of anthrax (n=4), hepatitis A (n=1), influenza (n=1), and smallpox vaccines (n=1). The cohort studies included both high (n=3; Level IV-A) and low (n=1; Level IV-C) levels of quality. The only systematic review was assessed as being of good quality (Level V-B). Two descriptive studies also had good quality (Level VI-B).

Three articles reported outcomes for mixed-sex samples. Researchers did not find sex differences with hepatitis A seroprevalence following a premilitary service vaccination.[30] However, following receipt of

the influenza vaccine, women had a higher influenza-like illness rate compared with men.[31] Similarly, after receiving the anthrax vaccine, women compared with men had a higher rate of localized effects that temporarily interfered with their performance of military duties.[32]

The remaining studies reported results for female-only samples. The only non–pregnancy-related study found no difference between anthrax-vaccinated and unvaccinated women in the number of their subsequent medical care visits.[33] Among the pregnancy-specific studies, researchers reported no difference in pregnancy rate, birth rate, or adverse birth outcomes between women who received the anthrax vaccine before pregnancy compared with women who did not.[34] Inadvertent administration of the smallpox vaccine to pregnant women did not result in preterm delivery or birth defects in liveborn infants.[35] Results from 1 study suggested a slightly increased rate of birth defects in infants whose mother received the anthrax vaccine during the first trimester; however, this was not statistically significant in the primary analysis.[36]

Nutrition/Energy/Weight

Nutrition, energy, and weight were the focus of 25 articles. The majority (n=15) were single studies with good (n=14; Level VI-B) and low (n=1; Level VI-C) levels of quality. Three cohort studies were rated as having either high (n=1; Level IVA) or good (n=2; Level IV-B) levels of quality. Also reviewed were a single systematic review of good quality (Level V-B), 2 well-designed, double-blind randomized controlled trials of high quality (Level II-A), and 3 controlled trials without randomization of good (n=2; Level III-B) and low (n=1; Level III-C) quality. Finally, a nonresearch article (Level VII-C) was included in this review because of its policy-relevant findings.[37]

Three studies reported sex differences among overweight service members.[38-40] Compared with male recruits, female recruits were more likely to be underweight and were more likely to be discharged for medical reasons during basic training.[41,42] Recruits with waivers for being underweight were discharged more frequently than normal weight recruits.[43] Muscle mass increased and body fat decreased over the course of Marine recruit training.[27]

Women reported disordered eating during recruit training[44] and following a combat exposure deployment.[45] Current weight dissatisfaction was reported in women who dieted in the past, had a higher BMI, or worried about meeting military weight standards.[44] Researchers reported many risk factors for disordered eating among female military personnel.[45,46]

Women in basic training experienced decreased iron levels.[47-49] Iron supplement intervention for women improved their health and mood outcomes during basic combat training (BCT).[50] During Army BCT, women consumed fewer calories than men.[51] Twice-daily consumption of iron-fortified food improved the iron status in iron-deficient anemic female soldiers.[47] Healthy food choices were correlated with healthy fitness lifestyles for women.[52] Men were more likely to use ergogenic nutritional supplements than were women.[53]

Women typically expended less energy than men did while engaged in similar activities.[54] During training, women's weight and BMI increased while fat decreased and fat-free mass increased.[55] During an outdoor training exercise, men lost more weight and experienced a greater total energy deficit than women.[17] One study evaluated the physiological and fitness outcomes of men and women wearing body armor.[56]

Waist circumference and BMI may underestimate obesity compared with direct assessment of body fat.[57] Nonpregnant women within weight standards did not have abdominal girth above military standards.[58] Three fourths of women enrolled in a weight management program were compliant.[59] Two intervention weight loss studies were successful for both men and women.[18,19]

Healthy and Risky Behaviors

Twelve articles focused on healthy and risky behaviors. Most were descriptive single studies of varying quality, including high (n=1; Level VI-A), good (n=6; Level VI-B), and low (n=3; Level VI-C). Articles reporting results from a randomized controlled trial (Level II-B) and a controlled trial without randomization (Level III-B) were also reviewed.

Of the 4 studies that focused on healthy behaviors, only 1 included a mixed-sex sample. In this study, researchers taught a healthy lifestyle behavioral intervention, but no sex difference in psychological measurements or weight loss was found.[18] Results from the female-only studies suggested that the most influential factors on women's health-promoting behaviors include self-efficacy, interpersonal influences, social strata, and perceived health status.[60,61] Researchers also reported that clinical breast examinations were more thorough when health care providers used a checklist.[62]

Risky behaviors are expensive and can contribute to premature attrition from military service. The DoD expends an estimated $2.1 billion per year for medical care and $965 million per year for nonmedical costs associated with being overweight, tobacco use, and high alcohol consumption.[38] Health risk behaviors that predicted discharge from the Marine Corps were smoking and unsafe sexual behaviors 3 months prior to recruit training.[42]

Studies about risky behaviors generally included mixed-sex samples. Men were more likely than women to engage in risky behaviors such as using ergogenic nutritional supplements,[53] gambling,[63] and heavy alcohol consumption, including binge drinking.[38,64,65] Women were more likely to have a tattoo, which independently was a risk factor for smoking, drinking heavily, using smokeless tobacco, and riding in a vehicle with someone who was drinking.[66]

In female-only studies, researchers found that alcohol or drug use prior to military service put women at risk for sexually transmitted infection (STI) and/or human immunodeficiency virus (HIV) transmission.[67] Women were more likely to test STI positive after reporting back from a vacation.[68]

Eyes, Ears, Nose, and Throat

Eyes, ears, nose, and throat issues were the focus of 10 articles. The descriptive studies demonstrated good (n=7; Level VI-B) and low (n=1; Level VI-C) levels of quality. Cohort studies that were high (n=1; Level IV-A) and good (n=1; Level IV-B) quality were also reviewed. Men were reported to be at greater risk than women for hearing loss,[69-74] eye injury,[75,76] and oral-maxillofacial fractures.[77] Men and women who received waivers for myopia attrited from military service at similar rates.[78]

Musculoskeletal Injury

Nearly one third (n=38) of the readiness/health protection/illness prevention articles addressed musculoskeletal injuries. Descriptive single studies of good quality (n=18; Level VI-B), along with an article with high (Level VI-A) and another of low (Level VI-C) quality, were reviewed. Cohort studies were

determined to have high (n=3; Level IV-A), good (n=11; Level IV-B), and low (n=1; Level IV-C) levels of quality. Two systematic review studies of good quality (Level V-B) and a nonsystematic review of good quality (Level VII-B) were also reviewed.

Studies reported that a lower level of fitness,[21,24] lower aerobic capacity, lower muscular endurance, or a history of smoking were associated with injury incidence.[20] Since women enter the military with lower fitness levels than men,[21] it is not surprising that women then experience more injuries than men during training.[20,21,79] In fact, 1 study reported that female soldiers had nearly twice the injury rate and more than 3 times the illness rate of male soldiers,[80] while another study reported that nearly 5% of female Marine Corps recruits experienced a stress fracture injury during recruit training.[14] Gender differences in injury rates may significantly affect career outcomes. Female Marine recruits who suffered lower extremity injuries and stress fractures during basic recruit training were unlikely to complete first-term enlistment or were not promoted to Corporal.[81]

A few studies did not find sex differences in injury rates or associated medical care. In the Army airborne population, women experienced similar rates compared with men of overuse injuries and fractures and a higher rate of stress fractures.[82] In a cohort study that analyzed disease nonbattle injury (DNBI) of Army personnel deployed to Operation Iraqi Freedom, females had a significantly increased incidence rate ratio for becoming a DNBI casualty.[83] Similarly, evidence of a sex effect in the return-to-duty rate following amputation during the Afghanistan conflict was not found; however, this may be due to the small sample size.[84]

Gender differences in injury rates were reported frequently. Women were more likely to experience symptoms from musculoskeletal injuries that interfered with performance of their military duties.[85] Higher rates for other injuries were observed among women, including rates for overuse injury, lower extremity overuse injury, overall time-loss injury, time-loss overuse injury, and time-loss lower extremity overuse injury.[86] Other studies reported that military women had a higher incidence of both lateral epicondylitis (tennis elbow) and de Quervain's tenosynovitis (thumb tendonitis) than men.[87,88] Women were reported to be at higher risk than men for osteoarthritis in the hip,[89] knee injury,[90] and ankle sprains.[91] Researchers did not find sex differences in the risk for knee re-injury.[92] Among military vehicle mechanics, higher traumatic injury rates were observed among men.

A number of studies examined risk factors for different types of injuries suffered by women, including knee injuries[90,93-95] and stress fracture injuries.[14-16,96-98] Other studies identified predictors of injury and injury-related outcomes. Anatomical measurements of the hips and knees predicted the likelihood of patellofemoral pain syndrome and shin splints.[99] Education, length of military service, and job satisfaction were identified as predictors of disability discharge for knee conditions.[100] Pelvic stress fractures among female military personnel were associated with shorter stature, leaner body type, and Asian or Hispanic race/ethnicity.[101]

Two studies looked at interventions to improve fitness levels or reduce injury rates in women.[25,102] After a musculoskeletal injury, women who rehabilitated during BCT were less likely to complete BCT than comparable men.[103] BCT injuries were correlated with older age, other than Caucasian race, E-4 (compared with E-1), and a concurrent self-reported illness.[104] Women training in the summer had a higher risk of time-loss traumatic injuries.[105] Factors associated with stress fracture injuries were older age, current or

past smoking, amount of smoking, drinking more than 10 alcoholic drinks per week, corticosteroid use, and lower adult weight.[106] Oral contraceptives were not recommended for prevention of physical training orthopedic injuries.[107] A screening program for new recruits suggested that significantly more women than men had physical restrictions.[108]

Health Care Utilization

Utilization of health care was discussed in 11 articles. The descriptive single studies were of varying quality, including high (n=1; Level VI-A), good (n=7; Level VI-B), and low (n=2; Level VI-C). The sole cohort study was determined to be of high quality (Level IV-A).

Women's willingness to seek medical care,[109-114] mental health care,[115] and dental care[116] was described in 8 studies. Compared with women who did not deploy, deployed women had more health care use 5 years after deployment.[117] Nearly all women had a ninth-grade reading level or above with adequate health literacy skills needed to understand health care instructions.[118] Combat duty was associated with high use of mental health services and attrition from military service after deployment.[119]

Acute Illness

Five articles addressed acute illness. Three cohort studies of good quality (Level IV-B) and 2 descriptive studies of good quality (Level VI-B) were reviewed in this section.

Men had a higher age- and race-adjusted mortality rate than women in the Army and Navy. There were no sex differences among Marine recruits in mortality rates and no deaths of female Air Force recruits.[120] Bell's palsy incidence rates increased with age and were higher among females, blacks, Hispanics, married persons and enlisted service members.[121] Heat illness occurred more often in women than in men.[122] BMI was not associated with heat illness in women but was predictive for men.[123] Female soldiers had a lower risk of hospitalization for acute respiratory illness; but when ill, they were ill for a longer period of time than males, and they also waited longer than males before seeking care for their illness.[124]

Nondeployable Status

Two articles focused on nondeployable status. The studies, including a cohort study of high quality (Level IV-A) and a descriptive study of good quality (Level VI-B), focused on specific reasons for nondeployable status. The leading causes for disability in Navy women were musculoskeletal and mental disorders.[125] Gynecological health conditions accounted for 3% of medical problems contributing to nondeployable status.[126] The average age for pregnancy, a medical condition that triggers a change from deployable to nondeployable status among female military personnel, was 24 years.[126]

Summary

Exercise and fitness research in military personnel was conducted in the training and garrison (nondeployed) settings during physical fitness testing. The impact of overweight BMI, injury, and stress fractures on fitness was reported. CAM use was higher among women. There was a slight increase in birth defects, though statistically nonsignificant, for women who received the anthrax vaccine during the first trimester. Smallpox vaccination given to pregnant women in the first trimester was not associated with preterm delivery or birth defects in liveborn infants. Excessive weight had a negative effect on women's military training and subsequent ability to continue in the military. Intervention studies showed great promise in promoting healthy transition to the demands of military physical training. Dietary

research during and after training offered limited information. Some healthy behavior studies were available, but most of the evidence available was on risky behaviors of service members. Men were more at risk for hearing loss, eye injury, and oral-maxillofacial fractures. Women were at greater risk for injuries and illnesses during training compared with men. Though the section on musculoskeletal injury contained the most studies within this section (n=38), these descriptive studies covered a broad range of topics.

GYNECOLOGICAL HEALTH

Fifty-nine articles addressed gynecological health. One third (n=22) of the articles addressed contraception and almost 30% (n=17) of the articles discussed STIs. A number of studies focused on specific types of gynecological health, including sexual health (n=6), vaginal health (n=6), and urological health (n=2). Hygiene (n=7) and menstruation (n=13) were also examined. Cancer research focused on breast cancer (n=5) and cervical cancer (n=5).

Contraception

Twenty-two articles addressed contraception issues. The majority of literature (n=17) on contraception represented single studies (Level VI), had low (n=1; Level VI-C), good (n=16; Level VI-B), and high (n=1; Level VI-A) quality of evidence. There was a high-quality randomized controlled trial (Level II-A) and 2 cohort studies of good quality (Level IV-B). A nonresearch article (Level VII-C) was included in this review because of its policy-relevant findings.[37]

Fourteen articles described the provision and use of contraception among military women,[37,127-138] with varied investigations into knowledge, attitudes, and decision making on contraception, type and frequency of methods used, and side effects. Education, knowledge and use of oral contraceptive pills (OCPs) for menstrual cycle control or menstrual suppression were included in 6 articles[128,129,131,137,139,140]; although desire was high, knowledge and use of OCPs for this purpose was low. Contraception was also investigated in relation to unplanned pregnancies and emergency contraception (EC). In 11 articles,[132,133,135,136,138,141-146] findings on planned and unplanned pregnancies included the relationships between contraceptive knowledge and use, demographic correlates, and family planning. Knowledge, on the part of both providers and patients, availability, and use of EC was reported in 3 articles.[37,127,147]

Sexual Transmitted Infections

STIs were discussed in 17 articles, ranging from a randomized controlled trial to single studies, most of good to high quality. The single descriptive studies included all levels of quality, including high (n=2; Level VI-A), good (n=6; Level VI-B), and low (n=1; Level VI-C). The cohort studies were high (n=1; Level IV-A) and good (n=4; Level IV-B) quality. There was a high-quality randomized controlled trial (Level II-A) and 2 nonrandomized controlled trials that were of high (Level III-A) and good (Level III-B) quality.

The prevalence of STIs in female military populations was documented in 12 articles,[67,68,133,148-156] 6 of which were specific for *Chlamydia trachomatis* and 4 that included *Neisseria gonorrhopoeae*, *C. trachomatis*, *Trichomonas vaginalis*, herpes simplex virus 2, and human papilloma virus (HPV). Five articles reported results on screening or testing procedures for STIs, including self-testing methods.[68,149,153,157,158] Six articles described risk factors associated with STIs in military women, including demographics, behaviors, and sexual history.[67,133,136,150,152,159] Programs for prevention of STIs and the promotion of safe sex were evaluated

in 14 articles,[67,68,133,136,145,148-156] 2 of which included HIV.[67,136] One article investigated access to health care for STI prevention and treatment.[145]

Sexual Health

Six articles discussed sexual health, including the impact of military culture and policies on sexual health. Five presented findings from single descriptive or qualitative studies (Level VI) with quality ratings of low through high. A nonresearch article (Level VII-C) was included in this review because of its policy-relevant findings.[37] Policies related to sexual conduct were investigated in 2 studies,[37,145] including the impact of policies on sexual behaviors, sexual relationships, prevention and treatment of STI, and pregnancy. Four articles identified risky sexual behaviors among military women that would compromise sexual health,[68,145,159,160] including alcohol use, use of protection from pregnancy and STIs, and sexual history. Five articles discussed reproductive health education of service members, including sexual health and awareness training, individualized counseling, and policies related to education on sexual health.[37,68,145,155,160]

Vaginal Health

Vaginal health was addressed in 6 articles, with the evidence provided by a cohort study of good quality (Level IV-B), and 5 single studies of high (n=1; Level VI-A) and good (n=4; Level VI-B) quality. Five articles reported on symptoms of vaginal infections (other than STIs),[156,161-164] including bacterial vaginosis and candidiasis vaginitis. Three discussed correlated behaviors,[156,163,165] such as douching, other feminine hygiene practices, and sexual practices. Three articles reported on testing methods, including self-testing, to determine causes for vaginal infections other than STIs.[156,162,164]

Urological Health

Urological health was covered in 2 articles, primarily reporting on urinary tract infections (UTIs), risk factors, and behaviors.[163,166] Both articles were single studies of good quality (Level VI-B), and both captured self-reported UTI symptoms and correlated behaviors, such as postponing urination and self-imposed fluid restriction, with UTI symptoms.

Hygiene

The issue of feminine hygiene was observed in 7 articles, all single studies of good quality (Level VI-B). Five articles illuminated the negative impact of the environment on hygiene and menstrual hygiene practices,[139,140,167-169] while 2 of these articles specifically described altered feminine hygiene practices in the field environment.[168,169] Hygiene-related health outcomes were identified in 3 articles.[140,168,169] Five publications recommended that education on feminine and menstrual hygiene in field or deployed environments be provided to female service members.[131,139,167-169]

Menstruation

The literature on menstruation in military women included 13 articles; most (n=11) were single studies of good quality (Level VI-B). Two other studies were cohort studies of good (Level IV-B) and high (Level IV-A) quality of evidence. Symptoms, attitudes, and menstrual suppression were addressed in 10 articles. While symptoms associated with menstruation were reported as bothersome to women in 4 studies,[137,139,140,170] burden and lost duty time was low overall in 1 study.[129] Job stress was associated with premenstrual symptoms in 1 study,[170] and life events were associated with menstrual symptoms in 1 study.[171] Amenorrhea[161,172] and irregular bleeding[128,131,172] were common complaints in theater. Six studies reported that women desired menstrual suppression,[128,129,137,139,140,167] yet there was little use of OCPs to induce

amenorrhea reported overall.[128,129,137,139] While 1 article[101] reported no association between amenorrhea and stress fractures in women, 1 article[14] reported an association with stress fractures, specifically pelvic and femoral, and amenorrhea in women who had slow run times.

Cervical Cancer

Aspects of cervical cancer were discussed in 5 articles that were all single studies of good (n=4; Level VI-B) and low (n=1; Level VI-C) quality. Cervical cancer screening (ie, Pap smears) of active-duty female personnel was reviewed in 4 studies,[128,131,173,174] with specific investigation into HPV screening in 1 study.[174] One study examined cervical cancer survivors' quality of life.[175]

Breast Cancer

Five articles examined issues related to breast cancer in military women, including 2 cohort studies of good (Level IVB) and high (Level IVA) quality and 3 single studies of good (n=2; Level VIB) and low (n=1; Level VIC) quality. Researchers focused on screening guidelines, mammograms, and/or clinical breast exams.[62,176] Breast cancer prevalence rates among military women were reported,[177,178] while another study explored the impact of breast cancer on military women's careers.[179]

Summary

The level of evidence for gynecological issues in military women was mainly from single descriptive or qualitative studies (Level VI), mostly with good quality ratings (Grade B). More than two thirds of the literature on gynecological health in military women focused on sexual health, including protection from consequences of sexual relationships such as STIs and unplanned pregnancy. There was a predominant focus on the prevalence, testing, risk factors, and prevention of *C. trachomatis* in young female service members. The knowledge deficit and use of contraception indicates that service members, both men and women, would benefit from information on contraceptives and family planning. Furthermore, while the literature identified menstrual disorders in this population, there was an identified gap in knowledge on the use of contraceptives for menstrual cycle control, suppression, and management of symptoms. Common infections other than STIs were identified as bacterial vaginosis, candidiasis, and UTIs; the main risk factor identified was the field environment. The research on cancer in the active-duty population was centered on screening procedures for the detection of cervical cancer and breast cancer, in particular, Pap smears for cervical screening.

PSYCHOLOGICAL HEALTH

Eighty-seven articles examined psychological health. Addictions (n=29), mood disorders (n=23), and stress (n=24) each comprised approximately 25% of the articles in this area. Twelve studies focused on suicide and 14 studies examined PTSD. Other disorders examined included eating disorders (n=6) and personality disorders (n=3). Eight articles investigated mental health care use.

Eating Disorders

Six articles with good quality evidence, including 4 single studies (Level VI-B) and 2 cohort studies (Level IV-B), addressed eating disorders in military females. One article noted that between 1998 and 2006, the prevalence of anorexia nervosa, bulimia nervosa, and eating disorders not otherwise specified (NOS) in military women had decreased from previous self-reported rates and were lower than in the general population.[180] Four articles reported that rates of females with eating disorders were higher in the Marines than in the other services.[44,45,180,181]

Relationships of eating disorders to various sociodemographics were included in all the reviewed articles.[44-46,180-182] Five of the articles, [44-46,180,182] including a meta-analysis,[182] reported that female service members had higher rates of eating disorders than their male counterparts. Caucasian females were reported as having a higher rate of eating disorders than females of other races,[44,45,180,182] although 1 article found no association between race and eating disorders.[46] This same article also found no relationship between risk of disordered eating and education level or obesity (BMI of >30).[46] Education,[44] BMI,[44,182] being overweight,[44,46,182] and weight dissatisfaction were reported as predisposing factors to eating disorders.

Reported weight dissatisfaction in females was significantly correlated with race/ethnicity, education, and region of origin.[44] Dissatisfactions in self-esteem and/or body image were correlated with eating disorders in females.[182] A study that examined stressful life events and eating disorders found that a greater proportion of enlisted females on active duty with combat related deployments developed new-onset disordered eating.[45] A history of past major life stress,[182] a diagnosed mental disorder,[45,46,182] misuse of alcohol,[182] or adherence to a special diet for weight loss[182] were also reported as significant contributing factors for eating disorder symptoms.

Posttraumatic Stress Disorder

PTSD was covered in 14 articles. Of these articles, most were single descriptive studies of all levels of quality, including high (n=1; Level VI-A), good (n=6; Level VI-B), and low (n=1; Level VI-C). The cohort studies were high (n=3; Level IV-A) and good (n=1; Level IV-B) quality. Two other high quality papers were reviewed, including a controlled trial without randomization (Level III-A) and a systematic review (Level VA). The effects of Operation Iraqi Freedom (OIF)/Operation Enduring Freedom (OEF) deployments on PTSD diagnoses in female service members were provided in 10 of the 14 articles.[119,183-191] One article described types of mental health-related hospital admissions for US Army soldiers in Iraq and Afghanistan during 2002–2004 and found that the most common diagnoses were mood, adjustment, and anxiety disorders (including PTSD).[183] Of deployed OIF personnel who sought mental health care during deployment, 27% were female, which was disproportionately high when compared with the percentage of females in the Army and Marines during this period.[186] Being female with combat duty in support of OIF was associated with a higher use of mental health services and with greater attrition from military service after deployment.[119]

Four articles reported prevalence of PTSD in military females.[119,189,190,192] PTSD, major depressive disorders, panic syndromes, and other anxiety syndromes were higher in military females than males, whereas alcohol abuse was higher in males.[192] PTSD-related diagnoses were higher among deployed female service members than among deployed male service members.[119,189,190] More females than males met the criteria for PTSD with combat exposure experiences, but PTSD rates were more similar across men and women when they were in combat support units.[189] One study reported that there were no sex differences in service members with a diagnosis of persistent PTSD, but that a greater number of females had a diagnosis of new-onset PTSD.[188] Researchers also reported that among both men and women, individuals who reported more types of military sexual stressors had significantly more severe PTSD, depression, and anxiety symptoms than individuals who reported fewer or no sexual stressors.[193] Deployment length affected depression and posttraumatic stress symptoms in males, but not females; previous deployment experiences affected posttraumatic stress symptoms and depression in both sexes with no difference.[187]

More female than male service members had preexisting factors that could highly predict development of PTSD or depressive disorders during a deployment.[194] Results from a PTSD screening survey administered during deployment suggested that PTSD and depression were among the most commonly identified disorders for female military personnel.[195] In fact, the probability of screening positive for PTSD was higher for female than male military personnel.[185]

Personality Disorders

Three cohort studies of high (n=1; Level IV-A) and good (n=2; Level IV-B) quality discussed personality disorders. One article reported results from a retrospective review of records from the Defense Manpower Data Center and the Defense Medical Surveillance System regarding the demographic and clinical characteristics of deployed military service members evacuated from OIF/OEF for psychiatric reasons.[196] A greater percentage of female military personnel than male military personnel were evacuated from OIF/OEF for psychiatric reasons. Of the evacuated military personnel, the psychiatric diagnostic categories of personality disorders, mood disorders, adjustment disorders, and anxiety disorders were the most common.

Two articles provided findings concerning psychiatric-related hospitalization of military personnel.[197,198] Among Navy enlisted personnel, females were more likely than males to have first-time hospitalizations for a personality disorder.[197] This article further reported that the population of females had higher rates of affective, histrionic, other, and unspecified personality disorders. The second article reported that rehospitalizations were correlated with being female only in analyses that did not control for active-duty status.[198]

Suicide

Twelve articles examined suicide. The single descriptive studies had good (n=5; Level VI-B) and low (n=2; Level VI-C) levels of evidence quality. The cohort studies were high (n=2; Level IV-A) and good (n=3; Level IV-B) quality. Most research (n=7) involved secondary analysis of existing military records to identify personnel with suicidal ideation, history of suicide attempts, mental disorders associated with suicide, or other factors associated with suicide.[83,119,183,199-202] The remaining studies (n=5) discussed self-reported suicidal ideation and behaviors of military survey participants.[203-207] Two studies suggested that suicidal behaviors were highest among personnel in combat units,[83,183] while other studies found the highest rates of suicidal behaviors were among Army personnel when compared with personnel from other services.[200,202]

Ten articles assessed suicidal behaviors among both males and females,[83,119,183,199-202,204,206,207] while the other 2 studies limited their samples to female subjects only.[203,205] Most studies reported that female military personnel were at increased risk for suicide or suicide-related conditions compared with male military personnel and their female civilian counterparts.[83,183,199,201,203,205] Opposite results were reported in 2 articles, both of which measured suicidal ideation among recruits and personnel in basic training, which suggested that men were at increased risk for suicide when compared with women.[200,202] Results from a longitudinal survey of combat medic students[208] found no significant difference in suicidal ideation by sex at intake or follow-up.[206] Another study reported no sex differences in suicidal ideation and attempts among active-duty Navy personnel during the deployment cycle.[207] Results from a video-based suicide prevention program found that the program's effectiveness was greater among women, though all participants demonstrated decreased levels of emotional distress by the program's conclusion.[66,159,204,209]

Addictions

Twenty-nine articles examined questions about alcohol and tobacco use. Most were single descriptive studies of high (n=4; Level VI-A), good (n=13; Level VI-B), and low (n=1; Level VI-C) levels of evidence quality. The cohort studies were high (n=3; Level IV-A) and good (n=6; Level IV-B) quality. Two well-designed randomized clinical trials (Level II-B) were also reviewed. Most research focused exclusively on either tobacco use (n=13)[10,20,85,131,208,210-217] or alcohol consumption (n=9),[65,159,186,192,195,209,218-220], and only a limited number of studies considered both behaviors (n=4).[38,63,64,66]

A few studies did not fully specify the substance use behaviors,[198,221] and only 1 study explicitly discussed drug abuse.[183] Of these articles, 2 studies considered generally the characteristics of different patient populations, including women who received outpatient care from a military substance use disorder treatment center[221] and soldiers hospitalized for mental disorders following deployments in support of OIF and OEF.[183]

Compared with other mental health disorders, alcohol abuse was among the most common diagnoses across different military populations, including soldiers seeking outpatient mental health care,[195] participants of a large DoD-longitudinal survey cohort,[192] and soldiers admitted for inpatient mental health care.[183] A frequently replicated sex-specific finding for both alcohol and tobacco use was that men consume both substances at significantly higher rates than women.[10,38,159,192,195,208,209,218,220] One study reported that among hospital employees, women reported higher tobacco use rates than men within a subsample (n=199) of Army Reservists. This finding was not replicated with the subsamples of active-duty Army and civilian hospital employees.[64]

Tobacco Use

Cigarette smoking rates for a number of different military subpopulations were detailed, including recruits,[211] new military personnel at an advanced training school,[210] female military personnel deployed to areas with echelon I or II medical facilities,[131] and even for an entire branch of service.[10] Only 1 article similarly discussed smokeless tobacco use rates.[210]

Cigarette smoking behavior was identified as a risk factor for a plethora of negative outcomes across many domains, including health care use and medical outcomes,[212] psychiatric hospitalization,[214] career performance and outcomes,[213] time-loss injury experienced during basic combat training,[20] and gambling.[63] The use of smokeless tobacco was identified as a risk factor for gambling[63] and musculoskeletal injury symptoms that limited job performance for medical specialties other than combat medic.[85]

Three articles specifically considered the relationship between cigarette smoking and smokeless tobacco use.[38,208,210] Researchers generally found that use of 1 type of tobacco product predicted the use of the second tobacco product. This was true among new military recruits, for whom cigarette smoking at baseline was the strongest predictor of subsequent smokeless tobacco use.[208] It was also true for military students enrolled in an advanced training school, with results showing both that cigarette smoking was associated with smokeless tobacco use, and smokeless tobacco use was associated with cigarette smoking.[210]

Two articles specifically examined the impact of the 8-week involuntary ban on tobacco[217] and alcohol use during basic training.[220] Basic training was treated as an intervention, with comparisons made between

tobacco and alcohol use before entering and after graduating from basic training. One article specifically evaluated alternative intervention approaches designed to prevent smoking relapse following basic training,[215] while another article identified ways to increase participant response rates to a smoking survey.[216]

Alcohol Use

Compared with research with civilians, alcohol use rates in the military were high.[218] It was possible that a military-specific normative culture contributed to maintaining these persistently high alcohol use rates.[209] Nevertheless, there were distinct demographic differences in alcohol use, as well as patterns of alcohol-related problems, within the military as a whole.[218]

Alcohol use was a risk factor for a number of negative outcomes, including risky sexual behaviors,[159] specific types of physical injuries resulting from impairment and antisocial behaviors,[65] and gambling.[63] Having a substance abuse history, defined as abuse and dependence upon alcohol and/or other substances, and substance-induced psychiatric syndromes, was a statistically significant correlate for repeat inpatient hospitalization for psychiatric disorders.[198]

One study presented unexpected results. Unlike studies with civilians and military men, alcohol consumption was not a significant risk factor for intimate partner violence victimization or perpetration among active-duty military women.[219]

One article specifically compared the rates of mental disorders and substance abuse or dependence diagnoses that were derived through the routine clinical use of validated screening instruments compared with clinician reports for patients who received mental health care at an in-theater facility. The researchers noted a large discrepancy, specifically in substance abuse and/or dependence disorder diagnostic rates.[186]

Alcohol and Tobacco Use

A few articles considered both alcohol use and tobacco use. Tobacco use, including cigarette smoking and smokeless tobacco use, and high alcohol consumption were both associated with increased health care utilization and medical expenses among beneficiaries enrolled in TRICARE Prime.[38] One study found that cigarette smoking, tobacco chewing, frequent binge drinking, driving while intoxicated, and riding with an intoxicated driver all predicted gambling,[63] while another study found that individuals with tattoos were more likely to smoke, drink heavily, use smokeless tobacco, and ride in a vehicle with someone who had been drinking.[66]

Mood Disorders

Mood disorders and other mental health problems were discussed in 23 articles. Most were single descriptive studies of high (n=2; Level VI-A), good (n=14; Level VI-B), and low (n=2; Level VI-C) levels of evidence quality. The cohort studies were high (n=2; Level IV-A) and good (n=3; Level IV-B) quality. Seven articles determined rates of depression or other mental disorders generally.[186,205,222-226] One study focused specifically on rates of seasonal affective disorder among military personnel living in Alaska[226] and another assessed female Marines' changing levels of negative mood states, including depression, anxiety, fatigue, anger, and confusion, over the course of recruit basic training.[27]

Eleven articles identified demographic and psychosocial correlates of depression or other mental disorders.[186,187,191,194,198,214,222,224,225,227,228] Several studies identified depressive disorder as one of the most common mental health disorders in different military populations.[192,195,206] Depression occurring either during pregnancy or during the postpartum period among military women was also examined.[205,222,223] Other articles addressed very unique topics.[193,196,219,227,229] For example, Rundell et al.[196] described the mental health problems of a sample of OEF and OIF military personnel who were evacuated from the theater of operations for psychiatric reasons. A study by Murdoch and colleagues[193] examined the work, social, and mental health consequences of experiencing sexual stressors. Pflanz et al.[227] examined rates of self-reported job stress as well as the association between job stress and depression. Forgey and Badger[219] identified patterns of intimate partner violence and identified factors associated with these patterns. Douglas et al.[229] examined the association between depressive symptoms and C-reactive protein.

Across the articles with mixed-sex samples that reported sex-specific findings, women were at greater risk than men to screen positive for a mental health condition[119,191,192,194,195,206,226,229] and receive a mental health diagnoses.[224] Women were also more likely than men to receive outpatient mental health care,[186] to be evacuated from a deployment theater for a psychiatric condition,[196] and to be hospitalized or rehospitalized for a psychiatric condition.[198,214]

Stress

Stress was discussed in 24 articles. Most were single descriptive studies of high (n=4; Level VI-A), good (n=11; Level VIB), and low (n=3; Level VI-C) levels of evidence quality. The cohort studies were high (n=3; Level IV-A) and good (n=2; Level IV-B) quality. A systematic review with high quality evidence (Level V-A) was also reviewed.

A number of studies included only female participants.[170,171,189,230-234] Seven of the 16 studies with mixed-sex samples did not report sex-specific findings.[184,227,235-238] A number of studies investigated the effect of stress on mental health outcomes,[183,184,187,189,228,239] with particular concern for the impact of war zone stress.[183,184,189,228] Other researchers focused on the relationship between stress and the development of PTSD.[183,189,228]

Results reported in several studies suggest that compared with men, women were at greater risk for mental health disorders that required hospitalization,[183] experiencing the highest levels of stress,[240] perceiving greater levels of family stress,[241,242] physical health injuries interfering with daily activities,[85] feeling unprepared for deployment,[242] reporting depression symptoms,[242] and perceiving less unit social support.[242] Interestingly, a number of researchers found no significant sex differences when examining similar questions. Results derived from a statistical model that controlled for occupational experience, injury, and stress failed to find a sex difference in depression among military personnel on a hospital ship deployed during the Persian Gulf War.[228] Another study found that previous deployment experiences did not differentially affect depression and posttraumatic stress symptoms by sex.[187] While 1 study reported sex differences for its sample's demographics and current receipt of family counseling, there were no differences by sex in self-reported anger/abuse behaviors and suicidal behaviors (ideation and/or attempts).[207]

Two studies focused on questions about risk and resilience factors.[237,242] One study reported sex differences in the risk and resilience factors of military personnel prior to deployment, with self-reported survey results

suggesting that men were more prepared for deployment, perceived greater unit social support, and had fewer concerns about life and family disruptions than women.[242] The second study sought to establish the reliability and validity of a risk and resilience inventory for use with OIF/OEF veterans, but it did not examine sex differences.[237]

Health care needs and stress specific to deployments was described in 1 article, with very few sex differences in outcomes found.[207] Other research focused on stress and physical health, including changes in self-reported health status post-9/11[236] and the link between low back pain and stress,[235] did not report sex-specific findings.

A number of studies examined the impact of stress on military work performance,[85,227,240,241] while 1 study focused exclusively on how differences in role strain stress and having children impacted junior enlisted females' military career aspirations.[234] Other female-specific research reported the effect of stress on pregnancy and birth outcomes,[230-233] and discussed the relationship between stress and menstruation.[170,171]

One study examined the relationship between occupational factors, including work-related stress, and heavy or heavy episodic drinking.[209] While rates of alcohol abuse differed significantly by sex, the study reported no sex differences in rates of heavy episodic drinking or heavy drinking during the most recent deployment liberty event.[209] The feasibility of an Internet-based self-help stress management intervention was examined in 1 study.[238]

Mental Health Care Utilization

Eight articles focused on questions about access to and use of military mental health care services. Most were single descriptive studies of good (n=5; Level VI-B) and low (n=1; Level VI-C) levels of evidence quality. The cohort studies were high (n=1; Level IV-A) and good (n=1; Level IV-B) quality. Only 1 study limited its sample to female participants,[243] but 3 of the remaining 7 articles did not report sex-specific findings.[244-246] Most studies focused on outpatient care[244-248] or inpatient care.[201,243] One study considered both types of care.[119]

Rates for mental health care use were reported for all military patients who received outpatient care at military mental health clinics in 2000,[244] all OIF, OEF, and other deployed Army and Marine Corps personnel during a 1-year period,[119] all Air Force basic military trainees and technical school students assigned to a base in 1997 and 2001,[248] and all active-duty Air Force personnel who received outpatient care at 8 military mental health clinics during a 1-year period.[247] Evidence of sex differences was mixed. Men were more likely than women to be diagnosed with mental health problems during Air Force basic training and technical school.[248] However, among all service members who returned from deployment to Iraq or Afghanistan, positive mental health screening rates were higher for women than men.[119]

A population-based study of military medical records over a 1-year period for all OIF, OEF, and other deployed Army and Marine Corps personnel reported mental health care utilization rates.[119] The same study examined rates of self-reported symptoms for specific mental health disorders, referrals for mental health care, use of outpatient and inpatient mental health care services following deployment, and subsequent career outcomes.[119]

Two studies examined differences in patient characteristics and outcomes by referral type.[247,248] Contrary to expectations, the 2001 policy change that permitted Air Force basic military trainees and technical

school students to self-refer for mental health care did not result in an increase in the number of trainees and students being evaluated and discharged, when compared with rates of mental health care utilization and separation from service in 1997.[248] In another study with active-duty Air Force personnel who received outpatient care at military mental health clinics during a 12-month period, researchers found that self-referred patients were different from patients who were supervisor-referred or commander-directed. In particular, women were more likely than men to self-refer for care, and across all members who received care, self-referred members were less likely to have confidentiality broken and to have career-affecting recommendations made.[247]

Results from surveys administered to active-duty peacekeepers before and after a deployment to Kosovo[245] and a voluntary anonymous survey of deploying soldiers[246] identified a number of important barriers to mental health care that were endorsed by approximately 20% to 30% of the sample. Researchers found that the peacekeepers most in need of mental health services reported the most barriers to care.[245] Deploying soldiers preferred to have postdeployment mental health screenings administered by unit providers through the use of surveys and interviews, and they felt the best way to reduce barriers to care would involve encouragement from friends and family.[246]

One study examined first hospitalization rates for specific mental health disorders during the mid-1990s, a period of limited military conflicts. Women were hospitalized at higher rates than men for bipolar disorder and major depressive disorder, but there was not a sex difference for schizophrenia.[201] Another study from roughly the same time period (mid-1990s through August 2001) examined hospitalization rates for a mental disorder of female Navy and Marine Corps personnel only. The authors found that women in combat support occupations, compared with women in all other military occupations, were significantly less likely to be hospitalized for a mental disorder.[243]

Summary

Based on the articles in this limited review of psychological literature from 2000 through 2010, 13 of the 14 articles supported the proposition that PTSD rates were higher in females, especially for those deployed to combat areas and those with preexisting psychiatric diagnoses. Only 1 article found no sex difference in PTSD rates. Proportionately more females than males were evacuated from theater with psychiatric-related diagnoses. The majority of articles reported that eating disorders were higher in military females, especially in the Marine Corps, which had the highest rates of all services. Although there were limited articles in this literature review related to personality disorders, the higher prevalence rates in military females versus males were evident.

There seemed to be a clear consensus from existing research that men consumed tobacco products and alcohol at significantly higher rates than women, and were at greater risk for screening positive for or receiving a medical diagnosis of substance abuse. Other frequently reported results about sex differences suggested that, excepting substance abuse, women were at greater risk than men to screen positive for a mental health condition and receive a mental health diagnoses. Women were also more likely than men to receive medical care, both inpatient and outpatient, for a psychiatric condition. Before accepting these arguments, it is important to recognize that a considerable number of studies contradicted these results, as discussed above. In particular, the mixed results about sex differences in suicidal behaviors strongly underscore just how little we know and how much more investigation is needed.

DEPLOYMENT HEALTH

A total of 32 articles addressed the health care of women in deployment settings. Gynecological care in a deployment environment was examined in a third (n=10) of these articles. DNBIs that occurred in deployed settings (n=9), health care use other than gynecological care while deployed (n=7), and aeromedical evacuation from theater (n=7) each contributed over 20% of the deployment health articles. Two articles examined the use of body armor by women.

Disease and Nonbattle Injury

Nine articles addressed DNBIs, Most were single descriptive studies of high (n=2; Level VI-A) and good (n=4; Level VI-B) levels of evidence quality. The cohort studies were all good quality (n=3; Level IV-B). Five articles addressed OIF and/or OEF rates of DNBI.[83,249-252] Three articles were reports on disease/illnesses and injuries in training environments, either on land or at sea during peacetime deployments.[80,253,254] Females were found to have increased rates of DNBI compared with males in wartime[83] and training situations;[80,254] and disease was reported to be of gynecological origin in 3 articles.[80,254] Women were twice as likely as men to be evaluated for an illness of neurologic origin[252] and at increased odds for reporting acute respiratory infection in theater.[255] One study examined the correlation of sex with use of permethrim to protect from illness while deployed.[251] The difference in nonbattle injuries (NBIs) between females and males was either nonsignificant[83,249] or lower in women[250] in wartime situations, and higher in training situations.[80] There were no sex differences in the rates of musculoskeletal NBIs in OIF and OEF for females compared with males.[83,249] Of the 2 shipboard studies during peacetime deployments, 1 reported a low rate of safety mishap injuries for women[253] and 1 reported that gynecological initial visits were among the top 3 highest reasons for on-board medical visits.[254]

Health Care Utilization

Seven articles addressed health care use by women during deployment. Most were single descriptive studies of a good (n=4; Level VI-B) level of evidence quality. The cohort studies were high (n=2; Level IV-A) and good quality (n=1; Level IV-B). In 1 study that analyzed data from the in-theater medical surveillance system of all deployers from 2001 to 2004, women in the Army were more likely than men to have medical encounters in theater, and all women were more likely than men to have a supplementary classification or diagnostic codes related to the genitourinary system.[256] Military women received care in theater for neck and back pain that was severe enough to warrant evacuation from theater.[257,258] Historically, women had higher odds of being hospitalized in theater during Operation Desert Storm.[259] Hospitalization in theater for mental health admissions related to attempted suicide and self-inflicted wounds were highest among young women in 1 study of OIF/OEF.[183] In another study, women were more likely to seek counseling for stress and anxiety related to deployment than were males.[207] The majority of prescriptions required by 1 Army unit's personnel while in theater were for females; of those, hormones and synthetic substitutes were predominant and not all could be filled by in-theater resources.[260] See the Gynecological Care section for specific care utilization.

Gynecological Care

Gynecological care in a deployment environment was examined in 10 articles. Most were single descriptive studies of high (n=1; Level VI-A), good (n=6; Level VI-B), and low (n=1; Level VI-C) levels of evidence quality. The cohort studies had good quality of evidence (n=2; Level IV-B). Gynecological care was reported as being provided at Level II and Level III echelons of care in OIF/OEF[114,128,131,148,161,172,261,262] and shipboard.[114,263] Sites where women sought gynecological care included field expedient (tented) medical

sites, various sick call facilities, gynecological clinics in combat support hospitals, and fixed facilities on land and shipboard. Gynecological care-seeking behaviors, including access and barriers to gynecological care, were examined. Presenting complaints were evaluated in 7 studies. Irregular bleeding,[128,131,172] amenorrhea,[161,172] menstrual symptoms,[129] pelvic pain,[172,262] pain with urination,[262] vaginal symptoms,[148,161,262] contraceptive care,[131] suspected pregnancy,[161,172,263] and routine wellness care[262] were cited as common reasons for seeking gynecological care while deployed. Several studies reported barriers to gynecological care, including limited access,[128,131] perceived lack of provider competence, confidentiality, privacy, and cleanliness in field settings.[114] Two studies evaluated the benefits of having advanced gynecological clinical capabilities in theater such as ultrasound,[172] colposcopy, endometrial sampling, ablation of condylomas, loop electrosurgical excision, and urodynamic evaluation.[261]

Aeromedical Evacuation

Aeromedical evacuation was examined in 7 articles. The evidence was presented in 4 cohort studies of good quality (Level IV-B) and 3 single studies of good quality (Level VI-B). All studies discussed frequency of female medical evacuations (MEDEVACs) from either OIF or OEF, or both theaters. Rates or incidence for female MEDEVACs for DNBI were provided for gynecological reasons,[83,264] musculoskeletal reasons,[83] and orofacial injuries or illnesses,[265,266] and a higher percentage of psychiatric evacuations were females.[196] Of those MEDEVACs for neck and back pain, women were more likely than men to be returned to duty.[257,258]

Body Armor

Body armor, an essential piece of protective gear during deployment, was discussed in 2 nonrandomized controlled trials with good quality evidence (Level III-B). These studies were designed to assess physiological responses of women to physical activity while wearing body armor.[56,267]

Summary

There were unique characteristics to women's health care needs in the deployed, austere environment. The literature on deployment health for women included examinations of DNBI, gynecological health care, and other health needs of women during deployment. Research on health care issues ranged from musculoskeletal issues, to oral-facial injuries, to mental health care needs of women. While the incidence of DNBI for women was included in reports of large cohorts by sex, the predominance of DNBI reported among women appeared to be related to gynecological illness and disease processes, a unique factor for women. This was evident in the literature that focused on specific issues or experiences of gynecological care that were rendered in theater. Women utilized a full range of gynecological services in theater, but it appeared that access to gynecological care and resources could be improved.

ENVIRONMENTAL AND OCCUPATIONAL EXPOSURES

Environmental and occupational exposures were the focus of 16 articles. Infectious disease or the protection from infection was examined in over 55% (n=9), and chemical exposure was covered in nearly 40% (n=6) of the articles. One study focused on the adequacy of acceleration protection for female high-G aircrew.

Infectious Disease

Infectious disease or the protection from infection was examined in 9 articles. Most were single descriptive studies of good (n=6; Level VI-B) and low (n=1; Level VI-C) levels of evidence quality. A cohort study of high evidence quality (Level IV-A) and a systematic review of good evidence quality (Level V-B) were also reviewed. The odds of seropositivity for exposure to *Borrelia burgdorferi* infection was higher among

female service members than male service members,[268] but diagnosis of Lyme disease during service was more common among male service members.[269] Leptospira-specific antibodies were more common among female Army blood bank donors than among male donors, with 57.1% of positives being female although females made up only 20.3% of the total sample.[270]

Most individuals who were seropositive for exposure to the organism that causes Lyme disease were exposed prior to entering military service.[268] Vaccination before military service showed some differences with higher hepatitis B surface antigen seropositivity prevalence among female than male recruits (39.4% vs 27.8%),[271] but there was no difference in seropositivity for measles, mumps, rubella, or hepatitis A by sex among recruits.[30,272] Active tuberculosis rates have been higher among female service members compared with males,[273] and the average age at diagnosis was lower among females than males (28.7 years vs 32.5 years).

Susceptibility to adverse outcomes can differ by sex as a result of different genetic predispositions. As expected, a lower percentage of female troops were glucose-6-phosphate dehydrogenase deficient compared with males, but 1.6% of female service members tested positive for the deficiency. Despite their lower risk factors, female service members were still at risk for possible adverse outcomes from malaria prophylaxis.[274] In a study to evaluate differences in the practices of use of personal protective measures for vector-borne diseases in troops deployed to Southwest Asia, no differences were found between sexes.[251]

Chemical and Miscellaneous Harmful Exposures

Six articles reported on chemical exposures. Three high quality cohort studies (Level IV-A) and 3 descriptive studies of good (n=2; Level VI-B) and low (n=1; Level VI-C) evidence quality were reviewed. Self-reported occupational codes were found to be moderately to highly correlated with occupational data extracted from electronic military personnel records, and validated the use of self-reported occupational codes. This was important since exposure to hazardous compounds and traumatic situations differed significantly across occupational specialties.[275] Compared with combat specialists, a number of occupational specialties were associated with greater risk levels for specific types of harmful exposures. For example, health care specialists were reported to be at increased risk for witnessing death and physical trauma. Field electrical/mechanical equipment repair specialists and craft workers were more likely to witness death, and be exposed to depleted uranium and pesticides.[275]

Exposure to specific hazardous areas and Kuwaiti oil well fire smoke was not associated with in-theater hospitalization during the Gulf War, but certain specialties and female troops were at increased odds of hospitalization.[259] Significant correlates between occupational exposures and longitudinal negative health impacts were found. Among female Army personnel, those in occupations with moderate to high exposure of occupational exposure to volatile organic chemicals had a 48% increased risk of breast cancer while on active duty.[178] Across female Air Force personnel, fuel and solvents exposure was associated with changes to hormone levels associated with fertility.[276]

Many studies that investigated occupational exposure relied on self-reports. Inaccurate, incomplete, and systematically biased self-reports were a concern with this type of research. Among service members known to have been exposed to hexavlaent chromium during depoloyment in Iraq, less than 25% of exposed soldiers specifically self-reported chromium exposure on the postdeployment health assessment (PHDA),[277]

providing evidence to support continued concern with the use of self-reports to investigate occupational exposure. Although not directly related to occupational exposures, there was a significant correlation between the levels of environmental exposure to tobacco smoke of servicewomen and their children.[278]

High-Level Acceleration

The case-control study investigating high-level acceleration was rated good quality (Level IV-B). Access to and use of sex-appropriate equipment may meaningfully impact servicewomen's physical performance and safety. Suits designed especially for the unique size and shape of females to protect the body against rapid-onset, sustained acceleration were recommended as part of a fit test for anti-G suits in female aviators.[279]

Summary

Infectious diseases and occupational exposures were found to affect male and female service members in different ways. In addition, females were more likely to be seropositive for certain organisms, and more likely to have cancer, hormonal disruption, and fertility issues than their civilian counterparts. One study indicated the importance of designing safety equipment specific to the female body shape.

OBSTETRICS/POSTPARTUM ISSUES/FERTILITY

Thirty-three articles addressed obstetrics, postpartum issues, and fertility. Prenatal care was examined in 39% (n=12) of the articles, and postpartum issues were discussed in almost 30% (n=10) of the articles. Other topics examined include breastfeeding (n=4), preterm labor (n=5), and general obstetric care (n=5).

General Obstetric Care

General obstetric care was the focus of 5 articles. Most were cohort studies of high (n=1; Level IV-A), good (n=1; Level IV-B), and low (n=1; Level IV-C) levels of evidence quality. A single good quality descriptive study (Level VI-B) and a nonresearch (Level VII-C) article that was included in this review because of its policy-relevant findings[37] were also reviewed. The authors compared reproductive health education programs, pregnancy prevention services, and current policies in the navies of 8 countries; questionnaires were completed by naval attachés or military officers.[37]

One article measured the pregnancy rate, described the characteristics of active-duty military women who become pregnant, and identified predictors of pregnancy.[135] Another study evaluated the influence of exercise on maternal and perinatal outcomes in a low-risk healthy obstetric population, finding that servicewomen who exercise have smaller babies and contract colds and flu more frequently.[12,230]

Two studies examined the relationship between anthrax vaccinations and pregnancy and birth outcomes. Researchers investigated the effect of anthrax vaccination by reproductive-aged active-duty women on pregnancy rates.[34] A second study looked at birth defects in children of anthrax-vaccinated active-duty women.[36] Both studies demonstrated the relative safety of inadvertent vaccine administration in pregnancy.[280]

Postpartum Issues

Postpartum concerns were examined in 10 articles. Most were single descriptive studies of good (n=5; Level VI-B) and low (n=4; Level VI-C) levels of evidence quality. A nonresearch (Level VII-C) article was included in this review because of its policy-relevant findings.[37] The health education programs, pregnancy prevention services, and current policies in the navies of 8 countries were compared in this article.[37]

Three articles addressed postpartum depression. The percentage of active-duty women with postpartum depression in one study's sample was higher than that in the civilian population.[222] In the second study, the Postpartum Depression Screening Scale was used to measure depression in active-duty women prior to hospital discharge, 2 weeks after delivery, and 6 to 8 weeks after delivery, finding that 40% of women reported depressive symptoms when they returned to work at 42 days postpartum.[223] A third study found that active-duty women appear to have a higher rate of depression and suicidal ideation compared with their civilian peers.[205]

Two articles examined sleep and fatigue in postpartum active-duty women. Fatigue was positively correlated with sleep disturbance,[281] and over half the sample had not regained full functional status when they returned to work at 6 weeks.[280] Another study examined the impact of pregnancy on the individual and the organization, finding that unintended pregnancy affects the individual, her family, and the military organization.[143]

One study compared satisfaction with and outcomes of home and clinic well-baby visits,[282] and another studied whether having a partner deployed during wartime increased the stress levels of pregnant women or changed birth outcomes.[230] Other articles investigated the amount of time needed for postpartum soldiers to return to prepregnancy fitness levels,[13] and evaluated the influence of exercise on maternal and perinatal outcome in low-risk, healthy, active-duty obstetric patients.[12]

Preterm Labor

The 5 articles covering preterm labor and preterm birth looked at risk factors that might be related to preterm labor and birth. Most were single descriptive studies of good (n=3; Level VI-B) and low (n=1; Level VI-C) levels of evidence quality. A cohort study with high evidence quality (Level IV-A) was also reviewed.

Researchers examined if stress, sleep disturbance, or fatigue during the late part of the second trimester were related to premature labor and birth, and reported that preterm labor was associated with lower perceived fatigue severity, low sleep disturbance, and more negative life events, and that the rank of officer was associated with preterm labor and delivery.[231] Another study found that single, separated, or divorced military women were at a greater risk for preterm delivery than married women, noting that marital status was a more significant predictor of preterm delivery than medical conditions.[283] In a study exploring differences in prematurity rates between black and white women, black women were found to exhibit more cardiac reactivity than white women, with a 2-fold disparity for preterm births that is similar to results found in other populations.[233] The fourth study examined the effects of standing, lifting, and noise exposure, and found that standing had an effect on preterm labor and preterm birth.[284] A final study evaluated preterm births and birth defects in infants of US military women who received the smallpox vaccine during the first trimester of pregnancy.[35] No association between vaccine administration and premature birth or birth defects was found.

Prenatal Care

Prenatal care was discussed in 12 articles. Most were single descriptive studies of good (n=8; Level VI-B) and low (n=3; Level VI-C) levels of evidence quality. A good quality cohort study (Level IV-B) was also reviewed. Four of the articles looked specifically at the quality of and satisfaction with prenatal care. One

study evaluated the utility of a multidisciplinary, focused clinic for junior enlisted pregnant active-duty military personnel designed to improve perinatal outcomes.[285] Researchers examined active-duty mothers' satisfaction with care and services outcomes in CONUS and OCONUS locations.[286] A qualitative study of military mothers' experience with prenatal care reported that these mothers desired to have provider support in decision-making processes and expressed the need for a positive, caring relationship during pregnancy.[287] The fourth study explored women's experiences with alternate models of prenatal care, which allowed investigators to identify themes in care delivery preferences, highlighting a concern about lack of continuity and a need for more time with the provider.[288]

Issues related to pregnancy while active-duty women were deployed were discussed in 3 articles. Researchers modeled the incidence of ectopic pregnancy and spontaneous abortions of active-duty pregnant women remaining at sea during deployment through their first 20 weeks of pregnancy.[263] One article reviewed gynecological visits at a clinic in a combat theater to describe pregnancy characteristics during wartime deployments.[161] In another study, authors evaluated the utility of gynecological ultrasound in a combat theater.[172]

The prevalence of domestic violence and the characteristics of pregnant women reporting domestic violence in a military setting,[289] and the effects of standing, lifting, and noise exposure on preterm birth[284] were topics discussed in articles related to prenatal care. Other articles included the prevalence of depression among active-duty low-risk pregnant women;[205] the type of patient preparing a birth plan and how closely the plans were followed during labor;[290] and the impact of having a partner deployed in the military during war time on stress levels of pregnant women.[232]

Breastfeeding

Breastfeeding was addressed in 4 single descriptive studies of good (n=3; Level VI-B) and low (n=1; Level VI-C) levels of evidence quality. One qualitative study explored the breastfeeding experiences of active-duty military women through an interactive interview process.[291] Researchers reported minimal DoD policy guidance concerning breastfeeding; and, while programs to increase the incidence and duration of breastfeeding were available at most hospitals, their quality and content varied greatly.[292]

A descriptive study examined the rates, duration, and workplace support of breastfeeding for active-duty women.[293] The impact of lactation consultants on breastfeeding initiation and continuation rates during the first 6 months of life was evaluated at military medical treatment facilities.[294]

Summary

Based on the research, administration of smallpox vaccine during the first trimester of pregnancy appeared to have no relationship to premature labor or delivery. Women who were single, divorced, or separated, and those who were black were at higher risk for premature labor and delivery, as were women who served as officers or in occupations that required them to be in a standing position. Military women experienced symptoms of postpartum depression and sleep disruption at higher rates than civilian women, noting that military women are required by policy to return to work in a full-time status at 42 days postpartum. Attention was been given to evaluating risk factors associated with specific occupational hazards and deployment while pregnant. The challenges of continuing to breastfeed after return to full duty in the postpartum period were explored, with findings that reinforce the need to have consistent and supportive policies applied in the workplace, in addition to access to certified lactation

consultants. Studies examining postpartum issues were notably of the lowest quality (Level C); thus, they would benefit from continued research.

CHRONIC DISEASE

Chronic disease and chronic conditions were the focus of 22 articles. Topics reviewed included cardiovascular disease (n=7), chronic pain (n=3), and disability (n=4). Stem cell and hematologic cancers (n=2), pulmonary disease (n=4), and chronic back pain (n=3) were also studied.

Chronic Back Pain

The literature on chronic back pain included 3 good quality descriptive single studies (Level VI-B). Two articles described the effect of chronic back pain on return to duty or surgical outcomes rather than the mechanism of injury, which was described earlier in this report. Women were more likely than men to complain of low back pain[235]; however, women were more likely to return to duty after back injury.[258] No sex differences were found for surgical treatments for low back pain.[295]

Pulmonary Disease

The articles on pulmonary disease were all determined to have good evidence quality and included a cohort study (Level IV-B) and 3 descriptive studies (Level VI-B). One study described health surveillance for asthma.[296] Other articles described diagnosing exertional dyspnea[297] and screening for airway hyperreactivity in young, asymptomatic soldiers.[298]

Age-adjusted incidence rates of first hospitalization for asthma were 3 times higher in women compared with men.[296] The researchers reported that during cardiopulmonary testing the majority of those patients with higher heart rate responses were females with small body mass.[297] Researchers reported very few female participants demonstrated an airway obstruction.[298] Seven percent of Army recruits who were tested had exercise-induced bronchospasm, but this did not hinder their performance during basic training.[299]

Cardiovascular

The literature on cardiovascular disease included 7 articles with good evidence quality. Two of the articles were cohort studies (Level IV-B) and 5 were descriptive studies (Level VI-B). Basic military training improved cholesterol and BMI.[7] Cholesterol levels increased with age for men and women.[10] The relationship between depression and clinical coronary disease was unlikely to be explained through direct effects on C-reactive protein levels, but may be mediated by BMI.[229]

Women's cardiac risk was lower than age-matched men.[300-302] Researchers explored the cardiovascular reactivity and risk of preterm delivery among pregnant black and white military women.[233] The risk of preterm delivery was double among black women compared with white women across all ranks. Black women with an increased diastolic blood pressure reactivity and heart rate delivered at an earlier gestational age.

Chronic Pain

Chronic pain was the focus of 3 articles. The literature on chronic pain included 2 descriptive studies of good quality of research evidence (Level VI-B). One descriptive study was low quality (Level VI-C).

Pelvic pain was the most common chief complaint for the deployed sample, though very few were diagnosed with chronic pelvic pain.[262] The majority of women (75%) returned to duty after the pelvic pain diagnosis.

Researchers explored whether catastrophic appraisal of an illness stimulus was implicated as a cause for psychiatric morbidity, psychological distress, and physical impairment in persons with chronic pain in an in-garrison National Guard sample.[303] In addition to other non-sex-related findings, these researchers reported that women were more likely than men to report acute or chronic pain.[303] Joint hypermobility syndrome was higher in women than men.[304] Although the incidence was higher in females than males, it was lower in the military than in the general US population.

Disability

Four articles addressed disability issues. Three cohort studies had good (n=2; Level IV-B) and high (n=1; Level IV-A) quality research evidence (Level IV-B). One good quality descriptive study (Level VI-B) was also reviewed.

Musculoskeletal and mental disorders for women make up over 60% of all disability-related diagnoses.[125] More men than women had a disc herniation, though results were likely due to the small sample of women in the study.[295] Researchers found that for discharge with disabling knee injury, Caucasian women had a higher risk than Caucasian men and non-Caucasian women were at lower risk than non-Caucasian men.[95] Enlisted women at higher pay grades were at reduced risk compared with men and younger women of knee-related disability discharge from the Army, even after controlling for age, race, duration of service, and job characteristics.[94]

Stem Cell/Hematological Cancers

Stem cell and hematological cancers were discussed in 2 cohort studies with good quality research evidence (Level IV-B). No differences were found in the rate of return to active duty between women and men following a stem cell transplant.[305] The rate of neoplasms for females was 55.4 cases per 100,000, compared with the overall rate for males of 37.7 cases per 100,000.[177] The most common cancer among women was breast cancer.[177]

Summary

Women with chronic back pain were more likely than men to return to duty after being medically evacuated from theater. No sex differences were found in surgical outcomes following back surgery. Hospitalization for asthma was higher for women. Black women experienced twice as many hospitalizations for asthma compared with white women. AFPT scores were equally associated with coronary heart disease risk factors for both sexes. Women had lower cardiac risk than men. Increased diastolic blood pressure reactivity and heart rate resulted in childbirth at an earlier gestational age for black women.

Pelvic pain complaints in theater were rarely diagnosed with chronic pelvic pain. Three fourths of women received care for pelvic pain in theater returned to duty after evaluation in Germany. One third of women with musculoskeletal symptoms stated that it interfered with their ability to complete their job. Joint hypermobility was more common in women than men.

Caucasian women were more likely than men and non-Caucasian women to be disabled from knee

injury. Sociodemographic factors correlated with knee-related disability from the Army. No sex difference was seen in relation to returning to active duty after a hematopoietic stem cell transplant. However, the rate of neoplasms was higher for women than for men. The most common cancer for women was breast cancer.

INTERPERSONAL VIOLENCE/SEXUAL TRAUMA

Twenty-two articles addressed interpersonal violence/sexual trauma. The majority of articles (n=13) focused on intimate partner violence (IPV). Sexual trauma (n=6) and child maltreatment/abuse (n=7) were also reviewed.

Intimate Partner Violence

Thirteen studies focused on IPV. Most were single descriptive studies with good (n=10; Level VI-B) and low (n=1; Level VI-C) levels of evidence quality. Two good quality cohort studies (Level IV-B) were also reviewed. A small qualitative study reported that active-duty military women overwhelmingly supported routine screening for domestic violence, but were evenly split regarding whether domestic violence reports should be sent to commanding officers.[306]

Gender differences in the relationship of IPV to psychological distress and the mediating/moderating effects of social support were described in 1 article.[307] Another article explored patterns of IPV and their relationship to psychosocial risk factors among active-duty women married to nonmilitary spouses.[219]

Researchers found that a premilitary history of interpersonal violence victimization predicted attrition from military service[308,309]; childhood traumas, including exposure to parental IPV, were significantly associated with attrition.[310] A number of studies reported IPV perpetration and/or victimization rates for different time periods, including premilitary,[311] during the second year of military service,[311,312] past 12 months,[289] and the time period 1998–2002.[313]

After controlling for demographic variables, 2 studies identified risk factors for perpetrating severe aggression against a spouse.[314,315] Past-year deployment was a risk factor for male soldiers,[314] while female soldiers perpetrated significantly more severe aggression against unemployed versus employed male spouses.[316] Results from 1 study suggested that men were more likely to reperpetrate spousal abuse, and that within each sex, civilian spouses were more likely than active-duty military spouses to reperpetrate spousal abuse.[316]

Sexual Trauma

Six articles addressed sexual trauma. Most were good quality single descriptive studies (n=4; Level VI-B). A good quality cohort study (Level IV-B) and a high quality systematic review (Level V-A) were also surveyed. Studies with samples of female Navy and Marine Corps recruits provided considerable evidence that negative childhood experiences profoundly affect adult career and health outcomes.[203,308,317] Women who experienced childhood physical abuse and/or childhood sexual abuse reported substantially higher levels of trauma symptomology as adults.[203] Several types of sexual violence experienced before entering military service predicted female recruits' attrition, including premilitary rape[317] and other premilitary interpersonal trauma.[308]

This evidence was particularly troubling since compared with previously reported rates of sexual assault victimization and perpetration among college students, premilitary rates for both victimization and

perpetration were higher.[318] Sexual assault and sexual harassment experienced during deployment were identified as issues relevant to the development of PTSD among women who had been deployed to Iraq and Afghanistan.[189] Despite the huge sex imbalance in sexual trauma research, the pernicious effect of sexual trauma is not limited to women. Researchers reported no sex difference in the negative effect of military sexual stressor exposure (eg, sexual harassment and assault) on functioning and psychiatric symptoms.[193]

Child Maltreatment/Abuse

Seven descriptive single studies of high (n=1; Level VI-A) and good (n=6; Level VI-B) evidence quality addressed child maltreatment and abuse. A comparison of substantiated child maltreatment rates found a lower rate among military families than civilian families.[319] Results from a small qualitative study suggested that military parents support health surveillance efforts, but questioned efforts to solicit information about adverse childhood experiences as part of routine health surveillance if they lack sufficient confidentiality assurances.[320]

A number of studies examined the impact of negative childhood experiences on adult career and health outcomes.[203,214,219,310,321] Specific types of childhood abuse may differentially impact trauma symptomatology during adulthood.[203] Similarly, characteristics of childhood sexual abuse experiences seemed to be related to very different patterns of adult self-identification as a victim of childhood sexual abuse.[321] There was evidence that childhood trauma also correlates with specific types of IPV experiences.[219] Childhood exposure to family violence was significantly associated with attrition in recruits.[310] A history of abuse, including physical, emotional, or sexual, significantly predicted psychiatric hospitalization in a large sample of enlisted Navy personnel.[214]

Summary

Although studies were limited, findings indicated that interpersonal violence had a detrimental effect on the psychological health of military members. Sex differences were only marginally explored, and while violence experienced before military service was found to influence attrition from military service, its effect on health requires further research. Violence by men increased postdeployment, and women were at risk for aggressive behavior toward male spouses who were unemployed. In a similar vein, women who experienced childhood sexual trauma demonstrated significant health and career outcomes as adults. One study found lower rates of child maltreatment in military families. Many studies conducted on the effects of interpersonal violence and sexual assault and trauma explored their effects on issues related to personnel management (career outcomes, promotion, and attrition). Future medical research should focus on sex differences, health outcomes, and prevention programs.

DISCUSSION AND GAP ANALYSIS

Overall, a large gap in knowledge about military women's health exists because the most commonly available level of evidence among all the literature reviewed is single descriptive studies, Level VI research. It is recommended that future research include cohort studies to describe incidence and analyze predictors of the common illnesses that women encounter as well as meta-analyses of existing evidence. Below we take into account MHS use data, including the common major diagnostic categories for women and health care burden, both in the normal garrison environment and during deployment. When considered in the context of the gaps in research literature, future research topics are identified.

Readiness/Health Protection/Illness Prevention

The majority of research published between 2000 and 2010 explored exercise/fitness concerns, with 2 studies with interventions that improved weight loss in women. The exercise/fitness category included research data collected during introductory military training and military exercises. Preparedness for the physical demands of introductory military training was heavily dependent on physical fitness and BMI. Women had a higher incidence of injury during military training. Further, women were more prone to stress fractures. Nearly half of the duty-limiting dispositions were the result of musculoskeletal conditions.[322] Women sought care for related conditions at a high rate prior to deployment, with musculoskeletal care being the second highest health care burden among females in the year prior to deployment, including all medical encounters, hospital bed days, number of individuals affected, and number of lost work days (Armed Forces Health Surveillance Center. Unpublished data 2015). Furthermore, musculoskeletal diagnoses were the fourth highest health care burden in theater from 2008 to 2013 (Armed Forces Health Surveillance Center. Unpublished data 2015). Therefore, sex-specific musculoskeletal research is needed to improve training and ensure military readiness.

Women used integrative medicine (formerly known as CAM) treatments more often than men. Integrative medicine treatments showed promise in reducing costly interventions for many common female-prevalent conditions, such as musculoskeletal pain, depression, pelvic pain, or headaches.[322] Continued research evidence can support the integration of these safe, cost-effective treatments into standard preventive medical care. Limited research was available regarding the health and birth outcomes with the military-required anthrax and smallpox vaccines. Longitudinal studies are needed to determine long-term effects, if any, can be traced back to vaccines administered during a military career.

Body weight influenced military members' training outcomes, career outcomes, psychological health, physical health, and injury incidence. The incidence of overweight/obesity rates among service members continues to climb in parallel with increases among the general US population. In 2010, 8.2% of military women were overweight/obese.[323] Two intervention studies reviewed for this report demonstrated improved approaches to weight management for women and men. Numerous national, DoD, and local weight management programs have been implemented to address this widespread epidemic. Systematic reviews of military healthy weight promotion interventions are needed to inform health care professionals, fitness experts, and women.

Deployment Health

Existing research has identified military women's health care needs during deployment by examining the top diagnostic categories for in-theater medical encounters of military women who sought medical care. Injury was the top diagnostic category for military women, according to the number of women who sought care as well as the total number of encounters across all female patients (Armed Forces Health Surveillance Center. Unpublished data 2015). While the literature demonstrated that women had higher DNBI rates during deployments than men, future research can investigate sex-specific causes and prevention of nonbattle injuries. Mental health conditions made up the second largest diagnostic category for in-theater burden of disease, and the cause for the highest rate of medical evacuation from theater among women (Armed Forces Health Surveillance Center. Unpublished data 2015). It is clear that the literature investigating mental health needs of women in theater is insufficient.

We concur with the conclusions of the Integrated Mental Health Strategy (IMHS) report and recommendations for future research on in-theater mental health care. Signs and symptoms not otherwise specified constituted the third largest diagnostic category of in-theater medical burden, but 40% of these medical encounters resulted

in abdominal and pelvic diagnoses (Armed Forces Health Surveillance Center. Unpublished data 2015). Since these conditions may actually be related to gynecological conditions, this diagnostic category deserves further investigation. The fourth most common diagnostic category was musculoskeletal diseases, further identified as other back problems and all other musculoskeletal diseases (Armed Forces Health Surveillance Center. Unpublished data 2015). Given that the literature described chronic back pain, as well as back and neck pain in theater requiring medical evacuation from theater, it may be beneficial to explore prevention and treatment of musculoskeletal injuries incurred prior to and during deployment.

Genitourinary diagnoses accounted for the fifth largest burden of health care for women in theater from 2008 to 2013 (Armed Forces Health Surveillance Center. Unpublished data 2015). Results from in-theater gynecological care studies were reported in 10 articles reviewed here. These results focused on military women's responses and complaints about the menstrual cycle, contraceptive care, and pregnancy. The evidence from existing studies, coupled with health care utilization data concerning in-theater genitourinary diagnoses, mandate further investigation about the impact of the deployed environment on the menstrual cycle and methods to manage menstrual cycle symptoms. Data from the Armed Forces Health Surveillance Center (AFHSC) indicated that between 2008–2013, 1 in 10 women in the OIF/OEF theater of operations was diagnosed with a gynecological disorder.[324] Of all gynecological-coded health care encounters in theater from 2008 to 2013 (n=12,056), 19.3% were for menstrual disorders, 18.3% for female genital pain, 2.7% for kidney stones, and 52% for all other genitourinary disease (except STI) (Armed Forces Health Surveillance Center. Unpublished data 2015).

A report from AFHSC indicated that 1 in 20 MEDEVACs from theater were attributed to gynecological diagnoses.[324] Furthermore, AFHSC reports that 6.5% of women who deployed during 2008–2013 were diagnosed with a UTI during deployment, 13.6% of whom had recurrent UTIs.[325] Recent unpublished data provided by AFHSC revealed 321 cases of in-theater kidney stones among military women, an indicator of the need to continue to research the impact of the environment on women's urinary tract, including intentional dehydration (Armed Forces Health Surveillance Center. Unpublished data 2015).

Overall, the data from in-theater encounters by women indicated that women were seen most frequently for injuries, mental disorders, undiagnosed signs and symptoms involving the abdomen or pelvis, musculoskeletal disease (including back problems), and genitourinary disease. The research literature and the health care utilization data together suggest an existing knowledge deficiency about in-theater medical care, especially with respect to prevention and treatment services with sex-specific implications.

Gynecological Health

The research on gynecological health topics is consistent with the care seeking behaviors of military women. According to AFHSC, in 2013 the top 5 reasons for genitourinary-related ambulatory care visits were for pain, inflammation, other symptoms of the female genital organs, menstrual disorders, and urinary tract symptoms.[322] In the same year, 30% of women's hospitalizations for genitourinary illness were for menstrual disorders and kidney infections that resulted from untreated UTIs.[326] There is a dearth of knowledge about the causes and correlates of UTIs in female service members. Findings on the behaviors unique to the military population that increase women's risk for developing UTIs, as well as preventive measures, deserve further investigation.

There is a body of literature substantiating menstrual disorders in this population. While treatment for menstrual cycle-related symptoms with contraceptive methods is an industry standard, there is a lack of research on the use of contraceptives to manage the common menstrual disorders impacting women's health, particularly during

training and deployment. Given evidence that findings on planned and unplanned pregnancies are related to contraceptive knowledge and use, research should focus on optimizing the use of contraceptives by military women for both menstrual management and family planning. Furthermore, while unintended pregnancies are documented in the literature, there is a lack of intervention research. Future research could capitalize on the findings that identify risky behaviors to build evidence-based prevention and intervention programs.

Viral/chlamydial infection, candidiasis, and herpes simplex accounted for nearly 45% of women's ambulatory visits coded in the infectious/parasitic diagnostic category in 2013.[322] Promising findings on self-testing and self-treatment for STIs and common vaginal infections should be investigated further to both promote vaginal and sexual health and to overcome barriers to care.

While research focused on contraception and STIs is well represented among studies published between 2000 and 2010, there is an absence of research on the prevalence and impact of breast and gynecological cancers on military women. In particular, there is a lack of research surrounding the implementation of HPV vaccination in military members (males and females) for the prevention of cervical cancer in servicewomen.

Psychological Health

AFHSC reported that mental disorders remained a leading cause of hospitalization for military women in 2013, with 19% coded as adjustment reactions and episodic mood disorders, more than any other code for hospitalization among the active component.[326] The 4 most common mental disorders for women seeking ambulatory care were adjustment reaction, anxiety disorders, episodic mood disorders, and depressive disorder.[322]

Only 2 articles reviewed here examined military women's in-theater hospitalizations and medical evacuations from theater for mental health disorders. While 1 study indicated that women were more likely to seek mental health counseling for anxiety and stress related to deployment, there is a lack of publications investigating counseling services, techniques, or in-theater programs that specifically address stressors encountered by military women during combat deployments. Future research might investigate women's psychological reactions to deployment, combat stress, and family separation. Furthermore, investigation into battlefield/deployment interventions and resiliency programs that women can use to mitigate these stressors is warranted. We concur with the conclusions of the IMHS report and recommendations for future research for mental health issues related to women's wartime experiences, particularly PTSD. There is relatively little research on sex-specific interventions and treatments.

The literature review for this section was consciously designed to exclude research on veteran women reviewed by Bean-Mayberry and colleagues,[3] and to focus on studies specific to active-duty service members that were published between 2000 and 2010. The majority of psychological health studies reviewed here were retrospective reviews of existing databases (Level IV) or single descriptive studies (Level VI). Most studies were rated from high to good quality (Grade A, B). The literature provided substantial evidence that service members experience symptoms of psychological health disorders during their military service. The reviewed research provided prevalence rates, risk factors for, and demographic predictors of psychological disorders, including PTSD, personality disorders, stress, mood disorders, and substance use disorders of service members. Rates of most psychological diagnoses were higher among military women than military men. Compared with their male colleagues, military women were more likely to seek mental health care during deployment and to be evacuated from theater for psychiatric-related diagnoses. Positive mental health screening rates were also higher

for women than men upon return from OIF/OEF deployments. It has been reported that prior to deployment, military men feel more prepared to deploy, perceive greater unit social support, and have fewer concerns about life and family disruptions than military women.

The prevalence rate for eating disorders was higher in military women than men. Of particular concern are the rates among female Marines, who had the highest rates of all services. Among enlisted women on active duty, those with previous combat-related deployments were more likely to develop new-onset eating disorders. Numerous studies report that Caucasian females have a higher rate of eating disorders than females of other races. Findings regarding potential contributing factors for eating disorders (ie, self-esteem, body image, weight, BMI, stressful events) have been inconsistent. Discussions regarding potential sex-specific interventions or programs for mitigating eating disorders were absent. Reported inconsistencies regarding sex differences in eating disorders demonstrate the need for more rigorous research. Until well-supported consistent findings are identified, the potential for efficacious eating disorder interventions may remain stymied.

A clear consensus from existing research with military samples is that men consumed tobacco products and alcohol at significantly higher rates than women, and were at greater risk for screening positive for or receiving a medical diagnosis of substance abuse. Use of tobacco products by military personnel was higher than use by their civilian counterparts.

Across multiple studies, researchers consistently reported that military women used mental health care more than military men. Numerous studies reported that military women were more likely than military men to receive both inpatient and outpatient mental health care and be rehospitalized for psychiatric conditions. Other studies provided contradictions and mixed results about sex differences in the use of mental health care. Sex-specific findings about suicidal behaviors we
re also mixed. The reported inconsistencies about psychological health care use underscore the need for more rigorous investigations on this topic in order to inform military policy and programs.

Gender-specific findings about the impact of deployment and service on other psychological disorders were inconsistent throughout the literature. The number of intervention studies was minimal. Studies concerning potentially efficacious sex-specific programs to promote and/or maintain optimal psychological health were absent from the literature. The lack of such research demonstrates the need for rigorous scientific studies to assess psychological health interventions and subsequent findings to be sure that sex-specific needs will be appropriately met. Although the reviewed literature provided some evidence that military women experience higher rates of psychological disorders than military men, these findings were generated by research designs that relied on descriptive studies and retrospective data rather than prospective and longitudinal methodologies.

Environmental and Occupational Exposures

Surprisingly little has been published on the effects of environmental and occupational exposures in military women. This effort identified only 6 studies that specifically addressed chemical exposures; this underscores the limitations of the existing literature given the sheer number of military women employed in high risk, extremely diverse, and extremely hazardous occupations. Much data already have been collected and exist in robust databases, such as the Millennium Cohort Study, Career History Archival Medical Personnel System, Defense Medical Epidemiology Database, Defense Medical Surveillance System, the Global Expeditionary Medical System, the Joint Medical Workstation (JMeWS), Global Emerging Infections Surveillance and Response System, Theater Medical Data Store, the Department of Defense Serum Repository, the Wounded Warrior

Recovery Project, the Expeditionary Medical Encounter Database, and the Military Health System Management Analysis and Reporting Tool. Rather than only focusing on new research, funding should be directed to mine existing databases to determine whether occupational exposures affect hormonal patterns and influence cancer rates, as well as to determine associations between exposures and negative reproductive outcomes, including infertility and premature births. As women continue to enter nontraditional areas like aviation, combat, submarine, and Special Forces and Ranger communities, great care should be taken to determine health outcomes and trends specific to military women.

Currently, military policies provide guidance for duty assignments that will afford a pregnant military woman and her unborn child a safe environment while maintaining optimal job and career performance. Relevant military policies are detailed in the following documents: OPNAVINST 6000.1C, AR 614-30, AR 220-1, AR 40-501, DoDI 1342.19, DoDI 1315.18, DoDI 6025.19, AR 40-400, AR-501, AR 4051, AR 600-9, DoDD 1308.1, FM 21-20, AFI 44-102, AFI 10-203, AFI 36-2110, AFI 36-2905, AFRCI 41-104, and ANGI 40-104. These policies address issues such as standing at attention, lying prone, participating in weapons training and swim qualifications, lifting, performing work at heights, exposure to heat or vibration, length of the work week, deployability, exposure to chemical or toxic agents, shipboard or field assignment, and physical conditioning. Policies must continue to be guided by evidence from scholarly research and not by popular opinion or solely for aggregate retention objectives.

Obstetrics/Postpartum Issues/Fertility

In 2013, 20.7% of *all* hospitalizations among active military members, and 57% of all hospitalizations of female members, were for pregnancy and delivery-related conditions.[326] This was the second highest cause of hospitalization in all active service members. Only 5 articles published during 2000–2010 explored issues related to obstetrical care. Of these 5 studies, 2 addressed the inadvertent administration of anthrax vaccine in military women. Other vaccines primarily administered to military members, such as those for smallpox and Japanese encephalitis, had not been evaluated in early pregnancy. One study indicated that military women who engage in physical exercise during pregnancy will likely deliver babies with lower birth weights. Considering the requirement to exercise and meet physical readiness standards both before and after pregnancy, this outcome should be further explored.

Findings about preterm birth and prenatal care from the reviewed literature were consistent with published research with civilian working women. Only 1 study evaluated the association of race with premature delivery in military women, finding the same association between race (black) and premature labor that is seen in the general population. Other studies identified risk factors for premature labor and births such as marital status (being unmarried), having an occupation that requires standing, and holding the rank of officer. Future research should explore the association between race and premature delivery in greater detail, noting that black women in the military differ from those in the general population in that they are fully insured, fully employed, and better educated. While maternal stress has been strongly linked to preterm birth in the general population, this correlation is wholly unexplored in military women. Future research efforts should focus on the effects of stress, anxiety, and PTSD on preterm birth in military women.

Results from breastfeeding studies strongly suggested that the continuation of successful breastfeeding past 6 months was directly related to the availability of certified lactation consultants. Findings from other postpartum studies indicated that military women experience postpartum depression and postpartum fatigue at a rate higher than that experienced by civilian women. Future research should concentrate on effective interventions to

reduce postpartum fatigue, improve sleep, and mitigate postpartum depression symptoms. In addition, limited research has been conducted on the psychological outcomes and recovery of military women with a deployed spouse or limited social support system.

Chronic Disease

Limited research evidence was available on chronic disease and chronic conditions. The search strategies employed in this review did not produce any research on chronic joint conditions, the most common musculoskeletal condition prompting an ambulatory care visit.[327] Three studies described low back pain intervention outcomes. Disorders of the back were the second most common musculoskeletal condition requiring ambulatory care visits.[322] Additional research is needed to understand the demands of military duty on women's musculoskeletal system.

Interpersonal Violence/Sexual Trauma

Not enough research has been done regarding IPV, sexual trauma, and childhood abuse among military personnel. However, results from existing studies showed that lifetime interpersonal violence experiences, including childhood traumas, have potentially serious negative effects on the health and well-being of service members, as well as on success in their military careers. Studies have also begun to document the prevalence of different types of interpersonal violence. Unfortunately, wide variability in prevalence estimates sometimes exists; without a clear understanding of the differences in research design and in trauma assessment that may influence these rates, it is difficult to reconcile the findings of these studies.

There has been some research on risk factors that may predict interpersonal violence victimization among military personnel, as well as morbidity and resilience in adjustment outcomes following interpersonal trauma; however, the mechanisms that link multiple risk and protective factors need to be understood more fully. In particular, the relative importance of military-specific risk factors should be explored. Commonly identified predictors that are more prevalent in the military (eg, heavy alcohol use), as well as possible risk factors that are unique to military culture and structure (eg, service protectionism, barriers to reporting), should be investigated.

Finally, much more work to develop and rigorously evaluate effective methods of primary prevention and victim support is warranted. Results from research reviewed here note that military personnel believed that screening programs may be useful for the purposes of health surveillance or the provision of targeted care. However, they had clear concerns about confidentiality. More studies should explore the fears and concerns of military personnel with regard to help-seeking behaviors, and their implications for the success of programs such as health screening.

SUMMARY

The preponderance of the literature on military women's health research is related to readiness and health promotion, followed by psychological health and gynecological health. These topics correspond with the demographics of servicewomen, who tend to be young and of child-bearing age. While the psychological health research included in this review is primarily based on research conducted pre-OEF/OIF, the findings are still relevant to the experience of today's military forces.

The literature gathered here represents a decade of research on military women's health issues. During this time, the nation went from a peacetime military to wartime military fighting on two fronts. As a result, research efforts to improve the health of the warfighter gathered momentum. Simultaneously, women's roles in the military expanded into new territory, including combat and submarines. However, the medical research that focused on the warfighter failed to consciously and seriously investigate sex differences, including those physiological and psychological reactions that may be specific to combat-related service. Long-term physical and mental health consequences associated with combat deployments are well-documented across the existing research on veteran women. As such, the apparent absence of a similar research effort to investigate these health issues among active-duty women who are still engaged in military service is inexplicable. In garrison, or the nondeployed setting, the majority of readiness research occurs in the training environment or with recruits, with the aim of recruiting and retaining a healthy force. Similar research efforts should focus on maintaining and sustaining all current military personnel by identifying the most effective health promotion, risk reduction, and disease prevention interventions and health care practices. Sex-specific evidence from such research would better support the efforts of military medical care providers to meet the comprehensive physical and psychological health requirements of all service members.

Since most of the reviewed research articles are best described as single descriptive studies, the overall level of reliable scientific evidence must be considered weak. This limits the conclusions that can be derived from the published findings. We further acknowledge that this review is limited to the years 2000–2010, and the gaps in existing research may have been addressed by peer-reviewed research published since 2010. To address this particular concern, a new research initiative will use the results of this report as a foundation for a comprehensive literature search and systematic review of all peer-reviewed research on military women's health that was published between 2000 and 2015. Results from this new initiative will be used to finalize a Military Women's Health Research Agenda.

CONCLUSION

While rigorous methods have been employed to find, evaluate, and assess the existing peer-review research on military women's health, limitations to the process exist. The summaries and recommendations for each area of research are the results of indirect findings and conclusions drawn from a heterogeneous literature. The myriad study designs and outcome variables make the synthesis of findings difficult. Readers are encouraged to refer to source references and interpret the findings in the context of their own clinical, research, or policy-making intent.

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APPENDIX 1: EXCERPT FROM THE MWHRIG HEALTH RESEARCHER GUIDE

Military Women's Health Researcher Guide

A project of the TSNRP Military Women's Health Research Interest Group

Researchers of the Military Women's Health Researcher Guide, 6th edition

Military Women's Health Research Interest Group

The mission of this group, a multidisciplinary and multi-service team, is to expand the foundation of knowledge upon which can be built expert practices in the preventive, acute, and chronic health care for women, influence policy and DoD program development, and lead to evidence-based decision making that supports the well being of women in the military healthcare system.

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Please respect the privacy of those researchers who have agreed to be a part of this book by using their contact information for only research-related networking and collaboration.

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If you are interested in additional copies of this book, please contact megan.foradori@gmail.com.

More Information on the TriService Nursing Research Program

from the TSNRP Website: **www.usuhs.mil/tsnrp**

Military Women's Health Research Interest Group page: www.usuhs.mil/tsnrp/Resources/RIG/women.php

Mission

To facilitate nursing research to optimize the health of military members and their beneficiaries.

Strategic Goals

- Expand the cadre of military nursing researchers.
- Provide infrastructure to stimulate and support nursing research and evidence-based nursing practice.
- Promote research on areas unique to the military and critical to the health of military members and on developing science to enhance military nursing practice.
- Expand the breadth and depth of the nursing research portfolio by encouraging and funding programs of research in TSNRP's focused areas of investigation.
- Foster partnerships for collaborative research.

Research Priorities

TSNRP supports quantitative and qualitative studies on operational or deployment health topics in their strategic focus areas including force health protection, nursing competencies & practice, and leadership, ethics, & mentoring.

TRISERVICE NURSING RESEARCH PROGRAM

Fostering Excellence in Military Nursing Science

Find us on Facebook

Please join us on our **Military Women's Health Research Interest Group** page!

Index of Our Project's Subject Matter Experts By Research Interests

Gender Specific & Reproduction				
Contraception/Menses	Genitourinary	Obstetrics	Mothering/Family	STI
Christopher	Criner	Alviar	Agazio	Clemmons
Chung-Park	Czerwinski	Armitage	Marter	Gaydos, C
Gonzales	Gehrich	Braun	Pearl (Ternus)	Gaydos, J
Meyer	Lowe	Foster	Smith	Jordan
Powell-Dunford	Ryan-Wenger	Hill	Weis	Meyer
Trego	Steele	Kennedy		Throop
von Sadovszky		Krulewitch		von Sadovszky
Wardell		Magann		Witkop
Witkop		McMullen		
		Nielsen		
		Rychnovsky		
		Tipton		
		Weis		

General Health/Conditions		
General Care, Systems, Occ Health, Policy	Nutrition/Performance/Exercise	Deployment/Post-Deployment Health
Baykan	Armitage	Alviar
Bean-Mayberry	Bhavsar	Braun
Dye	Clemmons	Conway
Gaydos, J	Friedl	Czerwinski
Koehlmoos	Karl	Foster
Krulewitch	McClung	Goodman
Lettieri	Steele	Jordan
McNulty	Tipton	Lowe
Seibert	Wilson	Marter
Tiesman	Witkop	Nielsen
Wilson		Pierce
Yano		Powell-Dunford
		Trego

Mental Health (includes PTSD, stress)
Agazio
Armitage
Goodman
Hopkins-Chadwick
Marter
Nayback-Beebe
Pierce
Woodruff

Substance Abuse (includes tobacco)
Conway
Stander
Street
Woodruff

Trauma	
IPV, DV, Abuse, MST	Injury
Ferguson	Macera
Forgey	Rauh
Hendrix	Tiesman
Krulewitch	Witkop
Lutgendorf	
Murdoch	
Rychnovsky	
Stander	
Street	
Vogt	

MWH Researcher Guide, Sixth Edition 100

APPENDIX 2: LEVEL 2 SCREENER

Article #:
Reviewer:
Date: February 4, 2015
Author:
Title:

Systematic Review of Military Women's Health Research: Abstract Screener

1. Inclusion/Exclusion Criteria:

A. Study relates to US military personnel:
Yes **No -> STOP**

Service, if known:

Army	Yes	No
Navy	Yes	No
Air Force	Yes	No
Marines	Yes	No
Coast Guard	Yes	No

B. Study includes women service members, compares men & women service members, compares military women with civilian women, or analyzes women separately
Yes **No -> STOP**

C. Study involves active duty/reservist/NG military eligible for healthcare in the MHS, and involves a health condition or functional status that requires health services
Yes **No -> STOP**

D. Topic is relevant to MHS healthcare or how MHS care is delivered to military women
Yes **No -> STOP**

---

2. Design:

Descriptive 1
Correlational 2
Experimental 3
Quasi-experimental 4
Qualitative research 5
Triangulation 6
Systematic review or Meta-analysis 7
Non-systematic review .....8 -> STOP
Editorial/commentary .....9 -> STOP
Unclear .....10 -> STOP

Data Source/Sampling: Answer as applicable

Sample size: _____ Non-patients? Yes No

Total sample size (if men): _____

---

3. Setting of Research: Choose all that apply

Unknown
Not Applicable

Treatment Facility Setting:
Military Treatment Facility
Civilian Facility
Multi-site study

Deployment Setting (if applicable):
OEF/OIF
Bosnia
Persian Gulf/Gulf War
Vietnam
Not Specified
Other, Specify _____

Other Setting:
Field exercise/training
Workplace
Fleet
Other, Specify _____

---

4. Topic(s): Choose all that apply

Pharmacology
Clinical research
Medical readiness
Post-deployment health
Psychological health
Environmental and occupational exposures
Teratogenicity
Health promotion, risk reduction, disease prevention, nutrition
Quality of care/patient satisfaction
Utilization and access
Cost analysis
Mortality
Tools (research or clinical)
Other _____

ACCEPT ARTICLE FOR REVIEW
DO NOT ACCEPT

5. Types of condition (s): Choose all that apply

Not applicable

Gender Specific Reproductive Care
Breast Health
Cancers of the reproductive tract
Genitourinary
STD / STI
Obstetrical
Contraceptive care
Fertility
Menstrual cycle disorders
Menopause

General Conditions
Bone, joint, rheumatic
Cardiovascular disease
Endocrinology/thyroid
Gastrointestinal
Neurological (includes stroke)
Obesity
Other, specify _____

Psychiatric
Mood disorders
PTSD
General psychiatric
Other, specify _____

Substance Abuse
Alcohol studies
Smoking
General substance abuse
Other, specify _____

Trauma
Polytrauma / TBI / SCI
Sexual assault / MST
General trauma
Other, specify _____

---

6. Notes:

APPENDIX 3: LEVEL 3 SCREENER

Article ID #:
Reviewer:

Military Women's Health Research Critique Form

First Author			
Article Citation			
Brief Title			
Study Question			
Study Design *(descriptive, experimental, etc.)*			
Sample	What was the sample size?		
	Is the sample patients or non-patients?		
	If patients, what was the male/female count?		
	What was the sampling method?		
	What was the response rate (if applicable)?		
Data Collection *What were the data collection strategies?*			
Findings *What were the results of the study?*			
Limitations *What does the author state as limitations?*			

Hierarchy of Evidence Rating System

Please check one.

(Modified from Melnyk & Fineout-Overholt, 2005)

☐ I	Evidence from a systematic review or meta-analysis of all relevant randomized controlled trials, or evidence-based clinical practice guidelines based on systematic reviews of RCT's	Strongest ↕ Weakest
☐ II	Evidence obtained from at least one well-designed RCT	
☐ III	Evidence obtained from well-designed control trials without randomization	
☐ IV	Evidence from well-designed case control and cohort studies	
☐ V	Evidence from systematic reviews of descriptive and qualitative studies	
☐ VI	Evidence from a single descriptive or qualitative study	
☐ VII	Evidence from the opinion of authorities and/or reports of expert committees	

Level of Quality

Please check one.

(Modified from Johns Hopkins Nursing Quality of Evidence Appraisal, 2007)

Grade	*Level*	*Research*	*Non-research*
☐ **A**	**High**	Consistent results, sufficient sample size, adequate control and definitive conclusions; consistent recommendations based on extensive literature review that includes thoughtful reference to scientific evidence	Expertise is clearly evident.
☐ **B**	**Good**	Reasonable consistent results, sufficient sample size, some control, and fairly definitive conclusions; reasonable consistent recommendations based on fairly comprehensive literature review that includes some reference to scientific evidence	Expertise appears to be credible.
☐ **C**	**Low/ Major flaw**	Little evidence with inconsistent results, insufficient sample size, conclusions cannot be drawn	Expertise is not discernable or is dubious.

General Comments	

APPENDIX 4: SUBJECT MATTER EXPERTS

Subject Matter Experts for the Military Women's Health Literature Review (2000-2010)	
LTC (Ret) Janice Griffin Agazio, PhD, CRNP, RN	LCDR Elizabeth Gloor, FNP
Maj Aimee L. Alviar, WHNP-BC	CDR Carl Goforth, PhD, RN
Lt Col Nicole H. Armitage, PhD, WHNP	COL (Ret) Petra Goodman, PhD, WHNP
Lt Col Beth Baykan, WHNP	Neil Grundberg, PhD
Bevanne Bean-Mayberry, MD, MHS	LTC (Ret) Teresa Hendrix, PhD, MS, CNM
LTC Amit Bhavsar, MD	CAPT Thomas Herzig, PhD, MSPM, PMP
CDR Lisa A. Braun, APRN, FNP-BC, PhD (c), MBA, JD, FAANP	COL Christina C. Hill, MD, FACOG
CAPT (Ret) Min Chung-Park, PhD	Marjan Holloway, PhD
Nakia S. Clemmons, MPH	COL Denise L. Hopkins-Chadwick, PhD, RN
MAJ Laurel Cofell, PhD	R. Rima Jolivet, DrPH, FACNM, MSN, CNM
Ava Conlin, DO	J. Philip Karl, MS, RD, LDN
LTC (Ret) Judy A. Criner, PhD, RN	Karen Kelly, PhD
Barbara Czerwinski, PhD, RN, NEA-BC, FAAN	Stephanie Kewley, PhD
Susanna Didrickson, WHNP	CDR Heather King, PhD, MSN
Frederick L. Dutton, Jr.	Heidi Kraft, PhD
CAPT Judy L. Dye, MS, RN, ANP-BC	Cara J. Krulewitch, CNM, PhD, FACNM
Mark Ettenhofer, PhD	CDR (sel) Rachel Lee, MD
Patricia Findley, DrPH, MSW	COL Julie Lomax, RN
Mary Ann Forgey, PhD, LCSW	LCDR Monica Lutgendorf, MD, FACOG

Subject Matter Experts for the Military Women's Health Literature Review (2000-2010)

CAPT (Ret) Everett F. (Pat) Magann, MD, FACOG, FRANZCOG	Diane Seibert, PhD, CRNP, FAANP
CDR Abigail Marter, PhD (c), MSN, NP-C	Maureen Shannon, CNM, FNP, PhD, FAAN, FACNM
James P. McClung, PhD	LTC Leilani A. Siaki, PhD, FNP-BC
Lt Col John McGee, PhD, MPT, MBA, OCS, ATC	LT Denise Smith, CNM
LCDR Patrick McMullen, MSPH, MS	CDR Dennis Spence, PhD, CRNA
LCDR Kellie McMullen, PhD	Valerie Stander, PhD
Stephanie McWhorter, MA	LTC Meryia D. Throop, PhD, DNP, FNP
COL Michelle Munroe, MSN, CNM	Hope M. Tiesman, PhD, MSPH
Maureen Murdoch, MD, MPH	Sandra Valtier, PhD
LTC Ann Marie Nayback-Beebe, PhD, RN, FNP-BC	Dawne Vogt, PhD
COL (Ret) Patricia W. Nishimoto, PhD, CNS	Victoria von Sadovszky, PhD
LTC Nicole Powell-Dunford, MPH, FAAFP	Kristen Walter, PhD
CDR Christopher Reddin, PhD, RN, CEN, PMHNP-BC	Diane Wind Wardell, PhD, RN, WHNP-BC
LTC (Ret) Sharon Reese, PhD, RN	COL Bradford P. Whitcomb, MD, FACOG
David Riggs, PhD	Lt Col Catherine Takacs Witkop, MD, MPH
MAJ Ludrena C. Rodriguez, CNS	Jeanette Witter, PhD
MAJ Tanja C. Roy, DPT, PhD	Susan I. Woodruff, PhD
LCDR Faye Rozwadowski, MD	COL (Ret) Linda Yoder, PhD, MBA, RN, AOCN, FAAN
LTC (Ret) Nancy Ryan-Wenger, PhD, RN, CPNP, FAAN	

APPENDIX 5: MILITARY WOMEN'S HEALTH LITERATURE EVIDENCE TABLES

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Adler 2005[187] Rating: VI Quality: B	Does the length of peacekeeping deployments and number of previous peacekeeping deployments affect the psychological health (specifically depression and posttraumatic stress symptoms) of male and female military personnel? Is there a sex difference in the effect?	3339; 1225	A primary psychological screening survey was administered in person to returning military members within 30 days prior to redeployment in groups of up to 100. Rank, marital status, and unit type were collected. Questions included peacekeeping deployment history (length of current deployment and number of times previously deployed). Instruments included a depression scale and a posttraumatic stress scale. Surveys were hand scored on-site and mental health staff briefly interviewed soldiers scoring above specified criteria as a secondary screen.	Longer deployments and first-time deployments were associated with an increase in distress scores in male soldiers only. Previous deployment experience affected depression and posttraumatic stress symptoms for males and females, with no sex difference.
Agazio 2002[61] Rating: VI Quality: B	What is the relationship between personal factors and behavior-specific cognition of perceived self-efficacy and interpersonal resources related to the health-promoting behaviors of active-duty women with children? What is the relationship between perceived health status, definition of health, demographic characteristics perceived self-efficacy, resources, and health-promoting behavior for active-duty women with children? How do active-duty mothers describe the experience of being on active duty and being mothers?	135 (28 participated in qualitative study); 135 (28 participated in qualitative study)	Participants were volunteers recruited through health fairs, random mailings to enrollees, and display of study materials at 6 outpatient clinics at 2 military hospitals in the US mid-Atlantic region; inclusion criteria included being an active-duty female, having at least 1 child, and being able to speak, read, and understand English. Quantitative data were collected using a scannable packet that included 5 validated instruments: Laffrey Health Conception Scale, Perceived Health Status Scale, Family Inventory of Resources for Management, Perceived Health Competence Scale, and Health-Promoting Lifestyle Profile II, plus demographic data. Qualitative data were collected by phone at the end of the survey through a focused interview with a subset of the participants, utilizing an interview guide with open-ended items addressing several content areas about health promotion activities, available resources, and gaps in health promotion services for active-duty military women with children.	Results of the study found that perceived self-efficacy, interpersonal influences, social strata, and perceived health status predicted health-promoting behaviors. Results from content analysis of the open-ended questions supported the quantitative findings of the study, specifically that subjects with a resolve to maintain personal health promotion were able to find time to pursue healthy behaviors.
Agazio 2010[60] Rating: VI Quality: B	What demographic characteristics, definition of health, perceived side effects, and resources can determine or predict health promotion behaviors among military women?	491; 491	Quantitative arm of a larger study using integrated methods that also included qualitative interviews and textual data. Active-duty or Reserve military women able to speak, read, and understand English were recruited through clinics (pediatric, OB/GYN, Internal Medicine, and Allergy/Immunology) at 2 military hospitals in the US mid-Atlantic region, at organized health fairs, and through ads in the clinic and facility newsletters. Subjects completed a demographic data sheet, the Perceived Health Status Scale, the Laffrey Health Conception Scale, the Family Inventory of Resources for Management, and the Health-Promoting Lifestyle Profile II.	Individual perceptions of health status, higher self-efficacy, and interpersonal influences significantly predicted health-promoting behaviors for Reservists with children and for active-duty women with and without children. Interpersonal influences were the only predictor of health-promoting behaviors in Reservists without children. The outcome indicated that self-efficacy and interpersonal influences were the most influential in determining health promotion.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Ajene 2004[177] Rating: IV Quality: B	What are the characteristics of neoplasms among Navy personnel? Have cancer rates among Navy personnel increased over time? How do these rates compare with the civilian population?	427; 78	Records from 1998 to 2000 containing the diagnoses for neoplasms (identified by ICD-9 codes 140-239) were pulled from the US Navy Physical Evaluation Board, provided by the Naval Medical Information Management Center, Bethesda, MD, and analyzed. Demographic characteristics extracted included age, sex, pay grade, and years of presentation.	The rate of neoplasms for females was higher than for males. For females, breast cancer had the highest rate.
Albright 2005[166] Rating: VI Quality: B	What behavior patterns characterize active-duty female soldiers who present for acute dysuria care at a military care facility?	238; 238	A sample of female soldiers presenting with acute dysuria, urgency, or frequency at Madigan Army Medical Center or its outlying medical clinics between October 1996 and February 2000 were asked to participate in this study. A second group of female soldiers presenting with complaints other than dysuria were also invited to participate. All women who volunteered to be part of the study completed a self-administered questionnaire (not formally validated) to study the association between dysuria and fluid restrictions, delayed voiding, and other adaptive measures commonly used by female soldiers; the study included demographic characteristics (age, parity, and military occupation).	The dysuria group drank significantly less than and postponed urination more than the control group.
Albright 2007[161] Rating: VI Quality: B	Among female Army soldiers who deployed during Gulf War I and Operation Iraqi Freedom (OIF), are there differences in the demographics and medical encounters of those who received a positive pregnancy test result during deployment?	77; 77	Data collected through a retrospective chart review of gynecological visits presenting to the gynecology clinic at Camp Doha, Kuwait, from August 2003 through April 2004. Variables collected included date of arrival in theater of war, demographic information (age, rank, military or civilian status, and component), chief complaint, gestational age, secondary diagnosis, final disposition.	Approximately 5% of the sample had a positive pregnancy test. Nearly a quarter of these pregnancies were achieved prior to arrival in theater. The majority of pregnancies were in the first trimester. The most common presenting complaint was amenorrhea. Final disposition for the majority of pregnancies was administrative redeployment and the remainder had a medical evacuation.
Albright 2007[172] Rating: VI Quality: B	What is the utility of ultrasound to evaluate gynecological problems in the combat theater within Iraq?	237; 237	Data for this study were extracted by chart review of gynecology visits requiring pelvic ultrasound presenting to the gynecological clinic at the US Army Health Clinic-Camp Doha, Kuwait from August 2003 through April 2004. Variables collected from charts included age, rank, military status, chief complaint, primary diagnosis, final disposition.	Fourteen percent of the visits required an ultrasound, with the primary presenting complaint being pelvic pain. Pregnancy was the most common final diagnosis. The majority of those pregnant received an ultrasound. The use of ultrasound assisted in returning 96% of the female soldiers to duty.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Ames 2007[209] Rating: VI Quality: A	What are the influences of the military work environment (deployment and liberty) on heavy and heavy episodic drinking among Navy career enlistees and officers?	2380; 1224	Mail survey and ethnographic fieldwork interviews were conducted on naval bases and work sites including submarines, carriers, and other types of military vessels in the Atlantic and Pacific Fleets located in CONUS and OCONUS with careerists who had served at least 7 years. Semi-structured, open-ended interviews and observations were conducted in selected work, recreational, dining, and sleeping areas on board ships and submarines in port, with 1 week aboard a carrier at sea for a training exercise. Observations were not conducted during deployment liberty. Self-administered questionnaires that also included demographic characteristics (age, sex, educational level, marital status, and race/ethnicity) were mailed to potential study participants at their duty stations beginning in spring 2001.	The prevalence of alcohol abuse differed significantly between men and women; however, no sex differences were found in the prevalence of heavy episodic drinking or heavy drinking during the most recent deployment liberty.
Andreotti 2001[75] Rating: VI Quality: C	What are eye injury rates across the military services? Are there demographic and military occupation risk factors for eye injury?	237; 15	Data on all active duty in the US Armed Forces between January 1, 1998, and December 31, 1998, were extracted from the Defense Medical Surveillance System. Demographic characteristics were collected. All primary and secondary diagnoses reported for hospitalizations and ambulatory visits for eye injuries during the study period were extracted using 53 ICD-9-CM codes. Causes of eye injuries resulting in hospitalization, coded in accordance with the North Atlantic Treaty Organization Standardization Agreement 2050, were used to characterize the causes into 7 categories; causes of injuries treated in ambulatory settings were not reported.	Men had twice the hospitalization rates as women.
Antczak 2008[180] Rating: VI Quality: B	What are the incidence rates of anorexia nervosa, bulimia nervosa, and eating disorders not otherwise specified across the military services?	1380788; 201607	The Defense Epidemiological Medical Database, containing records for all services (Army, Navy, Air Force and Marines), was queried for 1998-2006 inpatient hospitalizations and ambulatory visits (seen in military treatment facilities and/or per TRICARE benefit) with ICD-9 codes for anorexia nervosa, bulimia nervosa, and eating disorder not otherwise specified. Age, sex, rank, race, and service were also collected.	Females represented 85% of diagnoses, with the majority of cases being bulimia nervosa. White females had a higher rate of diagnoses than females of any other race.
Appolonio 2008[222] Rating: VI Quality: C	What is the prevalence rate of postpartum depression in an active-duty military sample? What psychosocial and demographic risk factors are associated with PPD symptoms for military mothers, and are these risk factors different from those identified in studies of civilian mothers?	87; 87	Potential subjects were women (including activated Reservists and National Guard members) who gave birth at Wilford Hall Medical Center, Lackland Air Force Base, San Antonio, TX; participation was voluntary. Recruitment was conducted via letters sent through the Office of Clinical Investigation and through fliers in the OB/GYN and pediatric departments with the survey's website address; women with poor delivery outcomes (low Apgar scores, fetal anomalies, or deliveries <28 weeks). Participants were given a $5 gift card to a baby needs store as an incentive. Data was collected electronically via a website within 6 months postpartum. Measures included the Edinburgh Postnatal Depression Scale (EPDS), the Postpartum Depression Predictors Inventory-Revised (PDPI-R), and a demographic questionnaire. Participants were also debriefed after data collection.	The following PDPI-R variables were correlated with EPDS scores. Low self-esteem, prenatal anxiety, poor marital/partner satisfaction, maternity blues, life stress, prenatal depression, difficult infant temperament, poor social support, history of previous depression, and childcare stress. There was no significant relationship between military variables and marital status and PPD.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Arsenault 2000[52] Rating: IV Quality: B	What are nutritional implications of consuming reduced fat or reduced energy foods in female military women?	50; 50	Retrospective data analysis of self-recorded food intake for 7 days on record cards (from a larger study on iron status). Subjects self-recorded food intakes and were interviewed by dietitians each day to ensure food cards were complete and accurate. Portion sizes were verified during the interview, nutrient data was obtained from the Nutrient Data Base for Individual Food Intake Surveys and items were entered into a computer database.	The > 14 RED group tended to be Caucasian, single, had lower BMI, and exercised more. Mean daily intake in > 14 RED group was significantly higher in carbohydrates, specific vitamins and minerals, and sodium, but significantly lower in cholesterol. Percentage of energy from fat was significantly lower in > 14 group than the < 14 RED group, but energy intake did not differ significantly. More >14 RED women used dietary supplements. >14 RED women may consume less energy from fat and improve their diet's nutrient composition by eating healthier food.
Barker 2001[268] Rating: VI Quality: B	What factors would better characterize the risk for Lyme disease infection among military personnel?	9673; 15.7%	The DoD serum repository provided a random selection of serum samples with demographic data collected in 1997; samples were originally collected for routine HIV screening or pre-deployment. Samples from each military branch were obtained based on service-specific proportions. Serologic testing for Lyme disease was done with an ELISA and a Western blot assay. Prior serum samples available for study group members were included for incidence analysis.	Female military personnel were more likely to test seropositive than males by ELISA testing.
Barney 2006[71] Rating: VI Quality: B	Must Marine aviation personnel, compared with other Marine personnel, meet different hearing threshold levels in annual and periodic audiograms?	20645; Unidentified	Navy and Marine Corps Hearing Conservation Program Database 1995-1999 collected data on annual, termination, and follow-up audiograms, age group, sex, officer status, and military occupational skills (MOS) groups for Navy and Marine personnel.	Officers and women had significantly lower rates for elevated thresholds, suggesting a protective effect.
Bathalon 2006[59] Rating: VI Quality: B	What is the prevalence of compliance and noncompliance with the current Army Weight Control Program (AWCP)? How would proposed changes (increased weight-for-height allowances and adoption of DoD body fat equation) affect prevalence of compliance and noncompliance? What is the relationship between body weight, body fat percentage, and Army Physical Fitness Test (APFT) performance among women?	909; 909	All female service members stationed in the Army Weight Control Program (AWCP) at Fort Bragg, NC, and who took the Army Physical Fitness Test (APFT) in October-November 2002 were informed of study. Female soldier volunteering for the study completed a demographic questionnaire, had their most recent APFT score recorded, and had their height, weight, and body measurements measured by a trained anthropometrist.	Most Army female soldiers were compliant with the current AWCP, but 47% versus 77% were noncompliant with the % body fat standard using the Army versus the DoD equation under new AWCP. 81% of noncompliant female soldiers with current AWCP were likely to be noncompliant with the proposed AWCP changes. There was a negative relationship between how much under or over body weight and performance on APFT, and a negative relationship between percent body fat and APFT performance. More women with a waist circumference >35 inches were identified as noncompliant with the AWCP using the proposed body fat equation.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Beck 2000[96] Rating: IV Quality: A	How does bone geometry and anthropometry relate to risk of stress fracture in women compared with men?	663; 663	Female recruits were surveyed at Parris Island, SC, between 1995-1996, with a randomly selected subset asked to participate in a study with bone scans and anthropometry and followed through 12 weeks of training. In a sub-study, comparisons were made to male recruits from a parallel investigation. Scan data and anthropometry were used to calculate bone properties and dimensions (e.g., areal BMD, mediolateral bone widths, cross sectional areas and section moduli of femur and tibia, whole bone strength index) as well as muscle cross-sectional areas and strength. Men and women developing shin splints were excluded from the final analyses.	Fracture cases of both sexes had smaller thigh muscles and were less physically fit than non-cases; they also had smaller bone cross-sectional geometries indicating weaker bones. Bone geometry differences appear to reflect adaptive responses to physical conditioning before basic training. Stress fractured women had thinner bone cortices but similar subperiosteal diameters; male cases had the opposite characteristics with narrow subperiosteal diameters but similar cortical thicknesses compared with non-fractured men. This implies that young women build bone on the endocortical surface and men respond on the subperiosteal surface in response to physical training.
Bedno 2010[43] Rating: IV Quality: B	Are overweight Army recruits who pass a preaccession fitness screening test more likely than fully qualified recruits to enroll in the Army Weight Control Program? Is a waiver for exceeding weight and body fat standards associated with increased attrition from the Army?	8208; 1218	Demographic (age, sex, race, body mass index [BMI], and tobacco use) and Assessment of Recruit Motivation and Strength (ARMS) data (waiver status) on all Army recruits from February 2005 through September 2006 were collected at 6 Military Entrance Processing Stations (MEPS). The US Army Medical Command provided data on Army Weight Control Program (AWCP) enrollment.	Women were discharged more frequently than men. Twice as many fully qualified women than men enrolled in the AWCP, but the reverse pattern was seen among women compared with men with waivers.
Bell 2000[21] Rating: V Quality: B	What are the relative rates of injury for male and female Army trainees while controlling for physical fitness?	861; 325	Volunteers from all female Army basic combat training (BCT) companies and 1 of 4 male companies formed during a 1 month period in fall 1998 were the subjects for this study. Trainees completed a baseline screening survey, including demographic data; study staff assessed the volunteers' body composition and fitness, percent body fat, flexibility, and muscle strength at baseline. Muscle endurance and aerobic fitness were measured using the Army physical fitness test and VO2 Max was measured at baseline and at the end of the 8-week BCT. Medical records were assessed every 2-3 weeks for injuries.	Women experienced twice as many injuries as men, but entered the training at significantly lower levels of fitness than men. After controlling for fitness, sex was not found to be significantly associated related to with training-related injury, while fitness was.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Bell 2003[292] Rating: VI Quality: C	What is the official policy about breastfeeding by female military personnel? What are the incidence, duration, and barriers to breastfeeding by servicewomen?	Undefined, literature review	A Medline search from 1970 to 2001 to determine what was known about the incidence, duration, and barriers to breastfeeding in the military used the following MESH subject headings: breastfeeding, breastfeeding (statistics and numerical data), breastfeeding (psychology), military personnel and military medicine. The Military Health System Web Site was searched for any breastfeeding policies or materials from TRICARE. Regulations, technical manuals, and field manuals from each service were reviewed for mention of breastfeeding. Federal and state laws/policies FIRSTGOV and Library of Congress "THOMAS" websites were searched using keyword breastfeeding. Telephone surveys of DoD hospitals representing all regions and branches of service were conducted to find resources, information, and services available.	TRICARE may not be meeting the goals of Healthy People 2010. There is minimal policy guidance regarding breastfeeding. Programs are in place at most hospitals but the quality and content varies greatly. After mothers return to work, support is meager. DOD/TRICARE may need to establish written policy guidelines and devote additional resources to support breastfeeding.
Belmont 2010[83] Rating: IV Quality: B	What are the longitudinal disease and nonbattle injury statistics of a Brigade Combat Team?	4122 deployed (1324 DNBI); 325 deployed (166 DNBI)	Electronic medical records for all soldiers in a US Army basic combat training unit deployed to Iraq for 15 months were queried for all medical visits occurring during the deployment; multiple counting at different levels of care and for follow-up visits were eliminated. Unit rosters were used to obtain casualty rosters. A comprehensive database was created using medical and casualty records to identify disease and nonbattle injuries (DNBI).	Females had increased rates of DNBI, DNBI who were medically evacuated (MEDEVAC), and DNBI who were returned to duty than males. When DNBI were classified by body system, females had greater risk of MEDEVAC due to reproductive issues when compared with musculoskeletal MEDEVACs; all reproductive system issues were MEDEVACed and nearly three quarters of female MEDEVACs were due to pregnancy related issues. Overall, 10% of women in the BCT were MEDEVACed due to a female reproductive DNBI.
Biggs 2009[143] Rating: VI Quality: B	How does pregnancy impact active-duty female Navy personnel's personal circumstances and career outcomes?	917; 917	A 59-question survey was hand-delivered by the principal or associate investigator 24 hours postpartum to all active-duty women delivering a living infant at Naval Medical Command Portsmouth, VA, between May 2005 and December 2005 and collected upon discharge from hospital.	Active-duty women are at risk of unplanned pregnancy during their initial enlistment and likely to occur while assigned to deployable units. They are more likely to be transferred earlier, to require financial assistance, and fewer have fathers of the baby involved. Many positive correlations with pregnancy exist, particularly with respect to command climate and future military plans. Education and training programs warrant further review, study, and program development.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Bobo 2004[198] Rating: IV Quality: B	What are the clinical and demographic variables that correlate with readmission to a large tertiary care military psychiatric inpatient service located in the Washington, DC area?	814; 319	Retrospective analysis of medical records for consecutive admissions to the Walter Reed Army Medical Center adult inpatient service between July 1, 1999, and July 31, 2000. Active-duty service members, military retirees, and other beneficiaries of military health care services made up the study population. Variables collected, from administrative records, for each admission included: age, status (e.g., active duty, dependent of active duty), rank (if active duty), educational level, marital status, number of children, employment status, legal problems, Diagnostic and Statistical Manual of Mental Disorder, fourth edition Axis I and Axis II diagnosis(es) substance abuse history, physical/sexual abuse history, legal status, onset of mental health problems, length of stay, number of admissions, number of lifetime admissions for psychiatric care.	Female sex was associated with rehospitalization among those with active-duty status, but not within the entire cohort once active-duty status was controlled in analyses.
Bohnker 2002[72] Rating: VI Quality: B	What are the mean hearing thresholds for Navy and Marine Corps enlisted populations by sex, age, and service? How do these results compare with government data for civilian workers?	68632; 4738	Audiogram records of Navy and Marine enlisted personnel (E1-E9) were collected from the Navy and Marine Corps Hearing Conservation Program computer database of a 20-25% random sampling all monitoring audiograms completed from 1995-1999 submitted by Naval medical facilities. Sex, age, and service variables were also collected.	Women displayed smaller threshold deterioration than men within each service at corresponding ages. Women in both services demonstrated threshold levels close to OSHA values.
Bohnker 2003[125] Rating: IV Quality: A	What are the leading causes of disability among Navy personnel?	10406; 24%	Review of a Navy Medical Information Management Command Physical Evaluation Board (PEB) computer database from CYs 1998-2000. Navy personnel records pulled included diagnoses clustered by standard ICD-9 groupings, sex and age categories (<30 years, 30-40 years, >40 years), and rate/rank.	Women constituted 24% of the records, though they only made up 14% of the active-duty manning. Women had also been reported at increased risk for injuries and hospitalizations.
Bohnker 2004[73] Rating: IV Quality: A	Does age, sex, or military rank influence auditory significant threshold shifts (STS) among Navy personnel?	83694; Unidentified	Database pull of active-duty Navy personnel (E1-E9 and O1-O6) in the Navy Hearing Conservation Program Database for 1995-1999 from annual or termination exams; data collected included sex, age grouping, military rank, and STS.	Women and officers had lower STS rates than enlisted and male personnel.
Bohnker 2005[10] Rating: VI Quality: B	Are body mass index and other health-risk factors related to performance on the Navy Physical Readiness Test?	153601; 22314	The Bureau of Navy Personnel provided a population-based convenience sample of Physical Readiness Information Management System (PRIMS) data for Spring 2002. Data collected from review of 2 databases provided by Bureau of the Navy. One database file contained physical readiness testing (PRT) data, and a second database included risk factor information.	Body mass index (BMI) increased with age in both men and women. Smoking was more common in men than in women and rates declined with age for both sexes.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Booth-Kewley 2005[214] Rating: VI Quality: B	What factors are predictive of hospitalization for mental health disorders in a sample of enlisted Navy personnel?	124931; 14% of total	Data for the study were from recruits entering the Navy during calendar years 1997 through 1999. The study group included all individuals with at least 1 hospitalization for a mental health disorder and all individuals with no hospitalization (controls); individuals hospitalized for a physical reason were excluded. Inpatient hospitalization information (up to 5 hospitalizations per person), education level and retention status information were extracted from the Career History Archival Medical and Personnel System (CHAMPS). Thirty-three medial or psychosocial items and demographic characteristics from the Sailor's Health Inventory Program (SHIP), a self-administered questionnaire administered to all Navy recruits during in-processing at Recruit Training Command since the beginning of fiscal year 1997, were obtained. Data were merged to form a combined database.	Female sex is a predictor of psychiatric hospitalization.
Bowles 2006[18] Rating: VI Quality: B	How did the LIFE (lifestyle change, individual readiness, fitness excellence, eating healthy) wellness program influence weight loss, lifestyle, personality/psychological functioning, and quality of life over 1 year?	53; 18	Subjects were participants during the first year of the LIFE wellness program, a military weight reduction program promoting health lifestyle change. Participants received a physical exam (brief, including weight and body mass index) and psychological screening, and completed several instruments to assess behavioral and psychological parameters (Eating Inventory, Quality of Life Questionnaire, Life Orientation Test-Revised, Multidimensional Self-Esteem Inventory, Eating Disorders Inventory, Health Attributes Test, COPE); all parameters assessed at 4 time points: baseline, 1 month, 6 months, and 12 months.	Results showed a significant main effect for weight over time, but no significant interaction effects for sex. Increased total quality-of-life scores suggest that all completers enjoyed a greater general quality of life over the duration of the program. No significant differences between the two time periods were found for the Eating Disorders Inventory scales.
Boyer 2005[136] Rating: II Quality: A	Does a cognitive-behavioral, group based intervention prevent sexually transmitted infections (STIs) and unintended pregnancies (UPs) in young female Marines?	2157; 2157	Female recruits were approached during the first week of the recruit training period by research assistants to voluntarily participate. Baseline questionnaires and STI, pregnancy and HIV screening completed. Experimental group received an intervention of 4, 2-hour sessions on safe sex practices. Control group received the same format of classes on physical performance, healthy eating, and cancer prevention. Follow up data collected at approximately 1 and 14 months after intervention.	The trial indicated that cognitive-behavioral interventions are effective for reducing behavioral risk and preventing STIs and UPs in young, sexually active women who are not seeking health care.
Boyer 2006[150] Rating: VI Quality: B	What are the sociodemographic markers and 3 month behavioral correlates of sexually transmitted infections (STIs) in a nonclinical cross-section of adolescent and young adult women?	2288; 2288	All women enrolled in recruit training for the US Marine Corps during a 1-year period were asked to voluntarily participate in either a cognitive-behavioral, skills-building intervention to prevent STIs and unintended pregnancies or a nutrition and fitness program. Participants (94.2%) completed a self-administered questionnaire and tested/retested for *Chlamydia trachomatis*, *Neisseria gonorrhoeae* and *Trichomonas vaginalis* infection. Data collection was baseline for a larger study. Quantitative demographic and behavioral questionnaire administered at enrollment.	One or more STIs were diagnosed in 14.1% of participants. The presence of an STI at screening was significantly associated with the participant's type of residence, age, years of sexual experience, frequency of hormonal contraceptive use, perception that their sex partners had other concurrent sex partners, and the race or ethnicity of their last sex partner.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Boyer 2008[67] Rating: III Quality: B	Are sociodemographic factors and constructs derived from the Information, Motivation, and Behavioral Skills model correlated with sexually transmitted infections (STIs) and the composite STI risk score for female Marine Corps recruits?	2157; 2157	All women enrolled in US Marine Corps recruit training from June 1999 through June 2000 were potential subjects. Within in 2 weeks of starting recruit training, the participants completed a self-administered questionnaire and were screened for *Clamydia trachomatis*, *Neisseria gonorrhoeae*, and *Trichomonas vaginalis*. Measures of sociodemographic factors, knowledge about the transmission and results of STIs and HIV, sexual behaviors, perceived peer norms about preventive behaviors, perceived risk for STIs, intention to engage in preventive behaviors, perceived self-efficacy to do so, and ability to communicate with one's sexual partner about safer sex reflected participants' last 3 months before entry to the service.	The averages on the STI/HIV transmission knowledge scale and outcomes knowledge scale were 71% and 67%, respectively. Forty-eight percent regarded their chances of getting an STI as a result of their sexual behavior as very safe or fairly safe (35%). At least 20% had an STI risk score of 10 or more out of possible 0 to 15, with 15 denoting high risk behaviors. Younger, single, women who have more knowledge about STIs, less positive condom attitudes, and perceptions of higher STI risk were in the highest quartile of STI risk scores. They were also more likely to agree with statements that sex is more likely/enjoyable under the influence of alcohol, and be heavy alcohol and drug users in the month before entry to Marine recruit training. Fourteen percent of the sample screened positive for an STI, which was associated with higher risk scores, indicating the need for prevention programs that focus on motivation to change sexual risk behaviors. Recruits diagnosed with STIs had higher risk scores, last partners who were non-Caucasian and resided in rural locations before entry.
Bray 2001[241] Rating: IV Quality: A	What is the relationship between job functioning and stress for military women and men? What is the relationship between functioning at work among female and male military personnel to work stress, non-work stress, symptoms of depression, substance abuse, and coping styles?	16193; 2974	This was a secondary analysis of the 1995 self-administered Department of Defense Survey of Health Related Behaviors Among Military Personnel completed between April and August 1995. Items were grouped conceptually from the questionnaire and a Principal Component Analysis with varimax rotation was performed to determine underlying factors for (1) job functioning; (2) 4 domains of stressors (work, family, health, financial); (3) coping style (avoidant or problem-focused); (4) depression; (5) alcohol consumption; and (6) illicit drug use.	Women perceived more family stress than men. Thirty-three percent of women reported stress due to being a woman in the military. An increase by 1 standard deviation on the work-related stress scale (1) significantly increased the odds of being in a lower job-functioning category by 28% for women and 15% for men and (2) increased the odds of lower functioning at work by 30% for both men and women. Family-related stress significantly increased the odds of lower job functioning by 19% for men, but was not significant for women. Symptoms of depression increased the odds of lower job function by 30% for both women and men. For men only, 1 standard deviation change in (1) negative coping increased the odds of lower job functioning by 15%; (2) being a heavy drinker versus abstainer or light drinker increased the odds of lower job functioning by 19%; (3) illicit drug use increased the odds of lower job functioning by 35%.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Bray 2010[220] Rating: VI Quality: B	What are the drinking rates of Navy and Air Force recruits in the month prior to basic training and in the month following the end of the forced abstinence period?	4692; 873	A 120-item self-administered questionnaire was administered in group sessions by civilian research teams at 1 advanced school Naval training base in November 2004 and March 2005, and at 4 Air Force technical training bases in April and May 2005. All personnel 18-25 years old were eligible. Eligible trainees attended informational briefings and were asked to participate by project personnel. Alcohol use, age, sex, education level, race/ethnicity, and marital status were collected.	A higher percentage of men than women were frequent heavy episodic drinkers.
Brown 2010[218] Rating: IV Quality: B	How do drinking behaviors and alcohol-related problems vary across demographic groups (e.g., men versus women, enlisted versus officer) within a military population?	9506; 3250	Data used was drawn from the 2002 DoD Survey of Health Related Behaviors among Military Personnel, an anonymous questionnaire administered in group sessions at 30 installations to a randomized selection of active-duty personnel. Eligible personnel not in the sessions were mailed a questionnaire. Sections of the questionnaire for this study included the quantity and frequency for the type of beverage (e.g., beer, wine, or liquor), alcohol-related problems (using 4 measures), symptoms of alcohol dependence (based on the occurrence of specified symptoms in the past 12 months), driving after drinking, alcohol-related consequences in the past 12 months, alcohol-related productivity loss, and demographic characteristics (age, race/ethnicity, educational level, marital status, and pay grade).	Military women were more likely than military men to be abstainers, light drinkers or moderate drinkers. Among all, men had significantly higher prevalence of all alcohol-related problems which is consistent with heavier patterns of use. Women who were moderate drinkers had a significantly higher rate of productivity loss, compared with men who were moderate drinkers.
Bryan 2009[204] Rating: VI Quality: B	What is the impact of emotionally charged videos (possible iatrogenic effects associated with suicide prevention efforts) among suicidal viewers and suicidal survivors?	286; 123	Study subjects included active-duty enlisted US Air Force airmen participating in a 2-week introductory class assigned to their first duty station following completion of technical training school; subjects were stationed at a large Air Force base in the southern US. Participants received 2 envelopes containing pre- and post-briefing surveys. Prior to the briefing, subjects completed the pre-briefing survey and sealed them into the envelope. The briefing was a standardized 2005 version of the Air Force Suicide Prevention Program Community briefing. The participants then completed the post-briefing surveys and sealed them in the second envelope. The survey included a demographic form (in the pre-briefing survey only), the Suicidal Behaviors Questionnaire-Revised (SBQ-r), and the Positive and Negative Affect Schedule-Short Version (PANAS).	There were a higher proportion of females in the suicidal group and the survivor groups. Females had a larger decrease with the intervention in the negative affect compared with males. Females also had a greater decrease in the positive affect in their post-intervention questionnaire.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Bullock 2010[107] Rating: V Quality: B	What is the evidence for making recommendations to prevent physical training-related injuries? What prevention programs and policies are recommended? Is there enough evidence to substantiate further research and evaluation of interventions and programs likely to reduce physical training-related injuries?	Undefined, systematic review	The MEDLINE, Defense Technical Information Center Scientific and Technical Information Network, and Cochrane databases were queried for human studies published after 1970 for specific physical training-related injury prevention strategies. These studies were then reviewed by the Joint Services Physical Training Injury Prevention Working Group, chartered by the Military Training Task Force of the Defense Safety Oversight Council.	No sex-specific findings reported (sex not analyzed). However, of all the interventions listed as not recommended, oral contraceptives for women was also not recommended due to the lack of evidence, poor quality studies, or a balance of conflicting evidence.
Calhoun 2000[285] Rating: VI Quality: B	Does care at focused obstetrical clinics improve perinatal outcomes among junior enlisted servicewomen?	5459; 5459	Study subjects included all junior (E1-E4) enlisted pregnant Army personnel receiving care at the focused junior enlisted active-duty obstetrical clinic at Madigan Army Medical Center between January 1, 1993, and June 30, 1996. Senior enlisted (E-5 and above) and non-active-duty women were used as controls. Study perinatal co-morbidities and clinical outcomes were compared with the control group.	There were no significant differences in outcomes except for smoking between white junior enlisted and black junior enlisted. In the junior active-duty group, 3 of the 6 co-morbidities reached statistical significance, with a higher incidence of smoking, gestational diabetes, and previous illicit drug use in whites. There was also an increased incidence of smoking and illicit drug use within the white non active-duty cohort.
Camarca 2001[273] Rating: VI Quality: B	What are the hospitalization rates, long term trends, and risk factors for active tuberculosis (TB) among Army personnel?	936; Unidentified	The Patient Administration Systems and Biostatistical Activity database, the Naval Health Research Center, and the Office of Prevention and Health Services Assessment were queried for US Army active-duty personnel discharged from any military or civilian hospital between January 1, 1980, and December 31, 1996, with a diagnosis of active TB (ICD-9-CM codes 010-018) and first hospitalization for each person. Denominator demographic data were obtained from the Defense Manpower Data Center; the Army Medical Surveillance Activity (AMSA) provided person-year denominators for age- and sex specific rate calculations from 1990 to 1996. Geographic location (by country) of active-duty personnel was extracted from the Statistical Information Analysis Division of the Directorate for Information Operations and Reports. AMSA also provided non-identified information on HIV status, health care occupational status and previous deployments.	Female sex was among the risk factors for hospitalization with active TB.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Cameron 2010[91] Rating: IV Quality: A	What was the overall incidence of ankle sprains, as well as the age, sex, and service-specific rates, among active-duty military personnel from 1998-2006?	423581; Unidentified	Data on all active-duty service members and Army Reserve and National Guard during periods of active duty and mobilization from 1998-2006 were extracted from the Defense Medical Surveillance System (DMSS). Ambulatory visits with an ICD-9 code for ankle sprains as the first diagnosis, age, sex, and service were collected; only first occurrences were included.	Females were more likely than males to sustain an ankle sprain during from 1998-2006 in all services except the Air Force. Incidence rates were higher in females than males across all age groups and were highest in service members under 20 years of age.
Campbell 2002[121] Rating: IV Quality: B	What are the overall incidence rates of Bell's Palsy and the rates within demographic subgroups of active-duty military personnel? Does climate, latitude, and seasonality affect incidence of the disease?	1181; 182	The Defense Medical Surveillance System (DMSS) was used to obtain all hospitalization and outpatient records for visits with a primary diagnosis of Bell's palsy (ICD-9-CM 351.0) between October 1, 1997, and September 31, 1999; only first diagnoses for active-duty service members were included as cases. Demographic characteristics were also extracted from the DMSS. The Idaho state Climate Services of the University of Idaho was used to provide climate data, and precipitation, temperature, and elevation data was pulled from the Oregon Climate Service.	Incidence rates were higher among females.
Carlton 2005[182] Rating: I Quality: B	How do cyclic weight measurements, fitness testing, and the associated anxiety affect eating behaviors and motivation for healthy treatment alternatives?	489; 211	An anonymous postal survey was mailed to all active-duty personnel assigned to the Naval Medical Command Portsmouth, VA, in May 2002. The survey contained questions about basic demographics, eating, dieting, exercise, changes in eating and dieting behaviors relative to the time preceding and following the physical fitness assessment (PFA), anxiety and worry about passing the PFA and a question with regard to motivation for assistance dealing with abnormal eating behaviors and weight regulation. In addition, body mass index (BMI) was calculated for each respondent.	Women had a significantly greater weighted score on body dissatisfaction compared with men.
Carney 2003[117] Rating: VI Quality: B	What are the military experiences, occupational exposures, and self-reported use of health care services 5 years after deployment of Gulf War veterans from Iowa?	3695; 335	Using data from the Defense Manpower Data Center, a stratified random sample of active-duty personnel between August 2, 1990 and July 31, 1991, listing Iowa as their home state, and deployed to the Gulf region were included. Structured telephone interviews based on standardized instruments and investigator-derived questions were administered between September 1995 and May 1996 using the Computer-Assisted Survey Execution system computer-assisted telephone interview software package. This involved a 10-minute introductory interview (demographics, service-related information), followed by a 60-minute interview (deployment experiences, health-related quality of life, health care use, and disability). Interview conduct and quality was monitored by trained supervisors.	No statistically significant sex differences reported, however, women reported feeling ill more than men at time of exposure. Men reported receiving more vaccines outside the US. Men had higher mean number of exposures and slightly more men reported highest level of preparedness. Women also had more than twice the rate of VA compensation.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Carter 2005[122] Rating: IV Quality: B	What are the trends in heat-related illness, hospitalizations, and deaths for the Army from 1980 through 2002?	5246; 719	Review of hospitalizations with ICD-9-CM diagnosis codes of 992.0 - 992.9, 276.0, 276.1, 994.4, and 994.5 from the US Army Research Institute of Environmental Medicine Total Army Injury and Health Outcomes Database (TAIHOD) and from the NATO Standardization Agreement codes 810 - 819 for any cases not found in TAIHOD from January 1980 through December 2002. Data collected included age, sex, race/ethnicity, rank, military occupational specialty, injury type, home of record, duty station (after July 1985), years in military service at time of injury, principal diagnosis, other diagnoses, and cause of injury.	Heat illness risk was significantly greater in women compared with men. Caucasian women were admitted for heat illness four times more often than any other group.
Carter-Visscher 2010[242] Rating: VI Quality: B	Are there baseline sex differences in historical, environmental, and psychological risk and resilience factors as troops prepare for deployment?	522; 60	Over a 2-1/2 week period, US Army National Guard Brigade Combat Team soldiers were invited to participate in the study 1 month (March 2006) prior to deployment to Operation Iraqi Freedom (OIF) for 1 year. Study participants completed self-report measures in group settings. The measures used included the PTSD Checklist-Civilian Version (PCL-C); the Beck Depression Inventory-II; the Prior Stressors, Childhood Family Environment, Concerns about Life, Preparedness, Unit Social Support, and Family Disruptions scales from the Deployment Risk and Resilience Inventory (DRRI); and a demographic data measure (age, sex, educational level, race, military occupational specialty, years in service).	Women scored lower than men on preparedness for deployment and perceived unit social support and correlated concerns about life and family disruptions back home more strongly with PTSD than men. Being female was independently associated with depression symptoms.
Castellani 2006[17] Rating: VI Quality: B	Are there sex differences in total energy expenditure and core temperature responses during a 54-hr outdoor training exercise characterized by sleep deprivation and energy deficit?	50; 20	US Marine recruits volunteering for the study completed a 54-hour field training exercise (FEX) in January or February at the Marine Corp Recruit Depot, Parris Island, SC. Measurements included: nude weight before and after the FEX; weight fully dressed and equipped pre-FEX; core temperature measured by an ingestible temperature telemetry sensor; total energy expenditure assessed by the doubly labeled water technique; and energy intake estimates by collecting wrappers from the individually wrapped ration items consumed and from written records of water and sport beverages consumed. Ambient temperature, relative humidity, and wind speed were measured every 15 minutes, using 2 portable weather stations.	Both men and women were able to sustain high energy expenditures despite large energy deficits; however, men lost more weight and experienced a greater total energy deficit than women. Total energy expenditure adjusted for body composition and physical activity levels were not different between men and women. Average core body temperature was not different between men and women.
Chinevere 2006[274] Rating: VI Quality: B	What is the prevalence of G6PD deficiency and WHO classification of those deficient among military personnel by self-reported ethnicity?	63302; 8428	Retrospective examination of glucose-6-phosphate dehydrogenase (G6PD) results among US Army personnel obtained from October 1, 2004 through January 17, 2005, was performed. Demographic data collected included sex and race/ethnicity and matched to G6PD results.	More males than females were deficient. Most males were found to have class HI variants while most females were class IV variants.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Chisick 2001[116] Rating: VI Quality: B	Can linear regression models be used to model demographic composition of the armed forces as it relates to dental treatment workloads?	15761; Unknown	Data for the study came from the 1994-1995 Tri-Service Comprehensive Oral Health Survey (TSCOHS), a 30-site randomized survey of Army, Navy, Marine, and Air Force active-duty and recruit personnel. A single military dentist at each of 26 study sites charted the dental treatment needs of all study participants using radiographs; examiner's recorded age, sex, race, education, and branch of service. Respondents provided rank (active duty only), home region (recruits only), marital status (recruits only), and annual dental utilization on self-administered electronic questionnaires. Recruit data were collected from February to July 1994 and active-duty data were collected from April 1994 to January 1995.	Composite time values (CTVs) are lower for females than males.
Christ 2007[282] Rating: VI Quality: C	Are home-based well-child visits, in comparison to clinical visits, associated with greater parental satisfaction and equal clinical outcomes? What is the financial impact of implementing a home-based model for well-child care?	630; 630	The sample included infants born at Tripler Army Medical Center between February 4 and June 24, 2004, at Tripler Army Medical Center, Honolulu, HI, admitted to the routine mother-baby unit, and discharged before 2 weeks; exclusion criteria were infants born <35 weeks, admitted to the neonatal intensive care unit, remained in the hospital at least 2 weeks, or were readmitted before the 2-week well-baby visit. Participation was voluntary. Demographic data on infants were extracted from birth records. At 4 to 6 weeks after birth, primary caregivers were verbally administered a telephonic survey of a validated questionnaire t measuring maternal satisfaction, quality of anticipatory guidance, and breastfeeding success. Questions on satisfaction with care were modified, with permission, from a previously validated instrument developed for the Group Health Associates of America. To assess clinical outcomes, mothers were asked if they contacted a pediatric advice line, made an acute office visit, or visited the emergency room.	The type of visit utilized most frequently (clinic versus home) differed among the military services. Satisfaction with home visits, as opposed to clinics, was greater. Clinic visits rated higher in the availability of services or equipment. Levels of maternal satisfaction with overall care were similar between home visits and clinic visits. The majority of respondents preferred a home visit over a clinic visit.
Chung-Park 2007[130] Rating: VI Quality: B	What is the contraceptive decision making experience for military women?	10; 10	A purposive sample of 19-24 year old active-duty women with a history of contraceptive use was recruited from the Well Women's Clinic at the military treatment facility in a large southwestern city. Data were collected via a private informal interview format (1 time for approximately 1 hour) and a demographic questionnaire from each participant. In grounded theory methods, the insights and impressions of the interviewer were also collected and considered as research data. Interviews were audiotaped and data were subsequently coded using various techniques to allow themes and theories to emerge.	Grounded theory methods revealed a core category that described military women's contraceptive decision-making process as taking responsibility, where the woman is ultimately responsible for initiating birth control.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Chung-Park 2008[147] Rating: VI Quality: B	Among emergency contraceptive pill (ECP) providers, what are their demographics, prescribing behaviors, knowledge, attitudes, and barriers when prescribing ECPs? Do knowledge, attitudes, and barriers predict the occurrence of prescribing ECPs?	68; 31	USS ships based in the San Diego, CA, area were selected based on the number of females aboard, the operational type, and deployment status. Ships with a similar platform (surface amphibious assault - multipurpose and amphibious assault - multipurpose or aircraft carriers) were identified as being in the experimental or control group. Separate ships were used for different groups to avoid study contamination and similar operational platforms were selected for each group to avoid bias. Potential participants (junior enlisted females stationed aboard study ships) attended forums (held away from the ships) describing the study and had the opportunity to ask questions. Recruitment occurred October 2004 - April 2005. A 68-item survey was completed at 3 time periods: T1=beginning of study, T2=after the 1st class (experimental group only), T3=2 months after T1, T4=after 2nd class (experimental group only), T5=2 months after T3.	The experimental group's knowledge increased significantly compared with the control group. Pregnancy rate post intervention was much higher in the control group.
Chung-Park 2008[146] Rating: VI Quality: B	What are the effects of the educational program "Contraceptive Behavior Change Model" on knowledge, attitudes, perceived benefits, barriers, self-efficacy, stages of change and contraceptive behaviors in junior enlisted female personnel?	198; 198	An e-mail message containing a link to an online survey tool was sent to a local health care providers' e-mail group and to directors of identified clinics to solicit study participants; recipients were asked to forward the e-mail and link to eligible health care providers (physicians, nurse practitioners/midwives, physician assistants, independent duty corpsmen, and pharmacists working at a medium-size teaching military facility in US southwest).The survey included questions assessing the provider's knowledge of ECPs, familiarity and prescribing practices, attitudes and beliefs about ECPs, perceived barriers to prescribing ECPS, and demographic information.	ECP knowledge and attitudes predicted prescribing behaviors. In general, providers had positive attitudes toward prescribing ECP. The majority of providers knew the rate of efficacy of ECP, the two most common side effects, and that pregnancy is a contraindication. A greater majority of OB/GYN providers and Family Medicine providers prescribe ECP compared with other specialties.
Ciccone 2010[303] Rating: VI Quality: C	Is there an association between frequency of pain catastrophizing and psychiatric morbidity in a population of National Guard members? Does catastrophizing pain account for individual differences in psychological distress and functional impairment?	2502; Not reported	A secondary analysis of self-administered surveys distributed to members of the New Jersey National Guard during predeployment medical examinations that took place between November 2007 and May 2008; the surveys were completed in groups of 25-75. Instruments completed by study participants included the Posttraumatic Stress Checklist; the Pain Catastrophizing Scale; the Patient Health Questionnaire; a pain survey with questions pertaining to intensity, duration, and location; the National Household Survey on Drug Use and Health; the Veterans Rand-36, the Trauma History Screen; and demographic characteristics (age, sex, race/ethnicity, educational level, marital status, work status, income level, military occupational specialty).	Women were more likely to report acute or chronic pain a problem. Eight percent of females reported no pain, 17.5% of females reported the presence of acute pain, and 14.5% of females reported the presence of chronic pain.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Clark 2002[151] Rating: IV Quality: A	What is the hospitalization rate among female Army enlisted recruits who have and have not been screened for C. Trachomatisin at Fort Jackson?	28074; 28074	The study group consisted of a cohort of female Army recruits entering full-time military duty from January 1, 1996, to December 31, 1997, who volunteered for C. Trachomatis screening and participated in an education program on sexually transmitted diseases; all other women entering active Army duty as enlisted soldiers during the same period formed the control group. Individuals in both groups were followed for hospitalization codes from date of entry into military service, January 1996 through December 1998, or until they left the service. Study outcomes included admissions for ICD-9 codes for Pelvic Inflammatory Disease, infertility, ectopic pregnancy, a combination of any of these 3, and for any other reason during the study period. Other variables included demographics, educational level, and aptitude test scores.	The overall prevalence of Chlamydia in the screened group was 9.1. There was a significant difference in the hospitalization rates for women who participated in the screening compared with the control cohort, but no differences were found for hospitalizations for PID, ectopic pregnancy, infertility, or a combination of the 3 diagnoses, between groups. Pregnancy and pregnancy-related conditions were the most common reasons for hospitalization. Women in the screened cohort who were positive for C. trachomatis and treated, were hospitalized for PID and ectopic pregnancy at the same rate as women who were screened and did not test positive.
Cohen 2009[258] Rating: VI Quality: B	What are the return-to-unit variables in soldiers with a primary diagnosis of back pain who have been medically evacuated out of a combat theater?	1410; 118	Data on soldiers with a primary diagnosis related to back pain (per ICD-9-CM codes) who were medically evacuated from forward-deployed units for Operations Iraqi (OIF) and Enduring Freedom (OEF), and other operations between 2004 and 2007 were obtained from a prospective database maintained in Landstuhl, Germany by the Deployed Warrior Medical Management Center. Other information prospectively collected included age, sex, rank, date of evacuation, whether the injury was incurred during battle, deployment mission (i.e., OIF or OEF), and disposition (i.e., return-to-duty or transfer to a military treatment facility in the continental United States). Other data collected included if presenting symptoms were primarily axial or radicular, corresponding MRI pathology, presence of headache, mechanism of injury, coexisting psychopathology, smoking history, treatment modality, and if the soldier was treated by a pain specialist before outcome designation.	Female sex was significantly associated with return to duty. Women were 57% more likely to return to duty after a back injury. The return-to-duty rate was 12% for men compared with 22% for women.
Cohen 2010[257] Rating: VI Quality: B	What are the return-to-unit factors among soldiers medically evacuated from combat areas to a fourth-level treatment facility with a primary complaint of neck pain?	374; 21	Data on soldiers with a primary diagnosis related to neck pain (per ICD-9-CM codes) who were medically evacuated from forward-deployed units for Operations Iraqi (OIF) and Enduring Freedom (OEF), and other operations between 2004 and 2007 were obtained from a prospective database maintained in Landstuhl, Germany by the Deployed Warrior Medical Management Center. Other information prospectively collected included age, sex, rank, date of evacuation, whether the injury was incurred during battle, deployment mission (i.e., OIF or OEF), and disposition (i.e., return-to-duty or transfer to a military treatment facility in the continental United States). Other data collected included if presenting symptoms were primarily axial or radicular, corresponding MRI pathology, presence of headache, mechanism of injury, coexisting psychopathology, smoking history, treatment modality, and if the soldier was treated by a pain specialist before outcome designation.	Females were approximately 80% more likely to return to duty after injury.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Coleman 2004[62] Rating: VI Quality: C	Do instructions from a standardized patient to military healthcare providers increase the quality of clinical breast exams and breast cancer screening for military women?	62; Unidentified	Random assignment to intervention or control group was determined by study site. All health care providers (HCPs [volunteer]) completed a survey to describe self-reported breast cancer screening practices. "Standardized patients" (SPs) individually pretested participants on clinical breast examinations (CBEs) and breast screening performance. Providers in the intervention group received individualized training from the SPs following the pretest. All providers completed a posttest on CBE and breast screening performance approximately 3 months after the intervention. SPs taught the control group HCPs after the posttest.	Slightly more providers were female than male but no sex-specific findings were reported.
Conway 2004[215] Rating: II Quality: B	What is the effect of either a telephone help line or a series of monthly mailings on continued smoking cessation following basic training? Are there demographic correlates with smoking status among individuals who relapse twelve months after basic training?	5503 survey and 2781 smokers; 5503	Baseline surveys were completed by female Navy recruits at the Recruit Training Command (RTC) in Great Lakes, Illinois, entering the Navy between March 1996 and March 1997 and volunteering for the study. Individuals volunteering for the study were placed in 1 of 3 experimental groups; random assignment of experimental group was made at the division level rather than the individual level. Subjects completed a 1 page entry survey; individuals reporting smoking experience prior to entering the Navy were followed after basic training through mailed surveys assessing 30-day smoking behavior at 3 months, 6 months and 12 months after RTC training.	At entry into service, 42.5% of all recruits reported smoking in the past 30 days. There were no significant differences among the three groups for continued cessation in terms of change over time. Age, race/ethnicity, and education were the sociodemographic characteristics correlated with relapse at 12-months. Smoking characteristics correlated with smoking are type of smoker, number of cigarettes smoked in 30 days, minutes until first cigarette of the day, and intentions to smoke after leaving RTC.
Conway 2007[213] Rating: VI Quality: A	Does pre-military smoking behavior predict career performance among female military personnel?	5503; 5503	Self-report survey data collected from females while at the Recruit Training Command between March 1996 and March 1997 was matched with Career History Archival Medical and Personnel System (CHAMPS) data in June 2005. Demographic information, accession-related outcomes, performance data, and inpatient hospitalization information were extracted.	Baseline smoking status was significantly related to retention, with the worst outcomes for daily smokers and the best results for never smokers. Furthermore, among those who left service, smoking status was related to reasons for discharge. A positive correlation was found between pre-military smoking and demotions and desertions. Conversely there was a negative relationship between smoking and the likelihood of both promotion and reenlistment.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Crouch 2009[312] Rating: IV Quality: B	What are the sex differences in the incidence and consequences of heterosexual intimate partner violence (IPV) among second year Navy personnel? Among IPV victims, what types of trauma symptoms are most common? Do perceived reasons for IPV differ?	1035; 576	Data were collected as part of a more extensive survey offered to Navy recruits at the Recruit Training Center at Great Lakes, IL during their first week in basic training between June 1996 and June 1997. Nonmilitary personnel of the same sex as participants administered the survey to groups of male or female recruits and informed consent was obtained. Respondents were invited to complete follow-up surveys after 6 months, 1 year, and 2 years of service. IPV was assessed at baseline and at year 2 using the intimate partner version of the Conflict Tactics Scale (CTS) which is a self-report survey instrument. Participants completed the Trauma Symptom Inventory at baseline and at 2 years. Participants were asked the number of times they had been injured by a romantic partner in the past year and to rate the reasons their partner had used aggressive tactics. Follow-up surveys were distributed and returned through US mail. Demographic data (age, ethnicity, marital status, family income, and education) were also collected.	Men were more likely than women to report severe IPV. There was no difference in reporting of moderate IPV. Women were more likely to report 1 or more forms of injury. Men reported higher dissociative symptoms and women reported higher depressive symptoms.
Custer 2008[144] Rating: VI Quality: B	What is the prevalence of unintended pregnancy among female Army personnel? What demographic and social variables are risk factors for unintended pregnancy?	212; 212	All female soldiers delivering live infants at Darnall Army Community Hospital, Fort Hood, TX, from June 1, 1998, to October 6, 1998, were invited to participate in a self-administered survey within 3 days postpartum. The survey included "intention for pregnancy" questions from the CDC's Pregnancy Risk Assessment Monitoring System (PRAMS), demographics, use of birth control, pregnancy intention of the father and mother both before and at time of survey, delivery information, fertility knowledge, impact of infant on financial situation and relationship with father of infant, military demographics (rank, housing type, intention to remain in the military). Women delivering as civilians in the military hospital but who had been in the Army at time of conception were included.	Nearly half of the pregnancies were mistimed or unintended. Almost all reported that the option to get out of the Army if they became pregnant was not a consideration in their intention for pregnancy and nearly three quarters of the women planned to stay in the Army. Odds ratios revealed that women who were unmarried and those who were living in the barracks were more likely to have unintended pregnancies. The highest percentage of unintended pregnancies was reported by lower enlisted ranks. No differences were found in race/ethnicity.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Czerwinski 2001[168] Rating: VI Quality: B	The goal is to describe feminine hygiene practices of military women in deployed and noncombat (home station) environments.	880; 880	A sample of US Army, Air Force, and Navy, and Marine officers and enlisted female military personnel who had previously been deployed to Panama, Haiti, Somalia, Cuba, Bosnia, or the Persian gulf (and no deployments prior to 1989) and lived in the US or on active duty with a status of Reserve, active duty, or veteran/retired. Surveys were mailed with letter of informed consent. The survey instrument was the Deployed Female Health Practice Questionnaire (FHPQ), a 191-item tool that was investigator-developed in a qualitative study and content validity was established by an expert panel and pilot testing. The FHPQ was designed around broad categories of health practices (e.g., health promotion, disease prevention and treatment, reproduction, lifestyle management) and demographic information; the Health-Value Scale, the Delighted-Terrible Scale, and the Mansfield/Voda/Jorgensen Menstrual Bleeding Scale were incorporated into the FHPQ. Part 1 of the FHPQ pertained to health practices in the participants' home base environments, and Part 2 pertained to retrospective data recalled from the most recent deployed environments. Participants returned the surveys in a stamped return-addressed envelope.	Women altered their feminine hygiene and menses management during deployment. Specifically, the proportion of women who used tampons and sanitary pads was unchanged, but there was a decrease in use of scented products, panty-liners, and combining tampons and pads. Disposal of used products changed during deployment. Super absorbency types of tampons and pads were more common in deployed conditions. Only half as many women douched during deployment as at home and bathing and hand-washing decreased. The most common general health symptoms included diarrhea and constipation. Health problems during deployment included UTI symptoms, vaginal yeast infections, painful cramps, skipped or late menses, and heavy bleeding or clots.
Dall 2007[38] Rating: VI Quality: B	What are the medical and indirect costs to the Department of Defense associated with tobacco use, being overweight or obese, and high alcohol consumption?	4.3 million; Unclear/NA	All active-duty military personnel eligible for TRICARE Prime and all dependents of active-duty personnel, military retirees, and dependents of military retirees formally enrolled in TRICARE Prime and in Tricare Prime for at least 10 consecutive months in 2006 or who died during 2006 were included in the sample; National Guard personnel, Reservists, and their dependents, military assigned overseas or who were enrolled in plans other than TRICARE, and retirees and dependents eligible for Medicare were excluded. TRICARE Prime claims data were used to estimate cost per disease case. The 2002 National Quality Management Program Special Study, the 2002 and 2005 DoD Survey of Health-Related Behaviors Among Military Personnel, and National Survey on Drug and Health were used to estimate prevalence of behaviors related to tobacco use, being overweight or obese, and high alcohol consumption.	Men typically consume more alcohol than women and at more frequent intervals. Men are more likely than women to be overweight.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Daniels 2005[235] Rating: VI Quality: B	Is the Job Related Physical Demands measure a valid self-report instrument to assess biomechanical exposure for low back pain?	279; 19	Active-duty Army personnel were recruited based on their military occupational specialties and assigned units at Fort Meade, MD; Walter Reed Army Medical Center, Washington, DC; Fort Meyer, VA; Fort Belvoir, VA; Fort Eustis, VA; Fort Story, VA; Fort Lee, VA; and Fort Bragg, NC. Entire units were invited to participate in the study and all units attended group sessions at their local installation to obtain details of the study. Those subjects with reported musculoskeletal symptoms in the upper extremity regions (i.e., shoulder, elbow/forearm, wrist/hand), neck and upper back symptoms were excluded. Inclusion criteria for the present study required that those individuals with low back symptoms must have reported experiencing them within the past 12 months. All asymptomatic subjects were included as a comparison group. Baseline self-administered questionnaires included 281 items on demographics, biomechanical exposures (Job Factors section of the US Air Force Job Requirements and Physical Demands survey [JRPD]), physical fitness (an item derived from the US Army Health Risk Appraisal), physical workload (Borg scale of perceived exertion), and clinical outcomes (SF-12, Visual Analog Scale, and. Vermont Disability Prediction Questionnaire).	The JRPD is a useful tool for self-assessment of biomechanical exposure associated with low back pain. Low back pain cases were more likely to be females than the control group.
Darakjy 2006[80] Rating: VI Quality: B	Can ambulatory health care information be used to describe the health of soldiers during operational training? What are the leading categories of health problems among soldiers undergoing operational training? What are the frequencies and relative rates of injuries and illnesses identified?	504; 95	Subjects were active-duty Army soldiers from a brigade of the 1st Cavalry Division during an operational/combat training exercise over a 37-day period during July and August 2003 at the National Training Center, Fort Irwin, CA. Personnel rosters were reviewed for demographics (sex, rank, branch designation - combat arms, combat support or combat service support). Outpatient visits, identified as new injury, illness, or follow-up at the main support medical clinic or Weed Army Community Hospital were pulled from an electronic data. Injuries defined as case were visits for physical damage to the body and included specific type (e.g., sprain, strain, fracture) and environmental conditions related to physical exertion or heat and sun exposure (e.g., sunburn, heat rash, dehydration). Phase of training (pre-exercise, exercise, and post-exercise) was also recorded.	Female soldiers had higher injury and illness rates than males. As with men, women of lower enlisted rank had higher injury and illness rates than did both NCOs and COs. Compared with female COs, female NCOs had higher illness rates and tended to have higher injury rates. Weekly illness rates for men and women were lower during the combat exercise than in either the preexercise or postexercise phase. Men's illness rates were highest in the preexercise phase, whereas women's illness rates were highest in the postexercise phase. Women's most frequent reasons for visits in order were musculoskeletal injury, environmental ailments, genitourinary complaints, dermatological, and neurological. For men, the top 4 illnesses and injuries were musculoskeletal, environmental, dermatological, and ENT.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Deering 2006[290] Rating: VI Quality: C	What do women presenting to this military training hospital typically request in a birth plan? Are the requests reasonable and within standards of care? How closely are the birth plans followed during labor and delivery?	67; 67	Active-duty females and dependents admitted to the National Naval Medical Center, Bethesda, MD, labor and delivery unit during a 3.5 year period and who submitted birth plans were eligible for this study. Chart reviews identified birth plans, which were analyzed for specific requests. Epidemiological data (e.g., maternal age, gravidity, parity, marital status, and educational level) and information about labor and interventions required and delivery outcome were extracted from each participant's inpatient records for labor and delivery. Results from inpatient records were compared with birth plans. Status of delivering provider (e.g., resident, family practice physician, or midwife) was recorded.	The majority of patients had a vaginal delivery. The most common birth plan requests were to: walk during labor, avoid episiotomy, and avoid an epidural. More than half of those who did not desire an epidural had one and nearly a quarter who did not want an episiotomy had one. Patients with birth plans were generally older and well-educated. The authors concluded that patients changed their minds regarding initial requests during labor.
Dewing 2008[295] Rating: VI Quality: B	Among active-duty military personnel who undergo lumbar micro discectomy, what are the clinical outcomes and patient satisfaction by type and level of disc herniation?	183; 44	Active-duty personnel who had a single-level micro discectomy between August 2000 and January 2003 were followed prospectively. Outcome measures included completion of the self-report Visual Analog Scale (VAS), the Oswestry disability index completed by an examiner not affiliated with the study at 3 time points (pre-surgery, 6 months post-surgery, and at the final follow-up visit), patient satisfaction with current symptoms, and return to active duty. Other data collected included age, sex, tobacco use, time in military service, documentation of elite military duty (e.g., Navy SEAL, Reconnaissance Marine, or Aviator), duration of preoperative symptoms, military rank, and duty status at initial consultation.	Female sex and increased duration of preoperative symptoms were not associated with poor outcomes as reported in the literature. Men had more disc herniations than women; however, the authors cautioned the difference was likely due to unequal sample size.
Dickstein 2010[184] Rating: VI Quality: C	How does unit cohesion and stress exposure relate to posttraumatic stress disorder (PTSD) symptom severity in Air Force medical personnel?	705; 51.6%	Data for this study were collected as part of a larger, ongoing longitudinal study. Informed consent was obtained from participants prior to deployment. A total of 705 US Air Force medical personnel serving as part of the 332nd Expeditionary Medical Group completed surveys while actively deployed at Joint Base Balad, Iraq, in the period between December 2004 and December 2008. The surveys included demographic characteristics, the Post-Traumatic Checklist-Military Version (PCL-M), 5 items measuring unit cohesion, the Military Healthcare Stress Scale, and the Combat Experiences Scale.	Unit cohesion differed by sex; greater unit cohesion was reported by men than by women.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Dooley 2001[279] Rating: IV Quality: B	Does sex affect G-tolerance in comparably trained males and females in best-fit G-protective equipment?	82; 38	The study was a cross sectional comparison of G-tolerance in male and female pilots/trainees exposed to various centrifuge profiles, including a flight equipment fit survey. G-tolerance during menstruation, G-tolerance with "V" dart waistband modification of the anti-G suit for females were included.	When properly fitted anti-G suits are provided, females exhibit similar G-tolerance to males.
Douglas 2004[229] Rating: VI Quality: B	Are depression scores independently and positively correlated with levels of inflammation as measured by C-reactive protein (CRP)?	696; 125	This study was part of the larger Prospective Army Coronary Calcium Project. All active-duty US Army personnel aged 39-45 years in the Washington, DC area were recruited at the time of a periodic, Army-mandated physical examination; exclusion criteria were history of coronary heart disease or history of angina pectoris. Participants provided medical history details, including history of hypertension, diabetes mellitus, hypercholesterolemia, psychiatric disorders, family history of premature cardiovascular disease, and smoking history. Height, weight, and blood pressure were measured; fasting serum glucose, glycosylated hemoglobin, insulin, and ultrasensitive CRP were obtained. Depression was measured with the self-administered 9-question depression module of the Patient Health Questionnaire (PHQ-9).	Depression scores correlated positively with female sex.
Dove 2007[221] Rating: VI Quality: B	What are the sociodemographic characteristics among women entering a military substance use disorder treatment center? Are other conditions (psychiatric history and/or family history of abuse or psychiatric conditions) commonly comorbid? What are the referral sources for patients entering treatment?	86; 86	The sample consisted of females admitted to the Tri-Service Addictions and Recovery Facility for substance use treatment. Data were collected from charts for women during the study period. Information acquired was based on a data questionnaire developed by members of multidisciplinary treatment team. Data collected from records for 3 years.	Most frequently used drugs were marijuana, cocaine, crystal meth, acid and ecstasy. Women reported a coexisting psychiatric condition. Depression and anxiety were the most frequently reported condition. The study showed that, except for education level, the military population's sociodemographic characteristics did not differ from those of the general population.
Dunn 2004[92] Rating: IV Quality: A	What is the long-term outcome after an anterior cruciate ligament injury and reconstruction to protect against re-injury of the knee in physically active men and women? How do patients compare to those treated conservatively?	6576; 566	A cohort of active-duty Army personnel who had been hospitalized for surgery for anterior cruciate ligament injury from 1990 to 1996 were identified; patients with a knee-related hospitalization prior to 1990, with a disability rating before the initial ACL-related hospitalization, with a nonarthoscopic procedure, or multiple ligament procedures were excluded. The US Army Total Army Injury and Health Outcomes Databases were linked to a capture the service members' medical history and follow up, to descriptively compare those with and without ACL reconstruction surgery. Demographic characteristics and level of physical activity were also collected.	Although the population was largely male, the study did not find women to be at increased risk of knee reinjury, nor was there a statistically significant difference in the rate of ACL reconstruction between sexes.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Ebbert 2006[208] Rating: IV Quality: B	What factors are predictive for smokeless tobacco initiation in young adults?	28229; 7791	Subjects were a subset of a larger randomized clinical trial of active-duty Air Force recruits entering basic military training (BMT) between October 1999 and September 2000 who reported never using smokeless tobacco regularly pre-military service. A 68-item baseline questionnaire was administered to all recruits during the second week of BMT; the survey included demographics, personal and family income, educational level, and tobacco use, tobacco use history, potential risk factors for tobacco use, and other health-risk behaviors. An 11-item survey designed specifically to assess any type of past year tobacco use was given 12-months at follow-up.	More men than women reported usage at follow up. No predictors for daily smokeless tobacco use among women were identified. Several predictors were identified for men who used smokeless tobacco daily: they tended to be younger, white, current smokers, and past smokless tobacco use.
Eick 2008[272] Rating: IV Quality: A	What is the incidence of mumps across the military services and what is the seropositivity rate of military recruits from 2000-2004?	869656; 153001	Data was extracted from the Defense Medical Surveillance System (DMSS) for all enlisted recruits, aged 17-35 years, who entered active duty in the US Air Force, Army, Navy, or Marine Corps between January 1, 2000, and December 31, 2004. Demographic characteristics and rates of mumps diagnoses were compared between subjects in the Air Force (targeted) and subjects in the Army, Navy, and Marine Corps combined (universal). Serum aliquot testing used banked Military Entrance Processing Station specimens collected prior to recruit measles, mumps, and rubella (MMR) vaccination for the same time period. Cohort analysis for seropositivity on 4 cohorts (foreign-born and US born for both targeted and universal groups) with equal N assigned to each was completed.	No sex-specific findings reported, although seropositivity and odds ratios for seropositivity among female subjects and adjusted to the total recruit cohort were reported, and concordance of mumps seropositivity among female subjects seropositive to measles and rubella, study population and adjusted to the total recruit cohort were reported.
Eick 2009[31] Rating: IV Quality: A	How well does the live attenuated influenza vaccine (LAIV) and the injectable trivalent inactivated influenza vaccine (TIV) protect against influenza-like illness among the adult population?	2005-2006: (non-recruits 701,753 / recruits 70,325) 2006-2007: (non-recruits 757,091 / recruits 47,967); Unidentified	Active-duty US Army, Air Force, Navy, or Marine Corps personnel stationed in the US who had received only 1 dose of either a LAIV or a TIV between September 1 and April 30 of the influenza season of interest participated; excluded personnel were aged 50 or older or pregnant at the time of immunization. Demographics, occupation, immunization, and medical encounter data for an influenza-like illness (ILI) for 2005-2006 and 2006-2007 were extracted from the Defense Medical Surveillance System (DMSS).	Females had a higher ILI incidence rate than males.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Englert 2003[248] Rating: VI Quality: B	Did a policy change permitting self-referrals (versus only secondary source referrals) by Air Force basic military trainees and technical training students to mental health services increase attrition from service rates? What was the most frequent initial mental health diagnosis? What were the primary diagnoses for those separated from duty prior to completion of basic training or technical training?	2018; 678	US Air Force basic trainees and technical school students seen at the Behavioral Analysis Service at Lackland Air Force Base during 2001 made up the study sample. Demographics, source of referral, time of referral, disposition, and diagnosis were collected.	In both basic training and technical schools, more men than women were diagnosed with mental health problems.
Evans 2000[283] Rating: VI Quality: C	Are there specific demographic or psychosocial risk factors among active-duty pregnant women that might contribute to adverse delivery outcomes?	269; 269	Study subjects were part of a longitudinal survey of active-duty military women recruited at 3 different medical centers. Subjects, approached while waiting for a routine OB clinic appointment, volunteering for the study completed at least 1 survey; those in their first or second trimester during the initial survey received a second survey during their third trimester. The surveys included demographic characteristics (age, ethnicity, educational level, marital status, rank, and parity), 3 scales measuring the supportiveness of the work environment, 2 scales measuring stress associated with the transition of pregnancy, pregnancy-related medical conditions (e.g., premature contractions, diabetes), and the General Severity Index of the Brief Symptom Inventory. Delivery outcomes were obtained from the delivery room logbooks at the participating medical centers.	Single and separated/divorced military women were at greater risk for preterm delivery than married women. Unmarried women were more likely to belong to ethnic minorities, lower rank, less educated, and reported a greater number of medical conditions than married subjects. Marital status was a more significant predictor of preterm delivery than were medical conditions.
Farley 2006[261] Rating: IV Quality: B	What is the value, unit cost, and medical effectiveness of providing specialized obstetric and gynecological care in a combat support hospital in Afghanistan during Operation Enduring Freedom?	62; 62	Records from the outpatient gynecology clinic located at echelon III (combat support hospital) care at Bagram Air Force Base (BAF), Afghanistan, were reviewed for cases requiring advanced gynecological procedures; chart reviews were completed for active-duty females requiring advanced GYN procedures at echelon (E) III and cohort analysis was performed on all patients sent for medical consultation at Echelon IV-V. Procedure, rank, military unit or origin, distance traveled to appointment, and time away from unit were collected.	Distance traveled, travel time, time to appointment, and time away from unit were less for the women who had care at Bagram then those who were sent to Germany for care. Far forward gynecological care decreased woman-hours lost. Savings per year were approximately $500000 or more than 3%/month. Savings were related to cost of travel to EIV-V and loss of work. The only need was to increase equipment at EIII.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Felker 2008[186] Rating: VI Quality: B	What is the feasibility of using validated screening tools in a population of active duty who sought mental health care while deployed to Operation Iraqi Freedom? What are the demographic and clinical characteristics of the sample?	296; 78	All service members voluntarily presenting for initial appointments at the mental health clinic at the US Military Hospital Kuwait (Camp Arifjan, Kuwait) between May and July 2005 were eligible for participation; those who agreed to participate had their demographic characteristics and initial mental health screening included in the data for this study. The screening instrument included demographic characteristics and 5 validated scales that screened for mental disorders and functional impairment. Providers diagnosed mental health disorders following review of results of screening tool and patient interview. Tools used were the Primary Care Post-Traumatic Stress Disorder Checklist, the PTSD Checklist-Military Version, the Patient Health Questionnaire (assessing depression), the Alcohol Disorders Identification Test Consumption Questions (AUDIT-C) screening test, and the Life Status Questionnaire (assessing general distress and functional impairment). Charts were reviewed for provider's primary diagnoses.	Females were more likely than males to seek help for mental health issues.
Feuerstein 2001[300] Rating: IV Quality: B	What are the frequency and statistical variation in the amounts of coronary arterial calcification in the Walter Reed Army Medical Center population?	3263; 848	All study subjects were clinical patients (military and dependents), most from the District of Columbia metropolitan area; individuals enrolled and scanned through institutionally approved long-term prospective trials were excluded. Demographic characteristics, a clinical chart review, and electron beam CT (EBCT) scores of a continuous population (third quarter of 1997 through 1999) of patients imaged with the EBCT scanner at Walter Reed Medical Center.	Male sex was strongly associated with coronary calcification.
Fjord 2009[37] Rating: VI Quality: C	What are the reproductive health policies, education programs, and pregnancy prevention services in place within navies where women work alongside male peers as sailors and officers?	8 Navies; 0	Questionnaires were sent to naval attaches from 15 countries stationed in embassies in Washington, DC, and the US, requesting that they refer sections of the survey to their appropriate departments; responses were received from 8 countries. The investigators collected available descriptive statistical data regarding the inclusion of women military personnel from each navy. The investigator-developed tool included dichotomous (yes/no) and open ended response formats. There were 7 stem questions on reproductive health education, 5 open-ended questions on sexual conduct policy and enforcement, 6 stem questions on provision of birth control, 9 on policies during pregnancy, maternity, and paternity leave, and 7 questions on childcare. No available information on instrument validation.	The percentage of women in the navies ranged from 8 to 25%. Three of the 8 navies did not allow women to serve aboard submarines at the time of data collection. Differences and similarities among the navies in regards to contraception counseling and availability, abortion services, and maternity and paternity leaves were found.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Forgey 2010[219] Rating: VI Quality: B	What are the patterns of intimate partner violence and associated psychosocial risk factors among married enlisted female soldiers?	248; 248	The commander of a large Army installation mailed a letter during the summer of 2001 inviting all US Army enlisted females married to a civilian spouse to an information session. Subjects who voluntarily consented to be in the study completed paper and pencil surveys that were returned at the information session. The survey included demographic characteristics (pay grade, military occupational specialty, time in military, on/off base housing, length of time at installation, work hours, time away on temporary duty, weeks deployed, age, race, educational level, years married, number of children, spouse's employment status, income level), the Conflict Tactics Scale 2 (CTS2), the Short Marital Adjustment Test (SMAT), the Sex-Role Egalitarianism Scale (SRE), the Short Michigan Alcoholism Screening Test (SMAST), the Childhood Trauma Questionnaire (CTQ), and the Zung Self Rating Depression Scale.	Females experiencing severe bidirectional violence were likely to be the most depressed and to have a history of child sexual abuse. Females experiencing minor bidirectional violence did not share any of the psychosocial risk factors found for severe bidirectional violence. Females perpetrating unilateral violence toward their spouse were found to be as satisfied in their marriages as nonviolence couples and less depressed than females experiencing bidirectional violence.
Friedl 2001[55] Rating: IV Quality: A	What are the changes in body composition in healthy women over 8 weeks of basic combat training (BCT)? What is the ability of existing anthropometry-based equations to detect changes in percentage body fat in the women?	150; 150	Subjects were from an all-woman basic training unit at Fort Jackson, SC, in the spring of 1993 who volunteered to participate. Anthropometric measurements were collected before and after BCT. Data was collected at baseline and at the completion of BCT. Height, weight, anthropometric measurements at 15 circumferences and 9 skinfold thicknesses were recorded, and total body fat mass was determined by dula-energy x-ray absorptiometry, from which total body fat mass and fat-free mass were calculated.	Weight and body mass index increased while fat variables decreased and fat-free mass increased. Existing equations lacked sensitivity and specificity to predict changes in body composition; for women who lost fat, body weight did not change. Circumference equation that includes the waist and hips was the most reliable measure of fat loss.
Friedl 2002[40] Rating: VI Quality: B	What is the best adjustment to improve the Army regulation Army Weight Control Program (AWCP) for measuring body fat?	1390; 347	Subjects were Army personnel obtained in October and November 2000 from Fort Bragg, NC, Fort Leonard Wood, Missouri, and Fort Jackson, SC; pregnant females and new recruits were excluded. Soldiers were asked age, sex, current and prior enrollment in the AWCP, current medical profile, current and prior pregnancy status. Measurements for height and weight were recorded: for men, neck and abdominal circumference; for women, neck, forearm, wrist, and hips; waist measured for both men and women. Army Physical Fitness Test raw measures and scores within last 6 months were obtained from unit records or as recorded on medical profile.	Men had higher average body mass index than women even though they were less likely to exceed body fat standards.
Friedl 2008[98] Rating: VII Quality: B	How can findings from studies of biomechanical influences on bones of the lower extremities translate into stress fracture injury prevention strategies?	Undefined, literature review	The authors reviewed findings in the literature from all Bone Health and Military Medical Readiness (BHMMR) research programs as well as previously non-published findings from military bone research.	While not all studies reviewed included sex-specific findings, sex differences were discussed where applicable.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Frye 2003[305] Rating: IV Quality: B	What proportion of military patients returned to active-duty service after recovery from hematopoietic stem cell transplants? What factors predict a successful return to duty after allogenic HSCT?	163; 13	Records of all active-duty military members referred for allogeneic hematopeietic stem cell transplants from January 1987 through May 2001 at Wilford Hall Medical Center, Lackland Air Force Base were reviewed for age, sex, military status (service branch and rank), and disease status. Current military status of surviving patients verified by the patient or with a family member.	The majority of patients were men, with a median age of 33 years. Twenty-one percent returned to active-duty status. Sex differences were not found. Only disease status at time of transplant was predictive.
Gahm 2008[195] Rating: VI Quality: A	What symptoms of mental health disorders did screening instruments identify among soldiers who sought care in a military outpatient mental health setting during a time of war? Is there a best combination of screening instruments that clinicians should use?	2882; 555	The sample included active-duty Army soldiers entering an outpatient behavioral health clinic located in an Army medical treatment facility on a large military base between June 2003 and July 2005. The Behavioral Health Screening Instrument (BHSI) was completed by personnel reporting for intake on a paper form in the waiting room with clinic staff collecting and scanning the forms. The BHSI included demographic characteristics and military information, psychosocial history, the Alcohol Use Disorders Identification Test (AUDIT), the PC-PTSD, the Patient Health Questionnaire 9 (PHQ-9, used to assess depression), the PHQ Anxiety and Panic scale, the Hostility (HOS) scale of the Brief Symptom Inventory (BSI), the Quality of Marriage Index (QMI), and perceived support from unit, leaders, and the military during deployment (from the Deployment Risk and Resilience Inventory).	Women experienced a higher incidence of mood disorders, anxiety and hostility. Men reported high scores for alcohol misuse, unit support, and relationship satisfaction. There were no sex differences detected on the mean PTSD score.
Garber 2008[44] Rating: VI Quality: B	What are the factors that predispose military women to develop eating disorders?	2157; 2157	Data were collected between June 1999 and September 2000 within 10 days of starting a 13-week Marine Corps recruit training in Beaufort, SC, as part of a larger voluntary study. Study participants (females only) completed a 1-time, self-administered questionnaire to assess participant characteristics (height and weight), health-related behaviors, and weight control behaviors, beliefs, intentions, and knowledge. Sociodemographic factors collected included age, race/ethnicity, marital status, education, place and region of origin.	Characteristics significantly correlated with weight dissatisfaction were race/ethnicity, education, and region of origin. Weight dissatisfaction was significantly greater in women who were Caucasian, college educated, and from the Northeast and West regions. Women with body mass indexes (BMIs) in the narrow range between 18.5 and 21.9 kg/m2 exhibited the lowest prevalence of weight dissatisfaction. The majority of new recruits reported ever engaging in at least 1 disordered eating behavior before enlisting. Overall, those with higher BMIs were worried about making weight, had dieted in the past, and intended to in the future were highly likely to report weight dissatisfaction. Women who did not believe endorse fasting as an acceptable weight control method were more weight dissatisfied.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Garland 2000[263] Rating: IV Quality: B	What is the incidence of ectopic pregnancy and spontaneous abortion of pregnant women in the first twenty weeks of gestation who remain aboard ship while at sea during deployments?	778; 778	The number of women crew members and the occurrence of pregnancies during specified time intervals were obtained from personnel and medical departments aboard 53 ships that participated in the Women Aboard Ship Study. Data were gathered on all active-duty Navy enlisted women hospitalized for any pregnancy-related outcomes in Navy medical treatment facilities from 1982 to 1992. Additional information was gathered from an anonymous mailed survey conducted by the Navy Personnel Research and Development Center in 1988.	The overall pregnancy rate was 19 per 100 woman-years. If women were to remain aboard ships at sea during deployments through their first 20 weeks of pregnancy, it is expected that approximately 9 ectopic pregnancies and 40 spontaneous abortions would occur aboard ships at sea.
Gaydos 2002[157] Rating: VI Quality: A	What is the accuracy of intravaginal swabs transported by mail in a wet vs. dry state for Chlamydia trachomatis and Neisseria gonorrhoeae? What is the sensitivity and specificity of vaginal swabs vs. standard clinical diagnostic methods? What is the acceptability to women of self-collected intravaginal swabs?	793; 793	Subjects were consecutive active-duty military women, 18 to 59 years, attending the Epidemiology and Disease Control (EDC) clinic at Womack Army Medical Center, Fort Bragg, NC, between March 1997 and October 1998 who volunteered to participate. Demographic characteristics were extracted from clinic records. Intravaginal swabs (one dry and one wet) were collected from each participant by providers (first 12 months of study) and then by the participant herself (next 7 months) prior to clinical examination. Pelvic exam and diagnosis by clinic standards followed the study sample collection: vaginal swabs for pH, wet preparations, and potassium hydroxide preparation. Cervical swabs were obtained for Chlamydia testing by enzyme immunoassay (EIA) and gonorrhea cultures.	Both sensitivity and specificity indicate that the dry swabs were as accurate as the wet swabs in the detection of Chlamydia and gonorrhea. This study demonstrated that a clinician-collected or self-administered vaginal swab detected more infections than routine clinic diagnostic methods and was an accurate specimen collection method for the diagnosis of both Chlamydia and gonorrhea. These swabs performed as well or better than clinician-obtained endocervical swabs for diagnosis of either Chlamydia or gonococcal infection by DNA amplification assays. Transportation of vaginal swab in dry state was as accurate as a wet swab shipped in liquid transport medium recommended by manufacturer.
Gaydos 2003[152] Rating: IV Quality: B	What are prevalence and risk factors for Chlamydia infections in Army female recruits?	23010; 23010	Subjects included all new female Army recruits entering basic training and present on Sundays at the Physical Examination Section, Reception Battalion, Fort Jackson, SC, between January 1996 and June 1999 who volunteered to participate. Participants completed a survey with demographic information, sexual risk history, and the presence or absence of any genital symptoms consistent with sexually transmitted infections, and prior history of sexually transmitted infections. First-void urine specimens were collected.	Recruits demonstrated high prevalence of infection. Year of study, race, age, and region of country were significant predictors.
Gibbs 2006[70] Rating: VI Quality: B	Do hearing profiles differ by sex or across Army service components (i.e., active duty, National Guard, and Reserves)?	14974; 2306	Audiometry test results generated by the Fort Bliss Hearing Conservation Service from January 2003 to March 2005 for Army active-duty, National Guard and Reserve soldiers were reviewed.	Females had a lower prevalence of >H-2 hearing profiles compared with males. In men, prevalence of >H-2 hearing profiles was lower in active-duty men compared with national guard reservists. In women, prevalence did not differ across service components.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Gielen 2006[306] Rating: VI Quality: C	What are the policy preferences and beliefs of female active-duty military personnel with respect to routine screening and mandatory reporting of domestic violence?	474 completed telephone interview; 474	Army, Navy, Marine Corps, and Air Force women identified by the Defense Enrollment Eligibility Reporting System database as being in the greater metropolitan Washington, DC, area between January 1998 and October 2000 received letters introducing the study; work addresses were used whenever possible. Interested women requested consent forms; those returning completed consent forms (a 4 page document specifying domestic violence as the topic of the study, a witness signature, and a statement that a woman's commanding officer could review her survey responses) then completed telephone interviews. Women were screened for physical and sexual abuse using a modified Abuse Assessment Screen. Questions to measure women's beliefs about domestic violence and standard demographic items were included in the interview; dates of the abuse and dates of military service were also collected.	Abused women were less likely to be college graduates, Caucasian, married, household income of $50K or more annually, and, more likely to be enlisted. Military screening may increase a woman's risk of further abuse, which may be related to mandatory reporting and lack of confidentiality among victims. Fifty-seven percent supported routine screening, 87% thought that the current policy on mandatory reporting should remain the same, and 48% thought that the abuse should be reported to the commanding officer, although abused women were significantly less likely to believe this. The majority agreed that women would be offended or embarrassed if asked about abuse during routine screening.
Gordley 2000[171] Rating: VI Quality: B	What is the relationship between stressor factors (job strain and life events) and menstrual function among military members?	170; 170	Subjects were military and civilian women from 10 Air Force bases (Davis-Monthan, Hill, Langley, Luke, Moody, Nellis, Pope, Warner-Robins, Seymour Johnson, and Shaw) who volunteered; women on hormonal contraceptives, had been pregnant within the previous six months, were currently pregnant, or diagnosed with specific disease conditions were excluded. Demographics and lifestyle data were obtained by interview. Instruments included the Adapted Job Content Questionnaire (JCQ) and the Life Events Questionnaire (LEQ). In addition, descriptive menstrual data were collected about menstrual cycles over prior three months and possible risk factors for menstrual disorders. Height and weight were measured.	Forty-six percent reported having 1 or more menstrual disorders. Only stress associated with life events was significantly associated with all menstrual outcomes. There was no association between any of the menstrual outcomes and job strain or non-work activities. Race was also significantly associated with hypermenorrhea and abnormal cycle length. Reports of 1 or more menstrual disorders were significantly associated with passive smoke exposure and with exercise.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Gotay 2008[175] Rating: VI Quality: C	What is the quality of life in long-term cancer survivors eligible for health care in the military health system?	41; 41	Names of TRICARE beneficiaries diagnosed with invasive cervical cancer between January 1, 1980, and January 1, 2000, were obtained from the Department of Defense Automated Central Tumor Registry (ACTUR). Self-administered surveys were mailed to eligible women (N = 2573). Surveys included demographics, comorbidity (using a questionnaire based on the Charlson comorbidity index), optimism/pessimism (using the Life Orientation test), social support (measured with the Medical Outcomes Study Social Support Survey and a 4-item social ties scale), quality of life (using the Medical Outcomes Study Short Form-36), long-term stressfulness of the diagnosis (measured by Impact of Event Scale-Revised), intimacy (Fear of Intimacy Scale), sexuality (Sexual Adjustment Questionnaire), self-perceived health and healthy/health-promoting behaviors, employment/ insurance issues, and perceived helpfulness of psychosocial support services.	The survivors reported quality-of-life levels comparable to those found in the community. Higher rates of cancer screening than the general population were found; lingering sexual problems that they perceived to be direct results of their cancer experience and lower income were linked to worse psychosocial outcomes.
Grier 2010[210] Rating: VI Quality: B	What are the prevalence, trends, and correlates of tobacco use associated with pre-military service use of cigarettes and smokeless tobacco?	31145; 3856	Subjects were service members attending Advance Individual Training at the US Army Ordnance Center and School, Aberdeen Proving Ground, MD, from January 2000 to December 2006 who volunteered to participate. Each subject completed the Soldier Health In-Processing questionnaire containing demographics, where basic combat training (BCT) was completed, any current injury or illness, and history of tobacco use.	Factors associated with smokeless tobacco use among men included younger age, Caucasian race, and cigarette use. For women, cigarette use was the only factor associated with smokeless tobacco use.
Grier 2010[104] Rating: VI Quality: A	What are the risk factors associated with self-reported training related injuries on arrival at Ordnance Advanced Individual Training?	31145; 3856	Soldier health in-processing (SHIP) survey contains questions on date of birth, sex, military rank, race, BCT site, whether or not they currently had an injury or illness (occurring before, during, or after BCT) that would affect their AIT performance, and history of tobacco use.	More injuries were reported among men than women during BCT. Risk factors for men included older age, black race, BCT site, current self-reported illness, and cigarette use. For women, higher injury risk was associated with older age, BCT site, and having a current self-reported injury.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Gunderson 2003[197] Rating: IV Quality: A	Among Navy enlisted personnel between 1980 and 1988, what was the incidence of first hospitalization for a personality disorder diagnosis and subsequent career outcomes?	32343; 3634	The study population included all Navy enlisted personnel on active duty who were first hospitalized for personality disorders (PDs) from 1980 through 1998. A control group of randomly selected personnel who served at some time between 1980 and 1998 who were never hospitalized for mental disorder was created. Hospitalization data were obtained from the Naval Medical Information Management Center, Bethesda, MD. Demographic, occupational, and service history was gathered from Naval Military Personnel Command, Washington, DC. Demographic characteristics (age, pay grade, educational level) were obtained at the time of entry into service. Other measures were obtained at the beginning of the observation period, at the time of hospitalization and discharge, and at time of separation from the service.	Women were more likely than men to have a first hospitalization for a personality disorder. Women had higher rates of affective, histrionic, other, and unspecified personality disorders. Rates in both men and women increased during the latter one-half of the 1980s and decreased during the early 1990s.
Gunderson 2005[296] Rating: VI Quality: B	What is the incidence rate for Navy personnel of first hospitalization for asthma?	3911; 995	Career History Archival Medical and Personnel System (CHAMPS) database search for the period between 1980 and 1999, on all active-duty military members. Hospitalization data were extracted from the Standard Inpatient Data Record (SIDR) databases. Career history data were compiled from personnel records and monthly extracts from the Defense Manpower Data Center (DMDC). Asthma cases were identified using the ICD-9 diagnostic category for asthma (493). Diagnoses were made at the time of discharge from military hospitals; admissions solely to shipboard medical facilities were not included. Annual midpoint populations of active-duty Navy enlisted service members, by age, race and sex were obtained from DMDC to estimate person-years.	Age-adjusted incidence rates of first hospitalization for asthma were higher in women than men. The rates in black women were twice as high as in white women. Age-specific rates in women rose in all age groups, but remained stable in men after the Persian Gulf War in 1990 and 1991.
Haas 2006[230] Rating: VI Quality: C	Does having a partner deployed during wartime increase the stress level in pregnant women, alter attitudes during pregnancy, or change birth outcomes?	95; 95	Anonymous surveys were administered to pregnant women waiting for an appointment at the antenatal clinic at Naval Hospital Camp Lejeune who had not previously completed the survey, from January to May 2005. Blood pressure was recorded on the survey by a medical assistant. The survey included questions on perceived personal stress level, impact of their partners' deployment on the pregnancy, and other attitudes toward the pregnancy as well as demographic characteristics.	Pregnant women with deployed partners gave birth to larger babies, reported changes in eating habits, and stated that media coverage impacted their stress level. Partner deployment, the presence of more than 1 child at home, and being active duty were predictive of reporting higher stress levels.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Haas 2007[232] Rating: VI Quality: B	Does having a partner deployed in the military during wartime increase the stress levels in pregnant women? What are the predictors of reporting higher stress?	525; 525	Anonymous surveys were administered to pregnant women waiting for an appointment at the antenatal clinic at Naval Hospital Camp Lejeune who had not previously completed the survey, from January to May 2005. Blood pressure was recorded on the survey by a medical assistant. The survey included questions on perceived personal stress level, impact of their partners' deployment on the pregnancy, and other attitudes toward the pregnancy as well as demographic characteristics.	Women with deployed partners more often reported higher stress levels than those with non-deployed partners. Having a partner deployed, being active duty, advanced gestational age, and having >1 child at home predicted higher stress reporting. Having a support person was protective against stress.
Haddock 2007[211] Rating: IV Quality: A	How are cigarette smoking behaviors among Air Force recruits trending? How does this compare with sex and age-stratified national samples?	114166; 45674	This study was part of 2 larger randomized trials and included all US Air Force personnel entering active-duty status, following basic military training (BMT) between August 1995 and August 1996 or between October 1999 and September 2000. While in BMT, participants had completed a scannable survey tool in groups of approximately 50 that included questions on smoking status, number and type of cigarettes smoked, level of tobacco addiction, motivation to quit, and selected health variables. National data (including only individuals matching the age range of the Air Force personnel) collected from the 1996 and 2000 Behavioral Risk Factor Surveillance System surveys, cross-sectional random telephone surveys conducted by state health departments and the CDC, were used for comparison.	No significant sex-specific findings reported. The rates of smoking increased from military cohort 1 to military cohort 2 for both males and females. The rates of smoking in each cohort were higher than the national comparative sample for males and females.
Harman 2005[264] Rating: VI Quality: B	What are the demographic characteristics and clinical disposition of active-duty military personnel evacuated for medical reasons from Central Command during Operation Iraqi Freedom (OIF)?	11183; 1663	The study population consisted of all military patients aeromedically evacuated from the Central Command area of operations during OIF in calendar year 2003. Data were extracted from medical evacuation records from US Transportation Command's (TRANSCOM) Regulating and Command and Control Evacuation System (TRAC2ES) and Defense Medical Surveillance System (DMSS) data. The TRAC2ES data extracted included patient name, social security number, cite number (specific to a particular patient and flight), age, service branch, unit name, movement classification (e.g., ambulatory, litter), precedence (e.g., routine, priority, urgent), originating and destination facility, conflict name, medical specialty code involved, injury type (battle vs. nonbattle), 1st and 2nd ICD-9-CM diagnoses, and a brief medical history. Because each leg of an evacuation was entered as a separate line, only the first record was included. Defense Medical Surveillance System (DMSS) data elements including ICD-9-CM diagnostic codes from pre- and postdeployment inpatient and outpatient encounters and selected portions of the most current pre- and postdeployment health surveys were linked to the TRAC2ES data through a common identifier.	Eighty-one percent of OIF active-duty aeromedical evacuees were male and 15% were female.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Hartmann 2006[252] Rating: IV Quality: B	What are the differences in the demographic and military variables of patients seen in the 47th command support hospital (CHS) compared with soldiers of the entire Army deployed to Operation Iraqi Freedom (OIF), along with the most common clinical presentations and estimation of the burden of neurologic disease in the OIF combat theater?	616; 124	Handwritten log and record review to obtain demographic and service information and selected clinical data of patients seen between April 16 and October 25, 2003, while deployed with the 252nd Neurosurgical Team at the 47th CSH in support of OIF.	Women were twice as likely as men to undergo a neurologic evaluation, most likely due to a headache diagnosis.
Hatch 2006[233] Rating: VI Quality: B	What is the cardiovascular reactivity and risk of preterm delivery among black and white military women?	500; 500	Subjects were pregnant active-duty military women attending the prenatal clinic at a large military medical center during 1997 through 2000 who volunteered and met inclusion criteria. Baseline questionnaire on medical history and reproductive history by interview at 6-12 weeks, with a follow up at 28 weeks. Study questionnaire included sociodemographics, medical history, reproductive history, and job stress (at baseline; at 28 weeks, questionnaire included lifestyle factors, hours worked, job characteristics, job stress, and a measure of life stress. Subset undergoing stress test had 2 standard 5-minute computer-controlled lab stressors: arithmetic and color word matching along with blood pressure and heart rate. Medical data on the course and outcome of the pregnancy were abstracted from hospital records.	The risk of preterm delivery was double among black women compared with white women across all ranks. Among all deliveries across gestation, increases in diastolic blood pressure and in heart rate were associated with a reduction in gestational age in black women.
Hauret 2004[103] Rating: VI Quality: B	What are the discharge and retention rates for trainees enrolled in the Physical Training and Rehabilitation Program (PTRP), compared with non-PTRP trainees who undergo uninterrupted basic combat training?	3959; 2803	The Physical Therapy Clinic, Moncrief Army Community Hospital, Fort Jackson, SC, provided data on all basic combat training (BCT) trainees assigned to the Physical Training and Rehabilitation Program (PTRP) between January 3, 1998, and July 24, 2001. Data elements included age, sex, date assigned to the PTRP, date of departure from the PTRP, and final status of each trainee at departure from the PTRP (returned to training or discharge from the Army). To compare discharge rates during the first 2 years after graduation, the Defense Medical Surveillance System provided data on BCT graduates not assigned to PTRP (3:1), matched on the following criteria: age (+/- 3 years), sex, race, attended BCT at Fort Jackson, start date of BCT (+/- 30 days), and active Army status. For all individuals, data on the current status in the Army (discharged vs. still on active duty) as of August 31, 2001, and date of discharge for those discharged were provided by the Defense Medical Surveillance System.	Women stayed in the PTRP significantly longer than men, regardless of their discharge status. Women were more likely than men to be discharged. Younger women had a higher risk of being discharged than older women.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Heinrich 2008[57] Rating: III Quality: B	Do 3 measures of body composition (i.e. bioelectrical impedance-determined body fat percent, waist circumference, and body mass index) generate similar estimates of obesity rates in an active-duty military sample?	451; 229	Participants in this study were recruited and randomized in a larger clinical trial. Inclusion criteria for this study included being within 5 pounds below or equal to/exceeding their allowable weight per US Air Force weight and height tables, access to a personal computer with Internet access, plans to remain in the local area for 1 year, and age 18-55. Exclusion criteria included being pregnant, breastfeeding, planning to become pregnant or became pregnant; weight loss of >10 pound in the last 3 months; use of a weight-loss medication in the past 6 months; on any military medical profile; or meeting a specific exclusion. Each participant completed a basic demographic form, years of military service, rank, and whether they planned to retire from the military. Weight, height, waist circumference, estimated percent body fat, and blood pressure were measured.	More women were overweight or obese than men, and the different methods resulted in different findings of obese and overweight participants.
Henderson 2000[329] Rating: VI Quality: B	What are the injury incidence and injury risk factors among men and women training to qualify as combat medics?	726; 287	Subjects were soldiers who had recently completed basic combat training (BCT) and advanced individual training (AIT) and were participating in the 10-week combat medic AIT at Fort Sam Houston, TX, who volunteered to participate. Subjects completed a questionnaire with demographic data, lifestyle characteristics, and injuries incurred during BCT. Height and weight were obtained from battalion personnel records. Information on injuries was extracted from medical records after completion of AIT.	In both BCT and AIT the cumulative injury incidence was higher in women than men. The number of limited-duty days in BCT and AIT were higher for women than men.
Herrell 2006[201] Rating: IV Quality: B	What are the rates and sociodemographic correlates for first hospitalization due to bipolar disorder, major depressive disorder, and schizophrenia among active-duty military personnel?	8723; 2191	Hospitalization data for active-duty military members with a first diagnosis of bipolar disorder, major depressive disorder, and schizophrenia between 1992 and 1996 were obtained from the Patient Administration Systems and Biostatistics Activity; cases were included based on DSM-III-R and DSM-IV diagnostic codes at the most recent hospital discharge date (if more than 1); date of hospitalization was the first hospitalization within the DoD for 1 of the 3 studied diagnoses. Demographic information came from the Defense Manpower Data Center. The data required to estimate person-years at risk since entry to the military were also provided by the DoD.	Females had higher rates for first hospitalizations with bipolar and major depressive disorders than males. Females had higher hospitalization rates for affective disorders than males.
Hoge 2006[119] Rating: IV Quality: A	What is the relationship between combat deployment and mental health care use during the first year? What are the lessons learned from the postdeployment mental health (MH) screening effort, particularly the correlation between the screening results, actual use of MH services, and attrition from military service?	303905; 32500	Review of the Post-Deployment Health Assessment (PDHA) and analysis of healthcare utilization and occupational outcomes using data collected from the Defense Medical Surveillance System (DMSS) for the 12 months after deployment on Army soldiers and Marines who completed a PDHA between May 1, 2003, and April 30, 2004, on return from deployments to Operation Enduring Freedom (OEF), Operation Iraqi Freedom (OIF), and other locations.	Across all returning service members, rates of a positive MH screen were higher for women than men.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Hooper 2008[256] Rating: VI Quality: B	How did the Joint Medical Work Station database function during the first year of its implementation in 2003? Throughout that year, what was the overall nature and patterns of health encounters among military personnel deployed to Operation Enduring Freedom (OEF)/Operation Iraqi Freedom (OIF)?	38498; Unidentified	All individuals have at least 1 health encounter in the Joint Medical Work Station (JMeWS) database (a theater medical surveillance system) in 2003 and who were deployed to OEF/ OIF for the first time in 2003 were included in the study. JMeWS data, provided by the Deployment Health Support directorate, Office of the Assistant Secretary of Defense for Health Affairs, provided the ICD-9-CM code for each encounter. Periods of observation for the study group were obtained from the US Transportation Command Regulating and Command & Control Evacuation System (TRAC2ES), a logistics database that tracks and stores patient movement records during aeromedical evacuations. Demographic and military service data were extracted from the Defense Manpower Data Center.	Women were more likely to have a JMeWS record, more educated, older, and to be Reserve/National Guard personnel than men. In the Army, women were significantly more likely than men to have a medical encounter documented in JMeWS, and encounters were more often associated with supplementary classifications or diagnoses within the categories of symptoms, signs, and ill-defined conditions or diseases of the genitourinary system. Among women, the most frequent diagnostic categories (excluding supplemental classification codes) were diseases of the respiratory system, injury and poisoning, and diseases of the musculoskeletal system. Similar patterns of care-seeking behaviors were reported among women in the US Armed Forces overall. Crude care-seeking rates for women were double those for men across all diagnostic categories. Results were similar for men but the categories were injury and poisoning, followed by respiratory then musculoskeletal. Similar patterns of care-seeking behaviors were reported among women overall, with crude rates being double those for men across all diagnostic categories.
Hopkins-Chadwick 2009[234] Rating: IV Quality: B	Are there differences between young enlisted Air Force women with and without preschool children on the following variables: marital status, family of origin, socioeconomic level, minority status, type of work, perceived availability of military resources, multiple role strain, stress-related symptoms, physical and mental health status, and military career aspiration? Among these variables, what are the best predictors of multiple role strain, stress-related symptoms, physical health status, mental health status, and military career aspiration?	100 (50 women with pre-school children and 50 women without pre-school children); 100	Study subjects included were junior enlisted, active-duty Air Force women ages 17-24 on a large Midwestern Air Force base. Participants were recruited using posters, e-mail announcements, and referral. Data were collected using electronic versions of the instruments on a personal digital assistant. Participants completed the electronic survey in such settings as the base exchange, the medical center, the fitness center, and selected operational buildings located on base. The investigator-developed questionnaire collected demographic information, questions to measure perceived availability of resources, the Daily Hassles Scale (DHS) to measure multiple role strain, the Basic Symptom Inventory-18 (BSI-18) to measure stress-related symptoms, and the SF-8 to measure health status.	No differences between women with and without children in role strain, stress, health, and military career aspiration were reported. In all women, higher stress was moderately predictive of higher role strain, but a poor predictor of career aspiration. Lower mental health scores were predicted by high stress symptoms, low military career aspiration, high role strain, and being non-white. Aspiration for a military career was predicted by high perceived availability of military resources, low family of origin socioeconomic status, and better mental health status. Motherhood was not a significant variable.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Hourani 2004[170] Rating: IV Quality: A	What are 1) the prevalence rates and 2) the psychosocial factors and lifestyle correlates of premenstrual symptoms in military women?	6026; 6026	Study used two large data sets (1998 Total Health Force Assessment and 1995 Perception of Wellness Readiness Assessment) of mailed surveys; a small proportion of the Navy and Marine Corps responses were from surveys administered at the worksite. The Defense Manpower Data Center provided data files for sample selection to represent shore-based females and males in all paygrades of all segments of the US military throughout the world. Questions were from standardized instruments with reliable psychometrics in a military population; a women's health supplement measured female-specific conditions, menstrual problems, and estrogen use. Medical history, health care use, depressive symptoms, perceived job stress, lifestyle, and psychosocial variables were measured.	The prevalence of self-reported premenstrual symptoms among active-duty women was 69%; they were more likely to report heavy periods, abdominal pain, and bleeding between periods and to report 2 or more current medical conditions, migraines, and healthcare visits for illness/injury or mental healthcare in the past year. Significant predictors of premenstrual symptoms in the LR analysis: all menstrual dysfunction measures except endometriosis; more likely to be younger; white and Hispanic; have tried to lose weight; rated self lower in physical fitness; never pregnant; smoker; rated self as having a lower health status; more depressive symptoms. High job stress was the greatest risk factor when compared with women without premenstrual symptoms.
Hourani 2006[240] Rating: VI Quality: B	Is self-reported stress associated with measures of mental health and job performance? Is there correlation with treatment receipt?	12756; 3250	Data was extracted from the 2002 DoD Survey of Health-Related Behaviors Among Military Personnel, a large, randomized population-based survey of personnel in all service branches on active duty between September 2002 through mid-February 2003; the survey was administered in group settings and by mail. Data utilized in this study included stress at work or home; mental health problems (including anxiety and depression symptoms) and receipt of mental health treatment; and job performance and productivity.	Among those reporting the highest levels of stress were women.
Howell 2000[158] Rating: IV Quality: B	What is the cost effectiveness and relative cost savings to military and civilian health sectors that result from 3 different screening strategies (i.e. no screening, screen only recruits 25 years and older, and screen all recruits) in Army female recruits?	Decision analytic model (more than 18,000 female recruits at Fort Jackson, from 1996 to 1998. Analysis results are presented per 10,000 females)	Descriptive statistics for the key variables were collected from publications that described the population of all female recruits who entered the US Army at Fort Jackson, SC, from 1996-1998. Key variables included age, Chlamydia trachomatis prevalence, cost of screening and treatment, clinic visit, and attrition from the military. Event probability and cost estimates were calculated to describe baseline characteristics. Costs of illness related to sequelae of Chlamydia were calculated for military and nonmilitary health care. Conditions included Chlamydia infection, inpatient and outpatient treatment for pelvic inflammatory disease, chronic pelvic pain, ectopic pregnancy. Costs for lost-training expenditures were considered.	From a military perspective, screening women aged <25 years provided the highest cost savings. Screening all female recruits incurred an incremental cost of $1199 per sequela prevented. From a civilian perspective, screening all recruits offered the greatest cost savings.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Howland 2007[65] Rating: VI Quality: A	What is the relationship between alcohol use and the types and severities of hospitalized injuries in active-duty soldiers?	211790; 18036	The Total Army Injury and Health Outcomes Database (TAIHOD) was used to analyze cause, type, and severity of noncombat injuries requiring hospitalization and the associations with alcohol use. Cases were included for all active-duty Army soldiers hospitalized at least once with a primary diagnosis of ICD-9 codes 800-995; patients presenting to an emergency room, who died, or with injuries related to combat were excluded. Alcohol comorbidity was interpreted from secondary diagnostic codes. The NATO Standardized Agreement 2050 (STANAG) cause coding system provided additional information on the nature of the injuries in addition to how they occurred. Data were analyzed by alcohol comorbidity and included demographics, causes contributing to the injury event, injury type, and injury severity.	Soldiers with privately owned vehicle (POV) driving-related injuries were more likely to be female.
Hsiao 2010[90] Rating: VI Quality: B	What were the incidence and risk factors associated with primary patellar dislocation injuries in a young and physically active population compared with the general population? What demographics and occupational risk factors for patellar dislocation injuries?	9299; 2014	All primary occurrences of patellar dislocation injuries, defined by ICD-9 code, among service members on active duty between 1998 and 2007 inclusive were extracted from the Defense Medical Surveillance System. Data obtained included demographic service characteristics and ambulatory encounters with a first occurrence primary diagnosis of patellar dislocation.	Women were 61% more likely to sustain a patellar dislocation injury than men.
Hsieh 2003[149] Rating: IV Quality: B	How acceptable is the use of self-administered swabs (SAS) to screen for Chlamydia in non-healthcare-seeking female soldiers? Is SAS preferred over urine testing? What is the sensitivity and specificity of SAS, if urine testing is considered standard testing?	1382; 1382	Non-healthcare seeking female recruits entering basic training at Fort Jackson, SC, between March and August 1999 were invited to participate. Participants received a briefing on the study, education on Chlamydia, and instructions on collecting a urine sample and vaginal swab. After providing both first-void urine (FVU) and SAS specimens, participants completed a questionnaire with questions about demographics, sexual risk behaviors, history of sexually transmitted infections, sample preference/comfort, ease of collection, comfort in collection, pain during collection, handling of specimens, preference in collection method by setting (clinic, home, and field), intention to use.	Twelve percent of participants were infected with Chlamydia. The relative sensitivity and specificity of the C. trachomatis Ligase Chain Reaction test on SAS was 81.1% and 98.6%. Ninety-one percent reported that they felt comfortable collecting the FVU specimen and 70% indicated that they felt comfortable collecting SAS. Either specimen collection type received high acceptability at home and in the field.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Hughes 2003[142] Rating: VI Quality: C	Does participation in the multidisciplinary program, Choices, while stationed overseas, reduce unintended pregnancies in young, single active-duty women?	173; 173	Unmarried active-duty women under age 27 at US Naval Air Station, Sigonella, who qualified to attend Choices (a 2-day program designed to reduce the rate of pregnancies among young sailors) between October 1999 and September 2000 made up the study; half of the women attended Choices while the other half did not attend. The number of unplanned pregnancies was the variable of interest. Control and independent variables were rank, age, command/unit, testing positive for a STD, and Choices attendance. The Composite Health Care System and base indoctrination training rosters were used to collect data.	Those who did not attend Choices were 3 times more likely to have an unintended pregnancy.
Hwang 2007[68] Rating: VI Quality: B	What is the relationship between diagnosis of sexually transmitted infections (STIs) at entry to Marine recruit training and subsequent sexual behaviors during vacation?	1712; 1712	All women enrolled in recruit training (13 weeks) for the US Marine Corps between June 1999 and June 2000 were invited to participate. Baseline data consisted of a self-administered questionnaire (demographic and sexual history). Within 10 days of enrollment, each participant received a routine reproductive health exam; STI screening (for *Chlamydia trachomatis*, *Neisseria gonorrhoeae*, and *Trichomonas vaginalis*) was performed during participant's exam regardless of sexual risk history. Each woman testing positive was treated according to clinical practice guidelines published by the CDC, and provided individualized counseling (information on STIs, safer sex practices, partner notification, and referral). After the conclusion of 13 weeks of structured training that precluded social activities or contact with male peers, subjects went on unrestricted vacation leave for a median of 10 days, and returned for an additional 3 weeks of training. Following completion of the second phase of training, a second self-administered questionnaire and universal STI screening were conducted.	Women testing STI-positive at baseline were more likely to test STI-positive after vacation. Baseline STI was unrelated to inconsistent condom use, non-monogamous partnerships or multiple partnerships.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Jacobson 2009[45] Rating: V Quality: B	Is there an association between stressful life events (such as deployment/ combat stress) and the development of eating disorders?	48378; 12641	Participants of the Millennium Cohort (a population-based sample randomly selected from all US military personnel) who completed a baseline survey between July 2001 and June 2003, and a follow-up survey from July 2004 to February 2006 were included in the study. Exclusionary criteria included individuals who: 1) were deployed in support of the wars in Iraq and Afghanistan prior to the baseline assessment or completed a baseline survey while deployed, 2) did not answer any disordered-eating questions; 3) were missing demographic information; and 4) met the criteria for disordered eating at baseline. Pregnant women, individuals with discrepant heights, and those who did not report either height or weight were excluded from the weight change analyses. The Defense Manpower Data Center provided demographic and military data, including: sex, birth date, race/ ethnicity, education, marital status, branch of service, service component, military pay grade, military occupation, deployment experience, and length of deployments. Other information used in this analysis included survey items: history of life stress (Holmes and Rahe Social Readjustment Rating Scale), history of diagnosed mental disorder, smoking history, alcohol use (CAGE questionnaire), and self-report of being on a special diet to lose weight. Disordered eating was determined using 8 questions from the Patient Health Questionnaire (survey-based diagnosis made by use of criteria from the American Psychiatric Association's DSM, 4th edition).	Cumulative incidence of self-reported disordered eating was higher for women than men. Women deployed with combat exposures were more likely to develop new-onset disordered eating and to lose an extreme amount of weight compared with women deployed without combat exposures.
Jennings 2005[111] Rating: VI Quality: B	What are the health care experiences and expectations among Army beneficiaries?	26; 15	Focus groups consisting of stratified random samplings (by region, site where care was given, rank, sex, and ethnicity) of Army soldiers and family members were held to investigate experiences with and expectations of their health care. Focus groups made up of purposive groups of health care personnel (HCP) was also conducted. Focus groups of consumer beneficiaries and HCP were held in 2 geographically distinct TRICARE regions. The same moderator conducted all of the focus groups; the moderator was a military health system civilian and was trained by an expert in qualitative research and focus groups. Verbatim transcripts from focus groups with a scripted dialogue at the beginning and end.	Four of the interviewed subjects were female. One female soldier stated that the aid station providers are all males and they administered a pregnancy test regardless of chief complaint.
Karl 2010[47] Rating: II Quality: A	Does consumption of a twice daily iron fortified (ferrous sulfate) food product improve iron status of female recruits during basic training?	124; 124	Study subjects were recruited from a population of female military recruits entering US Army basic combat training (BCT) in September 2008; exclusion criteria included a history of hemochromotosis, thalessemia, or ulcerative colitis or who stated an allergy to any ingredient in the food products administered. Subjects received an iron-fortified food product (total supplementation of 56 mg iron per day) or a placebo twice daily for 9 weeks of Army basic training. Compliance was assessed as 99% in both groups, based on weekly collection of empty food bar wrappers. Key outcome measures at the beginning and the end of the 9 weeks of training included blood levels of a hormone important in iron regulation (hepcidin) and other markers of iron status. Anthropometric measures were taken: height, weight, body fat percentages. Fasting blood samples were collected to measure hemoglobin, red cell distribution width (RD), ferritin, iron, total-iron binding capacity, transferrin saturation, soluble transferrin receptor, serum IL-6, C-reactive protein.	Twice-daily consumption of an iron-fortified food product improved iron status in iron-deficient anemic soldiers but did not adversely affect non-anemic soldiers. During basic training serum ferritin concentrations decreased; soluble transferring receptor, hemoglobin, and red cell distribution width increased. Serum hepcidin concentrations were not affected by basic training but were lower in iron-deficient anemic soldiers.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Kelly 2000[101] Rating: VI Quality: B	What are the risk factors and development mechanisms of pelvic stress fractures in female Navy recruits?	86; 86	Healthy female recruits in basic military training at the Naval Recruit Training Center, Great Lakes, IL, between March 1, 1995, and April 1, 1996, who volunteered made up the study group. At the time of diagnosis of a stress fracture by the Naval hospital's musculoskeletal clinic, participants completed a 21-question survey that included age, height, weight, race, known risk factors for low bone density (e.g., smoking history), self-perceived fitness, training activities (e.g., number of times as road guard), and length of stride while in formation. Medical records of patients and controls were examined and abstracted.	Marching at the rear of a sex-integrated training unit and short stature appeared to be significant risk factors for pelvic stress fracture. There was also an association with Hispanic and Asian ethnicity although this may be confounded by shorter stature. There were no observed statistical differences in pelvic stress fracture cases compared with controls for incidence of amenorrhea or fitness level typically observed as risk factors in other types of stress fracture.
Kennedy 2009[288] Rating: VI Quality: B	What are women's experiences with the Centering Pregnancy model?	322; 322	Pregnant women at a US Air Force base on the Eastern seaboard and a US Navy hospital in the Pacific Northwest who volunteered for the study were randomly assigned to group prenatal care (PNC) or individual PNC. At 3 months postpartum, semistructured qualitative telephone interviews were conducted in which women were asked to comment on what they liked most and least about their prenatal care, what they would change about their experience, and anything else they wanted to share.	Interpretative narrative and thematic analysis identified3 themes: 1) the experience with group PNC; 2) recommendations to improve group PNC; and 3) general concerns about PNC. Greatest concerns of women in individual PNC included lack of continuity and time with the provider. Group PNC offered the potential for provider continuity an community with other women.
Kent 2010[28] Rating: VI Quality: C	What are the prevalence and types of complementary and alternative medicine (CAM) use at an overseas military medical clinic among different military patient populations in Hawaii?	369; 254	Participants were volunteers aged 18 years or greater with a scheduled appointment at Tripler Army Medical Center (TAMC) Family Medicine Clinic between September 1 and September 28, 2008; individuals were recruited when they checked in for their appointments. The TAMC Family Medicine Clinic's patient population includes active-duty personnel, dependents, and retired service members from all branches of the military. Participants completed an anonymous modified survey instrument used in a study of CAM use among US active-duty Sailors and Marines and asked about the use of CAM, specific CAM therapies used, and demographic data.	CAM use was significantly higher among women than men.
Knapik 2001[20] Rating: VI Quality: B	Are there associations between injuries and physical fitness due to physiologic measures of aerobic capacity, body composition, and muscle strength? Are there associations between injuries and lifestyle characteristics?	1230; 474	US Army recruits attending basic combat training (BCT) at Fort Jackson, SC, volunteered to participate. Subjects were administered physiological testing and a questionnaire addressing smoking habits and past physical activity. Only those who arrived at basic training earlier were administered the physiologic portion of the study, due to limited resources. The study had three phases, physiological testing, Army physical fitness testing, and injury data collection from the subjects' medical records.	Women had over twice the injury rate of men for all injuries, time-loss injuries, lower extremity overuse injuries, and limited duty days; however, both men and women had a higher likelihood of injury if they enter BCT with lower aerobic capacity, lower muscular endurance, or with a prior history of smoking. Men were at greater injury risk if they had either high or low levels of hamstring flexibility, or had lower levels of physical activity at BCT entry.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Knapik 2002[105] Rating: VI Quality: B	What are the variations in activity-associated injury rates during different seasons of the year and any potential associations with environmental temperatures?	2568; 1025	Subjects were Army recruits participating in basic combat training (BCT) at Fort Jackson, SC, from October 1997 to December 1998. Physical characteristics were obtained from physical exams completed prior to entering BCT. Physical fitness data from the Army Physical Fitness Test completed within 3 days of arriving for BCT. The National Climatic Data Center and the Columbia SC airport provided temperature data. Injury data were obtained retrospectively from a review of the subjects' medical records.	Women training in the summer had a higher risk of time-loss traumatic injuries, but men did not.
Knapik 2003[25] Rating: IV Quality: B	What are the fitness and injury outcomes during implementation of the new Army Physical Readiness Training (PRT) program compare to Basic Combat Training (BCT)?	2580; 1166	Medical records and training data were compared at various times during Army BCT. Recruits completed a questionnaire asking about lifestyle characteristics prior to BCT. Medical characteristics, demographics, and injury data were extracted from recruit medical records maintained in the training company; physical fitness outcomes were obtained from the Army Physical Fitness Test (APFT) data; and training data (e.g., distances run) were provided by the battalions.	Both men and women in the BCT group were significantly more likely to incur an overuse injury than those in the new PRT group. Both men and women were also more likely to incur a lost-time overuse injury. Also, there were no differences in BCT men and PRT men in regard to the proportion failing the APFT at the end of BCT; however, women in the PRT group were significantly more likely to pass the test than women in the BCT group.
Knapik 2004[24] Rating: VI Quality: B	Did a multiple injury control intervention impact injury and physical fitness outcomes among soldiers attending US Army Ordnance School Advanced Individual Training (AIT)?	1283; 161	Subjects were US Army soldiers attending ordnance AIT at Aberdeen Proving Ground, MD. Control group was comprised of soldiers attending AIT prior to introduction of the interventions; study group included soldiers attending AIT after the interventions were introduced. Soldiers completed a Soldier Health In-processing Questionnaire on arrival that included demographics and current injury status; service related data was obtained by the Ordnance School and injury data from a clinic based injury surveillance system. Army Physical Fitness Test results on arrival, at 4 weeks, and 8 weeks, and observations of training were also collected.	The risk of a time loss injury was higher in the historical control men and in the historical control women compared with the multiple intervention in men and women, but after correcting for the lower fitness levels pre intervention, there were no significant differences between the multiple intervention and historical control groups.
Knapik 2005[23] Rating: IV Quality: B	What are the differences between a group of basic combat training (BCT) recruits engaged in the new standardized program to a group of recruits using a traditional BCT physical training program using physical fitness, injuries, and attrition as the outcome measures?	1967; 825	Five US Army BCT companies participated in traditional physical training (controls) and 5 participated in a modified physical training program (experimental group) during their entire BCT cycle. Initial Fitness Assessment (completed within 1-3 days of arrival) and Army Physical Fitness Test (APFT) scores (completed at weeks 5 and 7) were downloaded from a company-level database. Injury information was downloaded from the Standard Ambulatory Data Record. ICD-9 codes were used to identify injuries. Attrition was assessed using a company-level database. Height and weight obtained from company-level database.	Injury rates for females were lower in the newly designed program compared with the traditional basic training.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Knapik 2006[22] Rating: VI Quality: B	What is the effectiveness of the Fitness Assessment Program in preparing Army recruits for basic combat training (BCT)?	2072; 898	Recruits arriving for BCT at Fort Jackson, SC between March 2003 and June 2003 were administered the entry-level physical fitness test (PFT) and placed into 1 of 3 groups depending on their score: 1) individuals who failed the PFT and entered the Fitness Assessment Program (FAP), a pre-conditioning program; 2) individuals who failed the PFT and entered BCT without pre-conditioning; and 3) individuals who passed the PFT. Demographic characteristics, standard BCT test and evaluation results, military medical clinic data, and BCT completion records were extracted from official military records for analysis.	For the female sit-up data, the group by week interaction suggested that the preconditioning and no preconditionng groups improved more than the no need for preconditiong group from week 5 to week 7. Compared with no need for preconditioning women, injury risk was higher for the preconditioning and non-preconditiong women respectively.
Knapik 2007[86] Rating: VI Quality: B	What are the injury rates, anatomical locations of injuries, activities associated with injuries, and potential injury risk factors among Army vehicle mechanics?	561; 43	Names of US Army soldiers with a military occupational specialty code of 63B ("light wheel-vehicle mechanics") at Fort Bragg were extracted from the Standard Installation Division Personnel System. Experienced medical record reviewers identified each visit to any medical provider at Fort Bragg (from all medical treatment facilities at Fort Bragg including the Joel Health Clinic, Clark Health Clinic, and Robinson Health Clinic, Womack Army Medical Center, and the battalion aid stations) between March 2003 and February 2004 as injury or non-injury related; for each injury, the visit date, visit type (initial or follow-up), activity associated with the injury, diagnosis, anatomical location of injury, disposition (final outcome of the visit), and days of limited duty (if any) were extracted. Height and weight were obtained from the medical visit closest to March 1, 2003. Demographics were also extracted from medical records. The Defense Manpower Data Center (DMDC) was used to collect start and end dates of deployments during the study period.	Women had higher overuse injury rates while men had higher traumatic injury rates. Among men, elevated injury risk was associated with higher body weight and higher body mass index.
Knapik 2009[102] Rating: IV Quality: B	Will soldiers wearing specific footwear based on low, medium, or high foot arch have reduced injury risk during Army Basic Combat Training compared with soldiers who are wearing a stability shoe for medium arches?	3062; 915	Subjects were new US Army recruits participating in basic combat training (BCT) at Fort Jackson, SC, who volunteered to participate in the study; they were randomized into the experimental or control group in sequential order as they arrived for testing. Participants completed a self-report questionnaire (tobacco use, physical activity, injury history, and [for women] menstrual history). Plantar surface measurement classified each participant's arch height (high, normal, or low). Experimental subjects obtained prescribed type of running shoe based on their plantar shape. The control group received standard stability running shoes regardless of their plantar shape. Height and weight were obtained from the Reception Battalion Automated Support System database. Demographics were extracted from the Defense Manpower Data Center database. The BCT companies provided Army Physical Fitness Test scores. BCT injuries were obtained from the Defense Medical Surveillance System.	No sex-specific findings reported.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Kraemer 2001[26] Rating: IV Quality: B	What is the influence of different periodized resistance training programs on strength, power, endurance, and military occupational task performances in women over a 6 month training period?	193; 93	Subjects were tested and subsequently matched for body size and strength with a normative group of men and randomly assigned to one of six training groups. The training groups included total strength/power resistance (TP), total strength/hypertrophy resistance (TH), upper strength/power resistance (UP), upper strength/hypertrophy resistance (UH), field ballistic plyometric and partner-resisted exercise (FLD), and aerobic training (AER) groups. Subjects were tested pretraining (T0) and again after 3 months (T3) and 6 months (T6) of training. At each data collection session, body mass, fat-free mass, percent body fat, 1 repetition maximum (1-RM) squat, 1-RM bench press, 1-RM high pull, squat jump power, bench press throw power, squat endurance, 1-RM box lift, repetitive box lift, 2-mile loaded run, and US Army Physical Fitness Test variables (i.e., push-ups, sit-ups, and 2-mile run) were assessed. All women then participated in their respective 24-week exercise training programs including supplemental aerobic exercise 3 days/week[sup-1].	Periodized progressive resistance training was associated with improvements in high intensity physical performance through a 6-month period. These results supported the Specific Adaptation to Imposed Demand (SAID) Principle. Normative sex differences in strength and task performance could be minimized by specific training.
Lapierre 2007[191] Rating: VI Quality: B	What are the rates of posttraumatic stress (PTS) and depressive symptoms in soldiers returning from war?	4089; 6% of total	Volunteer study subjects were active-duty US Army soldiers who participated in a 2-week Army sponsored reintegration training program from February through July 2005, after returning from Iraq or Afghanistan 5-8 weeks previously; all soldiers served in combat arms, combat support, and combat service support branches. Participants provided demographics and completed the Screen for Posttraumatic Stress Symptoms (SPTSS), the Center for Epidemiological Studies Depression Scale (CES-D), and the Satisfaction with Life Scale.	Females were more likely to report depressive symptoms from both Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF), but not significantly correlated with any other variable of study
Lappe 2001[106] Rating: IV Quality: B	What are the risk factors for stress fracture during basic combat training (BCT) in female recruits?	3758; 3758	Subjects were female Army recruits entering BCT at Fort Leonard Wood, MO, between August 25, 1995, and June 23, 1996, who volunteered to participate. Height and weight and quantitative ultrasound (QUS) bone density measurements were obtained while subjects were at the Reception Station, and subjects completed an author-developed risk factor status assessment. Stress fractures were diagnosed by clinicians and confirmed by radiograph or Tc scan.	The incidence of stress fracture was 8.5% per 8 week BCT cycle. Factors associated with increased stress fracture risk were: older age, current or past smoking, amount of smoking, drinking > 10 alcoholic drinks weekly, corticosteroid use, and lower lowest adult weight. Factors associated with decreased risk of fracture were: black race, history of regular exercise, and longer history of exercise. Factors not associated with fracture were: current weight, contraceptive use, dairy consumption, height, age of menarche, previous fracture, family history of osteoporosis, and menstrual frequency.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Lauder 2000[97] Rating: IV Quality: C	What is the relationship between bone mineral density and the probability of stress fractures among female active-duty soldiers in the Army?	185; 185	Subjects were active-duty female Army soldiers in 8 military units on Fort Lewis, WA, between May 1996 and May 1997 who volunteered to participate; inclusion criteria included a history of abnormal eating behaviors and menstrual irregularities or a reported stress fracture in the recent past. Interviews were used to collect data including: height, weight, Army unit, alcohol intake, caffeine intake, smoking behavior, history of osteoporosis, exercise intensity, use of contraception (oral, injectable, or implantable), history of stress fractures, presence of eating disorders, and menstrual irregularities. Evaluation of abnormal eating behaviors was performed using the Eating Disorder Inventory. Subjects with reported menstrual irregularities underwent both a physical examination with a gynecologist and laboratory examination to verify a diagnosis of amenorrhea, oligomenorrhea, or late menarche. Bone mineral density (BMD) was measured on all subjects by the same trained individual.	Higher exercise activity in this group of women with abnormal eating habits and/or menstrual abnormalities was reportedly associated with higher prevalence of recent stress fracture. BMD of the femoral neck was negatively associated with stress fracture prevalence; BMD of the vertebral bone had no association with stress fracture. However, the coefficient of variation for dual energy x-ray absorptiometry measurements in this study was reported to be 50%. Some risk factors associated with stress fractures and BMD density were preventable, and careful attention should be directed at educating patients about avoidable risk factors. Optimal training programs should balance the beneficial indirect effect of increased exercise with its detrimental direct effect on stress fractures.
Lettieri 2004[270] Rating: VI Quality: C	Is there a difference in seroprevalance rates of Leptospirosis between military residents newly arrived to Hawaii and those who had been living in Hawaii for 90 days or longer?	488; 99	Subjects recruited from individuals voluntarily presenting at military-sponsored blood donation drives on the island of Oahu; individuals previously enrolled in the study were excluded. Combat and administrative personnel from each of the Armed Services were part of the population. Demographic data, risk factor, and illness data were obtained with a questionnaire. Serum from blood donation were collected and transported to the Department of Defense Veterinary Command Food Analysis and Diagnostic Laboratory (Fort Sam Houston, TX) for analysis for seroprevalance of leptospiral antibodies.	Four females and 3 males were positive; there was a statistical significance for sex.
Lieberman 2008[27] Rating: VI Quality: B	What is the nature and extent of cognitive, nutritional, and physical changes that occur during Marine recruit training?	51; 51	Subjects were female Marine recruits with a body mass index = 19 kg/m beginning USMC recruit training (RT) at Parris Island, SC, in May and June 2001 who agreed to participate. Subjects completed the Profile of Mood States (POMS) questionnaire capturing mood in the morning at the start of training week and every 4 weeks thereafter (week 1, 5, 9, 13). DEXA scans were completed for weight, percent body fat, and bone mineral density (week1, 5, 9 and 13) as well as fasting venous blood samples for cholesterol, free fatty acids, cortisol, and glucose at weeks 1 and 12.	Over the course of USMC recruit training, mood and body composition improved substantially and dramatically, an indication of the effectiveness of USMC RT for altering the physical and the cognitive status of trainees.

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Lincoln 2002[100] Rating: IV Quality: B	What is the natural history of 13 musculoskeletal conditions requiring hospitalization and discharge from the Army (demographics, behavioral, psychosocial, occupational and clinical)?	15268; 2246	Records of active-duty Army personnel first hospitalized for a specific musculoskeletal-related disorder or severe sprain/strain (one of 40 specific ICD-9-CM codes) who had completed a health risk appraisal between 1988 and 1996 and developed a disability up to 1997 were extracted from the Total Army Injury and Health Outcomes Database. Demographic and service-related characteristics, date of separation from service, dates of hospital admission(s) and diagnoses, smoking status, work-related stress, and disability ratings were variables obtained.	Among females, fewer covariates reached statistical significance, although lower education level was significant in more than 1 model.
Lindstrom 2006[243] Rating: VI Quality: B	What are the mental health hospitalization rates of military women working in newly sex-integrated combat support occupations prior to the onset of the wars in Iraq and Afghanistan?	73777; 73777	Study participants included all active-duty nonpregnant enlisted women within the 4 lowest pay grades (E1- E4) who served for a minimum of 6 months in the Marine Corps or Navy between January 1, 1994, and August 31, 2001, and who had worked in their occupational subgroup (1 of 2 sub-groups based on their occupational specialty) for at least 6 months. Participants were followed for up to 2 years of service from the date they entered the specified occupational category. Demographic data were obtained from the Defense Manpower Data Center and included sex, pay grade, race/ethnicity, service branch, occupational subgroup, and the date of entrance into the occupational subgroup. The subjects' primary hospitalization diagnoses (by ICD-9-CM code) were obtained from the Standard Inpatient Data Record and the Health Care Service Record. An inpatient visit was classified as a mental health hospitalization if the primary diagnosis at the time of discharge was coded as ICD-9-CM 290-319.	Two percent of women were hospitalized for mental health disorders. Women in combat support occupations were less likely to be hospitalized than those in non-combat support occupations. Older women were more likely to be hospitalized; white women and those in higher pay grades were hospitalized less often. The most common diagnoses were adjustment disorders, personality disorders, mood disorders, and substance-related disorders.
Linton 2004[236] Rating: VI Quality: A	What is the self-reported health status of Department of Defense health care beneficiaries pre- and post- September 11, 2001?	60160; 31812	One question from the Health Care Survey of DoD Beneficiaries (HCSDB), a self-administered mailed survey that assesses beneficiaries satisfaction with health care, asks beneficiaries to rate their overall health status. The HCSDB quarterly samples are randomized so that beneficiaries are surveyed only once per year. This study compared the pooled results from quarters 1-3 in 2001 and compared the response to the "rate your overall health status" question with the response of the 4th quarter 2001 group.	Statistically significant increases in unfavorable health were reported by active-duty personnel and dependents of active-duty personnel, beneficiaries affiliated with the Army and the Marines, beneficiaries under the age of 44, and beneficiaries in the Mid-Atlantic, Mid-West/Central, and Pacific Rim regions. After 9/11, there was a significant increase in unfavorable health status reported by both sexes. Active-duty females showed one of the largest increases in self-reported poor health

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Lowe 2003[163] Rating: VI Quality: B	How frequently did female Army and Navy personnel experience vaginal infections and urinary tract infections during deployment?	841; 841	Active-duty and Reserve females in the Army and Navy who had been deployed for at least 2 weeks of sea duty, field duty, or temporary duty in a foreign country in support of a military operation made up the target population. Units with 10 or more women were randomly selected from a list provided by the US Defense Manpower Data Center; 88 units were selected. Unit commanders approved unit staff members to distribute the surveys. The subjects could either return the completed anonymous survey to the unit staff member for bulk mailing or return it to the researcher in a postage-paid envelope. An investigator-generated survey that included information about deployments, available health care providers, risk factors for genitourinary infections, symptoms of genitourinary infections, and demographic characteristics was used; expert reviews supported the content validity of the survey, and it was pilot-tested with 16 Army Reserve females.	During deployment, 30.1% of women reported vaginal infections and 18.4% reported UTIs. Risk factors reported included holding urine, using tampons, taking birth control pills, taking antibiotics, douching, sexual intercourse, and non-cotton underwear.
Lowe 2009[164] Rating: IV Quality: B	How accurate are advanced practice nurses' (APNs) clinical diagnoses of bacterial vaginosis (BV), candidiasis vaginitis (CV), and trichomoniasis vaginalis (TV) using a traditional standardized clinical diagnostic protocol compared with a DNA probe laboratory standard specific to these 3 diagnoses?	535; 535	Subjects were active-duty women presenting with vulvovaginal or urinary symptoms at one of 4 troop medical clinics in the US Army or Navy between November 2002 and July 2006 who volunteered to participate. Clinical diagnoses were made by research staff using a standardized protocol of history, physical examination including pelvic examination, determination of vaginal pH, vaginal fluid amines test, and wet-prep microscopy. Vaginal fluid samples were obtained for DNA analysis. Laboratory technicians read and recorded the DNA results. Clinicians were blinded to participants' self-diagnoses and DNA results, and laboratory technicians were blind to the clinicians' diagnoses.	Clinical diagnostic accuracy was highest for TV, followed by CV then BV. Diagnostic sensitivity ranged from a high of 84.6% for TV, 83.8% for CV, to 80.8% for BV. Diagnostic specificity ranged from 99.6% (TV), to 84.8% (CV), to 70% (BV). APN treatment decisions were based on clinical diagnoses. Commission treatment errors occurred for 24% of women, and omission treatment errors occurred for 16.5% of women.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Lowe 2006[165] Rating: VI Quality: A	What is the prevalence of vaginal douching among military women? What are the behavioral factors associated with douching?	1432; 1432	A sample of active-duty Army and Navy women from randomly selected units (with at least 10 female service members) at home and in austere environments completed an anonymous survey about behavioral factors associated with douching and genitourinary infections. Report was a secondary analysis of survey data collected to describe the scope of the problem of genitourinary infections in military women.	The frequency of douching was associated with being African American, more months of using tampons, having sexual intercourse, having more than 1 sex partner, using spermicides, and being in the enlisted and non-commissioned officer ranks.
Lund 2005[112] Rating: VI Quality: B	What is the incidence of obstetric-gynecology provider sex preferences among military hospital and clinic patients in a large California military teaching hospital?	1544; 1544	A survey with questions related to patient physician-sex preferences and priorities were distributed over a 2-month period to women receiving OB/GYN care. Women presenting to all department clinics and antepartum and postpartum patients at a large military hospital were given questionnaires.	Sixty percent had no preference or preferred a male provider. Forty percent preferred a female provider. Age, race, rank, and duty status were associated with sex preference. Female civilian dependents (wives and daughters) were more likely than active-duty women to have a sex preference, although among active-duty women, junior officers were more likely than lower enlisted to have a sex preference.
Lutgendorf 2009[289] Rating: VI Quality: B	What are the prevalence of and characteristics of pregnant women receiving initial prenatal care who report domestic violence in a military setting?	1162; 1162	An anonymous written survey was provided to all pregnant women presenting for initial prenatal care at Naval Medical Center Portsmouth from January 2007 to March 2008. The screening measure used was the Abuse Assessment Screen; additional survey items measured risk and demographic factors. Patients received an envelope containing the survey and a resource card with contact information for domestic violence assistance; completed surveys were placed in the envelope and dropped into a locked collection box. If participants chose not to participate, they could place the blank survey in a box.	Of surveys completed, 14.5% screened positive for abuse and 1.5% reported current pregnancy abuse. Single women and separated or divorced women were at an overall increased risk of physical or emotional partner abuse. A family history of abuse was also associated with increased risk of abuse within the previous 12 months.
Magann 2002[12] Rating: VI Quality: B	What is the influence of exercise on maternal and perinatal outcome in a low-risk healthy obstetric population?	750; 750	Active-duty women attending the antenatal clinic at Naval Medical Center, San Diego, CA, were invited to participate. Data were collected via survey previously developed for a prior study and modified for a military patient population at all prenatal visits and immediately postpartum. Data collected included demographics, gravidity, parity, maternal illness, prepregnancy weight, weight gain during pregnancy, prior preterm delivery, smoking, social support, and stress. Outcome variables were obtained from medical records within 1 week of maternal hospital discharge and included risk of anemia, preterm labor, preterm birth, preterm premature rupture of membranes, induction of labor, length of labor, abnormal fetal heart rate during labor, amnioinfusion, meconium-stained amniotic fluid, mode of delivery, postpartum hemorrhage, birth weight, and intrauterine growth restriction.	Heavy exercise was associated with a higher incidence of cold and flu in the mother, increased labor induction and augmentation, longer first stage, and longer total length of labor. Women who exercised heavily in the study were significantly older, of higher SES as measured by post-tax income, and exercised more at conception than those in the moderate, low, and no exercise groups. Heavy exercise was associated with a significantly lower birth weight compared with no exercise, and exercise was associated with a reduced incidence of cord abnormalities.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Magann 2005[284] Rating: VI Quality: B	What are the effects (throughout pregnancy) of standing, repetitive lifting, and noise in the workplace compared with no standing, lifting, or noise exposure, on maternal and perinatal outcomes in a low-risk, healthy population of working women cared for by a single group of providers?	814; 814	Active-duty women attending the antenatal clinic at Naval Medical Center, San Diego, CA, were invited to participate. Data were collected via a survey previously developed for a prior study and modified for a military patient population at all prenatal visits and immediately postpartum. The entire questionnaire was completed at the initial prenatal visit; modifications of work conditions were recorded at each subsequent visit and after delivery prior to hospital discharge.	While the overall effect of standing had no effect on gestational age at delivery or birth weight, alterations in the amount of time standing were necessary for most women. The risk of preterm labor and preterm delivery was higher in women standing greater than 4 hours each work day than women who did minimal standing. There was no overall effect of lifting on preterm labor or preterm birth; but when compared with non-lifters, those who lifted heavy weights for up to 4 hours had higher rates of preterm labor.
Maguen 2006[245] Rating: VI Quality: C	What are the basic physical and mental health needs of peacekeepers? What are the most commonly reported barriers to seeking mental health treatment? What demographic, mission stressors, and psychological symptoms predict barriers to mental health care?	259; 22	Active-duty military personnel stationed at a US military base were asked to voluntarily complete a brief survey 2 to 3 weeks prior to their deployment to Kosovo in August 2000; a group agreeing to participate in a follow-up assessment was contacted by phone or mail an average of 7 months after returning from Kosovo for a postdeployment interview. A group of reservists in North Carolina who were part of a security contingent being deployed to Bosnia completing the same surveys and follow-up interviews were used in the cross-validation portion of this study. Follow-up surveys were either paper or by telephone interview. Measures included demographics (age, sex, ethnicity, rank), the PTSD checklist, the Potentially Traumatizing Events Scale, a basic physical and mental health needs scale, and a barriers to mental health scale; the latter 2 were adapted for the National Vietnam Veterans Readjustment study.	Predeployment stress symptoms and postdeployment PTSD symptoms were predicators of barriers to seeking mental health care in the Kosovo peacekeepers, sex was not significant.
Mancuso 2008[277] Rating: VI Quality: C	How do soldiers report their exposure to a toxic industrial chemical on the Post Deployment Health Assessment at the time of redeployment?	234; 10	Symptoms, physical examination findings, and laboratory results at the time of evaluation (from all personnel exposed to a toxic industrial chemical) were collected in theater at an industrial water treatment facility in Iraq in September and October 2003 by a team from the US Army Center for Health Promotion and Preventive Medicine-Europe, Department of Occupational Health and Epidemiology. These results were merged with data from the Post Deployment Health Assessment (PDHA) form completed at time of redeployment.	The only differences noted were in time at the site and female sex, probably reflecting both greater exposure among the current exposure group and greater concerns regarding exposure significance among women in the past exposure comparison group.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Martinelli 2002[278] Rating: VI Quality: B	What personal and situational factors are risk factors for exposure to environmental tobacco smoke among female military personnel and their children?	238; 238	Study participants were recruited from Walter Reed Army Medical Center, Washington, DC, and Womack Army Medical Center, Fort Bragg, NC, between March 1998 and May 2000. Self-report questionnaires to measure personal and situational factors, passive smoking factors, and daily cigarette exposure were distributed in locations such as the woman's health clinic, a DoD commissary, military day care centers, and military training activities at 2 different Army medical facilities. Instruments used included the Pros and Cons of ETS Scale (a modification of the Decisional Balance Scale for smoking), the Self-Efficacy to Resist ETS Exposure Scale (modified from the Self-Efficacy to Resist Smoking Scale), the Mother's Expectation Measure, and the Mother's Self-Efficacy to Reduce Child's Exposure Scale.	The trimmed model showed that 32% of the variance in a mother's daily exposure was accounted for by living with a smoker, having high ETS pros, having less self-efficacy to resist ETS, and having greater self-efficacy to reduce child's exposure. There was a significant, positive relationship between the mother's and child's daily ETS exposure.
McCarroll 2000[316] Rating: VI Quality: B	Does sex and/or military status contribute to the number of cases and patterns of recidivism in military and civilian men and women identified as spouse abusers in the Army?	48330; 14023	Records of spouse abuse from the US Army Central Registry (ACR), a database of substantiated spouse and child abuse reports, from FY 1989-1997 were reviewed. Records of all offenders (active-duty males, active-duty females, civilian males, civilian females) were analyzed for first and second recurrence of spouse abuse.	Males are more likely than females to relapse. The effect of sex exerts a stronger influence than military status on the recurrence of spouse abuse.
McCarroll 2004[313] Rating: VI Quality: B	What are the patterns and severity of domestic violence (DV) incidents involving enlisted Army personnel that were reported to the Army Central Registry (ACR) from 1998-2002?	20959; 13284	Data from substantiated cases of physical and emotional abuse DV cases in the ACR of enlisted males and females were collected; spousal sexual abuse cases were excluded. Data pulled included DV pattern (mutual vs. nonmutual, frequency, severity), military vs. civilian status, and demographics data.	The rate of female victims was always greater than male victims for nonmutual abuse and the severity of abuse of female victims was always more severe than of male victims. The active-duty female had the highest risk of becoming a victim.
McCarroll 2010[314] Rating: VI Quality: B	What is the relationship between length of soldier deployment and self-reports of moderate to severe spousal violence when demographics (i.e., age, sex, race, rank, and number of children in the household) are controlled?	26835; 1315	A random sample of married active-duty Army men and women at each of 47 Army installations in the United States completed a modified Conflict Tactics Scale survey between 1990 and 1994 about behaviors exhibited while attempting to resolve marital conflict. Other data collected included demographic characteristics, deployment, rank, and whether a child lived with the respondent.	No sex-specific findings reported. However, deployment had a small but significant effect on self-reported severe spousal aggression by active-duty Army men and women. The probability of severe aggression increased with the length of deployment. After controlling for demographic variables, the probability of severe aggression was significantly greater for soldiers who had deployed in the past year compared with soldiers who had not deployed.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
McClung 2006[49] Rating: VI Quality: B	What is the prevalence of iron deficiency (ID) and iron deficiency anemia (IDA) in female Army military personnel before and after basic combat training (BCT), and after at least 6 months of permanent assignment?	1216; 1216	Blood collection times included immediately following initial entry to the Army (IET), immediately following basic combat training (AIT), or following at least six months of permanent assignment (PP). Blood was collected 4 hours post exercise. A single blood sample was taken by antecubital venipuncture and analyzed for serum ferritin, total iron binding capacity (TIBS), serum iron (Fe), red blood cell distribution width (RDW), hemoglobin (Hgb) and hematocrit (Hct). Transferrin saturation (TS) was calculated from TIBC and Fe. Iron deficiency (ID) and iron deficiency anemia (IDA) were determined using a three-variable model including serum ferritin, TS, RDW and Hgb.	Female military personnel experience diminished iron status following training. The prevalence of iron deficiency was greater in women in the AIT group than the IET or PP groups. Iron deficiency anemia (IDA) was greater in the AIT group than in the IET and PP groups. The prevalence of IDA was greater in Hispanic and African-Americans and was greatest in Hispanic and African-American female military personnel following BCT.
McClung 2009[50] Rating: II Quality: A	What is the longitudinal effect of military training on iron status in female soldiers? Are changes in iron status indicators during training predictive of physical performance at the end of the training period?	219; 219	Subjects were female recruits entering basic combat training (BCT) at Fort Jackson, SC, who volunteered to participate; the initial date of recruitment was August 9, 2007. Data were collected at the start (time 1) and end of 8 weeks (time 2) of BCT. Data collected included fasting blood samples and the Profile of Mood States (POMS) questionnaire at times 1 and 2 and two mile run time at time 2. Observed consumption of a daily capsule was done to determine compliance.	Military training degrades iron status in female military personnel. Markers of iron transport and storage were demised from baseline following training. Change in sTfR over the course of the 9 week training period was correlated with 2-mile run time, indicating that the decrement in Fe status had an effect on the ability of female soldiers to perform aerobically demanding tasks.
McClung 2009[48] Rating: VI Quality: B	Does iron supplementation (100 mg ferrous sulfate capsule per day) prevent typically observed decrements in iron status and associated functional deficits in physical performance and mental status in female recruits during basic training?	94; 94	Subjects were female Army recruits entering basic combat training (BCT) who volunteered to participate. Fasting blood collection and height and weight were collected within 1 week of arrival at BCT and within 1 week of completion of BCT. One-mile run time upon entry to BCT was collected. Iron (Fe) status indicators (Hb, erythrocyte distribution width [RDW], serum ferritin, transferrin saturation, and soluble transferrin receptor [sTfR]) were determined from the blood samples.	Daily treatment with 100 mg ferrous sulfate through 8 weeks of Army basic training improved iron status, especially in women who began basic training with iron-deficiency anemia. Functional status was significantly improved to the level of women with normal iron status for 2 mile run time in the iron deficiency anemia women following treatment. Mood state, notably vigor, improved for all women with iron treatment. The data indicate that women identified as iron deficient at the start of basic training should be provided an iron supplement.
McGinnis 2003[269] Rating: VI Quality: B	How many cases of Lyme disease were reported in the Navy from 1997-2000 and how do they compare to national figures?	210; 84	NDRS and DMED databases were reviewed for a Lyme disease diagnosis between January 1997 and December 2000. Epidemiological and clinical information were obtained from NDRS.	Rates for active-duty females were reported. Results of sex-specific analyses were not reported.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
McNulty 2001[181] Rating: VI Quality: B	What is the prevalence of eating disorders among active-duty female Army, Navy, Air Force and Marine personnel?	1278; 1278	Surveys were distributed to the total female population at 3 major medical centers for the Army, Navy, and Air Force in 1997 and all the female Marines stationed in Okinawa, Japan in 1999. An adapted version of the Eating Disorder Inventory was used, with 27 military variables regarding their influence on reported eating behaviors added. Qualitative comments were invited.	All services reported eating disorders, but the Marines had the highest rate of bulimia, anorexia, and eating disorder NOS.
McNulty 2005[207] Rating: IV Quality: B	What are the health care needs and perceived stressors of active-duty members deployed to Iraq during the predeployment, mid-deployment and postdeployment phases?	1195; 259	Subjects were active-duty Navy personnel from 3 aircraft carriers deployed to the Persian Gulf during Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF); surveys were randomly distributed among Navy members located in 30 departments per carrier, matched for rate/rank and sex distribution, between spring 2002 and fall 2003. Data were collected predeployment, mid-deployment and postdeployment. Data were collected using components of the Family Index of Regenerativity and Adaptation-Military series: the Family Self-Reliance Index, the Family Index of Coherence, the Family Changes and Strains, the Family Adaptation Checklist. The Deployed Member Well-Being, a researcher-developed tool based on the Family Member Well-being Tool, and the State-Trait Anxiety Inventory were also completed; and demographic characteristics and self-reported health care visits were collected.	There were no sex differences in anger/abuse or suicidal ideation/attempted reported. Both sexes reported suicidal ideation/attempted at 3-4%. More males were married and more female sailors were <25 years of age. More female sailors had children at home, and previous and current family counseling were greater among females. Both sexes had alcohol issues at 4% and 5%, and 10% in each group sought help for stress. There was no significant difference in adaptation scores between men and women. Deployed Member Well-Being scores were higher among men than women.
Merrill 2001[203] Rating: VI Quality: B	How are childhood experiences of sexual and physical abuse related to adult trauma symptomatology in female recruits?	1051; 1051	During their first week of training, a sample of US Navy recruits were administered by 1 male and 1 female US Navy psychological technician at the Recruit Training Command, Orlando, FL, January through April 1994. Instruments used were the Demographic and Family History (DFH) questionnaire, the Conflict Tactics Scale, Parent-Child version, the Trauma Symptom Inventory, the Sexual Events Questionnaire, and the Trauma Symptom Inventory.	History of childhood physical abuse (CPA) and childhood sexual abuse (CSA) were associated with trauma symptoms; and childhood abuse was associated with higher rates of suicidal behaviors and ideation. On average, women reporting CPA with or without CSA had more trauma symptoms and more suicidal behaviors and ideation. On average, women with both CPA and CSA had more intrusive experiences, sexual concerns, and dysfunctional sexual behaviors than women reporting CPA only or no childhood abuse.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Merrill 2004[310] Rating: VI Quality: B	What is the relationship between childhood exposure to family violence (child physical abuse [CPA], child sexual abuse [CSA], and domestic violence [DV]) and attrition in Navy recruits? Does sex moderate this relationship?	5491; 2569	Subjects were incoming male and female Navy recruits at the Recruit Training Center (RCT) at Great Lakes, IL; the questionnaires were part of a more extensive survey package given in a classroom setting to volunteers during their first week at the RTC, between June 1996 and June 1997. Survey instruments included a modified version of the Sexual Events Questionnaire (assessing CSA), the Parent-Child version of the Conflict Tactics Scale, Form R (measuring CPA), and 6 items adapted from a previously used study measure that assessed DV. Attrition rates were collected from the Career Historical Archival Medical and Personnel System database.	Overall, men (34%) and women (33%) did not differ in attrition rates. Women were more likely to report experiencing CSA and DV as children. Women were more likely than men to report exposure to multiple types of childhood violence. For men, all 3 types of childhood violence were significantly associated with increased attrition when considered separately and jointly. For women, only CSA was significantly associated with attrition. Both male and female recruits with a history of exposure to childhood violence were more likely to attrite than recruits with no exposure; this effect was stronger in men than women. Timing of attrition was also affected by sex. Men were more likely to attrite during the first year and women were more likely than men to attrite in the second or third years of service. There was no difference in the fourth year.
Merrill 2005[311] Rating: IV Quality: B	What rates of severe intimate partner violence (SIPV) perpetration do Navy personnel self-report? Are SIPV perpetration rates higher during the second year of service in the Navy compared with pre-military rates?	963; 542	Data were collected as part of a more extensive survey offered to Navy recruits at the Recruit Training Center at Great Lakes, IL during their first week in basic training between June 1996 and June 1997. Nonmilitary personnel of the same sex as participants administered the survey to groups of male or female recruits and informed consent was obtained. SIPV perpetration was assessed using the intimate partner version of the Conflict Tactics Scale (CTS), a self-report survey instrument. CTS data were collected at baseline and after 2 years of service. Follow-up surveys were distributed and returned through US mail. Demographic data (age, ethnicity, marital status, family income, and education) were also collected.	Rates of SIPV perpetration by men significantly increased over time. Rates of SIPV perpetration by women significantly decreased over time. Age was significantly associated with pre-military SIPV for men but not for women. At time 2, age was not related to SIPV perpetration for either men or women. Ethnicity was significantly associated with self-reported rates of SIPV perpetration at time 1 for both men and women. Among men, Hispanic subjects were significantly more likely to report SIPV than were Caucasian subjects; African American subjects reported an intermediate level of SIPV that did not significantly differ from that for either of the other 2 ethnic groups. Among women, African American subjects reported significantly higher rates of SIPV than did either Caucasian subjects or Hispanic subjects. The rates of SIPV reported by Caucasian and Hispanic subjects did not differ.
Merrill 2006[309] Rating: VI Quality: B	Does a pre-military history of intimate partner violence (IPV) predict higher attrition rates among Navy recruits?	5498; 2573	Subjects were Navy recruits who volunteered to complete a more extensive set of self-report survey instruments in single-sex groups during their first week at the Recruit Training Center at Great Lakes, IL, between June 1996 and June 1997. For this study, responses to the Conflict Tactics Scale-Intimate Partner instrument were used. Additional information about their military records were obtained from the Career History Archival Medical and Personnel System database of the Naval Health Research Center in San Diego, CA.	Women were more likely than men to report perpetrating physical IPV, perpetrating verbal IPV, and receiving verbal IPV. The effects of marital status on IPV did not differ for men and women. In no analysis was sex a significant predictor of attrition. The only analysis in which the effects of IPV were significantly different for men and women was that for receipt of verbal aggression. Women who received verbal IPV were significantly more likely to leave the military than were those who had not, whereas men who had been the recipients of verbal IPV were no more likely to leave the military than were those who had not.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Meza 2006[110] Rating: VI Quality: B	What are the differences in health care ratings and reported health care experiences for active-duty uniformed services personnel using health care plans other than military treatment facilities?	3871; 658	This study included responses to the Health Care Survey of DoD Beneficiaries (a mail survey developed by the TRICARE Management Activity that asks questions regarding satisfaction with and access to health care) completed by active-duty uniformed personnel in the fourth quarter of 2002. Designed to model the questions asked on the Consumer Assessment of Health Plans Survey (CAHPS), the analysis and reporting methods were those recommended by CAHPS. Demographic data collected included age, service, geographic region, marital status, health status, race, rank, sex, number of visits to doctor in past year, and time in health plan.	No sex findings were reported, although data analysis states results were controlled for sex.
Mitchener 2008[266] Rating: IV Quality: B	What oral-facial (oral, dental, and maxillofacial region) injuries and disease resulted in air medical evacuation of Army soldiers from Operation Enduring Freedom (OEF)/Operation Iraqi Freedom (OIF) in 2003 and 2004? What are the frequency and cumulative incidence of illness and injuries (battle and nonbattle) of the oral-facial region that required medical air evacuation from OIF and OEF? What caused the oral-facial battle and nonbattle injuries?	374; 35	Data were gathered from the US Air Force Transportation Regulating and Command & Control Evacuation System database for medical evacuations (MEDEVACS) for 2003 to 2004. Oral-facial injury and disease cases were identified by ICD-9-CM codes, then classified using the NATO Standardization Agreement (STANAG) scheme for cause-of-injury.	There were significantly more males than females who were MEDEVAC'd for oral-facial disease or injury.
Mitchener 2009[265] Rating: IV Quality: B	What are the causes, frequency, and cumulative incidence rates of battle illnesses, nonbattle illnesses, and injuries of the oral-facial region that required medical air evacuation of Army soldiers from Operation Enduring Freedom (OEF)/ Operation Iraqi Freedom (OIF) in 2005? What are the diagnostic categories for these casualties?	Unknown	All MEDEVAC cases of US Army (regular Army, Army Reserves, and National Guard) deployed personnel in the US Air Force Transportation Regulating and Command and Control Evacuation System (TRAC2ES) database for calendar year 2005 were evaluated for oral-facial disease and injuries (using ICD-9-CM codes selected by dental experts), then classified by the NATO Standardization Agreement (STANAG) coding scheme for cause-of-injury. Demographic characteristics (age, sex, and rank), details of the evacuation (origin, destination, and date), and medical data (patient history, casualty event, injury type, and diagnosis) were obtained from TRAC2ES. The Defense Manpower Data Center provided total population numbers.	Other than frequency data, no sex-specific findings were provided. The majority of all non- oral-facial MEDEVACS were male soldiers. For oral-facial MEDEVACS, compared with non-oral-facial MEDEVACS, the percentage of men was higher, and women were underrepresented.

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Mitchener 2010[77] Rating: IV Quality: B	What are the military's rates of oral-maxillofacial injuries, causes of oral-maxillofacial hospitalizations, and recommended approaches to improving surveillance, research, and prevention?	Epidemiological study	Active-duty US military personnel who sought inpatient or outpatient treatment for one or more oral–maxillofacial injuries from 1996 to 2005 were identified in the Defense Medical Surveillance System using ICD-9-CM diagnosis codes associated with oral–maxillofacial injuries. Demographics were collected. ICD-9-CM diagnosis codes were divided into two categories: oral–maxillofacial wounds and oral–maxillofacial fractures. Multiple visits for same diagnosis within 60 days of the initial visit were excluded.	The oral–maxillofacial fracture rates for men were consistently higher than those for women.
Morris 2002[297] Rating: IV Quality: B	What is the frequency of specific diseases and the most useful tests to establish the diagnosis in an active-duty military population presenting with exertional dyspnea?	174; 62	All active-duty patients aged 18 through 50 referred for evaluation of exertional dyspnea to the Pulmonary Disease Clinic at Brooke Army Medical Center, Fort Sam Houston, TX, were asked to participate in the study when they presented to the clinic. Any individual with previously documented pulmonary or cardiac disease, and all patients had to be to perform full pulmonary function testing (PFT) maneuvers and complete a cardiopulmonary exercise (CPEX) study on a graded exercise treadmill. Controls had to be asymptomatic without history of cardiac and pulmonary disease, able to complete the Army Physical Fitness Test (APFT) 2-mile run above the passing standard (based on age and sex), and show no baseline spirometry abnormalities. Data from all subjects included history, physical examination, body fat measurement, chest radiography (CXR), arterial blood gas testing, laboratory testing, full PFT, inspiratory and expiratory pressure determinations, methacholine challenge testing, CPEX testing, electrocardiography, and echocardiography; additionally, all subjects completed a respiratory questionnaire. Other diagnostics tests as indicated.	No statistically significant sex specific findings reported. During cardiopulmonary testing the majority of subjects who had an increased heart rate response were females with small body mass.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Morris 2007[298] Rating: VI Quality: B	Can a portable spirometer screen for the prevalence of airway hyper reactivity in asymptomatic military personnel?	222; 51	Active-duty participants with <1 year active-duty service were recruited from the enlisted students at the US Army Medical Department Center and School. Exclusionary criteria included a current history of pulmonary or cardiac disease, previous medical evaluation for exertional dyspnea, inability to pass the Army Physical Fitness Test (APFT) 2-mile run, active complaints of exertional dyspnea, upper respiratory symptoms attributable to allergic rhinitis, or upper respiratory infection within the previous month. All subjects were screened and completed a baseline spirometry (Microlab 3300 Portable Spirometry) and a standard forced expiratory maneuver from maximal inhalation to record the forced expiratory volume at 1 second (FEV1) and forced vital capacity (FVC). Those with a reduced FEV1 and FEV1/FVC ratio indicating airway obstruction and an age and sex matched control (1:1 ratio) were asked to complete an Exercise Challenge Test. Spirometry testing was completed at 0 and 15 minutes after the Exercise Challenge Test (1.5 mile run at a normal pace). Other data collected included descriptive statistics (smoking history, APFT failure history, remote history of asthma, prior bronchodilator use) and spirometry: mean FEV1, FVC, FEV1/FVC ratio.	Spirometer testing demonstrated that 4% of the females and 17% of males demonstrated an airway obstruction.
Murdoch 2007[193] Rating: VI Quality: B	Do overall functioning and psychiatric symptoms of military personnel differ by exposure to military sexual stressors?	815; 327	Enlisted active-duty personnel at a southern Army installation during their first duty tour completed a 21-page questionnaire in October 1999. A second group included individuals confirmed as “active duty” in the National VA Enrollment Database between January 1, 1998, and June 20, 2002, who were willing to complete a mailed survey; this group responded to a mailed 22-page questionnaire between December 2001 and February 2003. Different instruments were used to measure sexual harassment for each group; A modified Department of Defense Sexual Harassment Core Measure was used for the Army group, and the Sexual Harassment Inventory was used with VA enrollees to assess sexual harassment over their entire military careers. Other items included 3 items from the SF-36 that measured physical limitations, the modified Social Adjustment Scale (SAS-SR), the Penn Inventory for PTSD, the RAND Mental Health Battery (Short Form), a 10-question drinking history, the TWEAK (assessing alcohol-related problems in reproductive-age women), the Primary Care Evaluation of Mental Disorders (PRIME-MD) anxiety and somatization screeners, and sociodemographic characteristics (age, race/ethnicity, marital status, educational level, time in service, service branch, rank).	For men and women, impaired functioning and more severe psychiatric symptoms were more common among those reporting more types of sexual stressors. Subjects who reported more types of sexual stressors also described poorer functioning and more severe psychiatric symptoms, compared with those who reported fewer or no sexual stressors. Forty-five percent of men and 80% of women reported at least one sexual stressor type.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Nasky 2009[194] Rating: VI Quality: B	Among military personnel exposed to an enemy-inflicted disaster, do risk factors predict the subsequent development of posttraumatic stress symptoms or diagnosis of a depressive disorder?	191; 32	Crew (enlisted and officers) of the USS Cole completed 5 psychometric measures and demographic and other data in December 2001 (2 months after the bombing of the ship). The questionnaires included the 4 subscales of the Impact of Event Scale Revised (IES-R, assessing subjective distress caused by traumatic events) and the Zung Self-Rating Depression Scale (SDS) administered by the Special Psychiatric Rapid Intervention Team (SPRINT). Demographic data collected were age, sex, marital status, and rank. Other data included relation to the injured or deceased, any previous significant life event, and whether the service member found separation from shipmates after the attack difficult.	Females scored significantly higher than males on the IES-R on the intrusion subscale.
Nevin 2007[30] Rating: V Quality: B	What is the anti-Hepatitis A virus seroprevalence in a military recruit population in 2004?	2026; 352	A random sample of enlisted recruits from all 50 states, the District of Columbia, and US territories first entering the military in 2004 and an oversampling of 2 specific groups made up the sample for this study; exclusion criteria were <18 years at time of serum collection, >34 years at day of entry to military service, previous military service, or no serum specimen obtained within 6 months of date of entry. Blood serum specimens were obtained from the Department of Defense Serum Repository (DoDSR). The Defense Medical Surveillance System provided demographic characteristics (age, sex, race/ethnicity, service branch, and home of record) and service-related data.	No sex-specific findings reported.
Newby 2003[315] Rating: VI Quality: B	What is the relationship between wife-to-husband physical aggression and employment between active-duty wives and civilian employed and unemployed husbands?	1185; 1185	Data were collected during 1990-1994 as part of a larger study of family violence. Surveys were administered to active-duty married male and female soldiers at 38 Army installations in the US. Participants randomly selected by each installation to represent 15% of their active-duty married solders. The surveys included demographic and military service data and the Conflict Tactics Scale (measuring conflict resolution tactics used in resolving marital conflict).	Women with unemployed spouses reported higher levels of severe aggression toward their spouses than women with employed spouses.
Niebuhr 2007[69] Rating: VI Quality: B	Do new enlistees with a medical waiver for hearing deficiency attrite from military service differently than fully qualified enlistees in a matched comparison group?	6041; 25% of total	Case subjects included all active-duty enlistees who entered service from 1995 to 2004 after receiving an accession medical waiver for hearing deficiency. Matched comparisons (on age, race, branch of service, month and year of beginning active duty, and Armed Forces Qualification Test percentile score) were selected from all fully qualified enlistees (no medical waiver required) at a 3:1 ratio. Subjects were prospectively monitored for attrition until December 31, 2004, or completion of 4 years of service.	Male sex is among the risk factors for hearing deficiency.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Niebuhr 2008[9] Rating: IV Quality: B	Does passing the Assessment of Recruit Motivation and Strength (ARMS) test lower the likelihood of early attrition among Army enlistees?	9196; 1514	Subjects were applicants for active-duty Army enlisted service and were processed at the Atlanta, Buffalo, Chicago, Sacramento, San Antonio, or San Diego Military Entrance Processing Stations (MEPS) between May 1, 2004, and December 31, 2005, who were 18 years of age or older when they took take the ARMS test and volunteered for the study. ARMS test results (pass or fail) were compared with attrition data at 180 days for those who actually entered active-duty service. Covariate data were obtained from standard medical forms collected at MEPS as part of the standard enlistment application process, and attrition data were obtained from the Center for Accession Research.	The attributable risk of attrition associated with failing the ARMS test was approximately 40% among female subjects and approximately 30% among male subjects.
Niebuhr 2009[8] Rating: IV Quality: A	Are individuals who exceed the traditional Army standards for weight and body fat, yet still able to demonstrate physical fitness capable of serving in the Army?	11660; 1975	All applicants for active-duty Army enlisted service and processed at the Atlanta, Buffalo, Chicago, Sacramento, San Antonio, or San Diego Military Entrance Processing Stations (MEPS) between February 8, 2005, and September 2006, were required to take the Assessment of Recruit Motivation and Strength (ARMS) test. Subjects who passed the ARMS test but exceeded weight and body fat standards were given a provisional ARMS waiver to enter the service within 30 days. Individuals 18 years of age or older at the time of ARMS testing who volunteered for the study were included in the study. Subjects were categorized according to weight and body fat status: those able to join the service with an ARMS waiver (OBF) and those who met the weight and body fat standards (FQ). Subjects were tracked for attrition at 90, 180, and 365 days of service. Attrition data were collected from the Center for Accession Research, US Army Recruiting Command. Other data collected included demographics and current tobacco use.	No sex-specific findings reported; however, soldiers (male and female) who were over the body fat standard but passed the ARMS test completed training and remained in the Army at the same rate as those who met the body fat/weight standards.
Niederhauser 2009[109] Rating: VI Quality: B	Do patients in a military treatment setting prefer a specific type of physician attire? Does physician clothing style influence patients' perceptions of physician competence?	328; 328	Patients checking into the OB-GYN clinics of the Naval Medical Center in Portsmouth, VA, for their initial visit were asked by front desk clerks over a 2-month period to complete a survey prior to their scheduled appointment. Women too ill to complete the survey and those with appointments with non-physician providers were excluded. The survey included demographic characteristics (age, race, active duty or dependent, rank, reason for visit), questions regarding preferred dress (military or civilian) for their physician, and pictures of male and female physicians in different attire with associated questions.	Female patients in a military setting do not have a preference for specific physician attire, and attire does not influence their perception of the doctor's competence. However, a greater number of dependent wives reported physician attire had no influence on their comfort level discussing both general and personal topics when compared with active-duty women. Patient comfort level, desire to return, and desire to follow advice was significantly less when the male or female physician wore only a uniform.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Nielsen 2009[128] Rating: VI Quality: B	What predeployment healthcare screenings and gynecological care during deployment are available to female soldiers supporting Operation Iraqi Freedom?	397; 397	A 2-page questionnaire was distributed to all US military females presenting for any medical reason to 1 of 3 different combat support hospitals' outpatient facility (level 3 echelon of care) in Iraq. Surveys were anonymous and unlabeled; no personal health information was gathered. No minimum time in-theater was required.	Gaps remain in predeployment gynecological screening and counseling. Ten percent of women who deployed had no cervical cytology 1 year before deployment, 35% reported a gynecological problem, and 44% received care at their base. Irregular bleeding was the most common problem. Thirty-three percent received predeployment menses regulation counseling with 48% using continuous oral contraceptive pills for cycle control.
Nindl 2002[58] Rating: VI Quality: B	What is the relationship between circulating components of the IGF-1 system and leptin on regional distribution of fat tissue, lean soft tissue, and bone mineral content (BMC)?	120; 63	Subjects were active-duty personnel who graduated from the US Military Academy at West Point and were participating in a longitudinal study tracking bone mineral density changes. Subjects received a comprehensive medical screening by a physician to identify and eliminate potential confounding endocrine, orthopedic, or other pathologies that would adversely impact the study measures. The physical screening, DXA scan, and fasting blood draw were all done on the same day. Total body estimates of percentage of fat, bone mineral density, and bodily content of bone, fat, and nonbone lean tissue were determined using DXA. Blood was obtained via venipuncture between 0700 and 1000 after an overnight fast and no exercise or strenuous physical activity beforehand.	Women had lower lean soft tissue values for the arms and higher fat tissue values for legs as well as lower BMC values for the arms and legs, but had higher values for trunk. Men had lower concentrations of IGF-I, IGFBP-3, and leptin and higher concentrations of IGFBP-2 and IGFBP-6 than women. In women, IGF-1 correlated significantly with total soft tissue mass in the legs, overall total soft tissue mass, total lean soft tissue mass, lean soft tissue in the arms and legs, total BMC, and BMC in the arms, legs, and trunk. In contrast, IGF-I did not correlate with any of the DXA measures in men. IGFBP-3 correlated significantly in women for total lean soft tissue, lean soft tissue in the trunk, and total BMC, as well as BMC in the arms, legs, and trunk. IGFBP-3 did not correlate with any of the DXA measures in men. IGFBP-2, IGFBP-6, and the IGF-I/IGFBP-3 ratio were not significantly correlated with any measure of regional body composition for either men or women. Leptin correlated significantly for all regional measures of total soft tissue, region percent fat, and fat mass for both men and women. Additionally, leptin correlated significantly in men for total lean soft tissue and lean soft tissue in the trunk. Leptin correlated significantly in women for lean soft tissue in the arms and BMC in the trunk.
O'Boyle 2005[205] Rating: VI Quality: C	What is the prevalence of depression among active-duty pregnant military women, and how does this rate compare to rates among their civilian counterparts?	82; 82	Subjects were women receiving prenatal care at Fort Lewis, Tacoma, WA, between April 2002 and January 2003. Depressive symptom screening using the Edinburgh Postpartum Depression Scale (EPDS) was done at various times throughout pregnancy and at the postpartum visit. Data collection included demographics (age of women), gestational age at the time of EPDS administration, EPDS total score, and response to the suicidal ideation question.	Active-duty women appeared to have a higher rate of depression and suicidal ideation compared with rates in nonmilitary populations.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Ollayos 2002[173] Rating: VI Quality: B	What is the prevalence of clinically significant lesions as a function of age and military relationship among female Air Force and Army beneficiaries of the Military Health Care System?	126024; 126024	Pap test records from the Armed Forces Cyctocenter (AFCC) collected between January 1994 and June 1999 were reviewed for clinically significant lesions (carcinoma, high-grade squamous intraepithelial lesion, or low-grade squamous intraepithelial lesion). Records from women using US Air Force medical treatment facilities (MTFs) not offering cytology screening services on site made up 97.5% of the sample; the remaining records were from US Army MTFs temporarily understaffed with screening personnel. Other data collected included age and a code identifying whether the patient was active duty or a spouse or child of an active-duty member.	Younger women, especially active-duty younger women were at increased risk for clinically significant lesions (CSL). Among women 15-29 years, active-duty women, daughters, and wives had a prevalence of CSL of 7.8, 5.0, 4.0 respectively. CSL prevalence decreased steadily with age for active-duty women and wives and was less than 1% by age 40. Daughters experienced a slight decline of CSL to 4.8% in the 20 to 24 age group. Active-duty women aged 20 to 24 years experienced the highest relative risk (RR) of 18.9. The RR of active-duty women had become approximately equal to that of wives by age 40.
O'Rourke 2008[132] Rating: VI Quality: B	What is the relationship between pregnancy/ paternity intention and the choice of contraceptive methods among a military population?	592; 503	A sample of Army recruits at Fort Bliss, TX, and Fort Gordon, GA, were interviewed at in-processing. Self-administered, sex-specific surveys were completed. The survey consisted of a modified version of the Pregnancy Risk Assessment Monitoring System (PRAMS) that measured pregnancy intent, and additional questions on intention including perceived problems, happiness, and potential financial costs of pregnancy. Other data collected included: use of contraception during their most recent intercourse, sex, age, education level, marital status, ethnicity, rank, history of sexually transmitted infections in the past 5 years, number of sexual partners in past year, and binge drinking	Males were more likely to use condoms than females and were more likely to report dual protection.
Otto 2006[78] Rating: VI Quality: B	What was the attrition rate of military enlistees with a medical waiver for myopia from 1999-2001?	1589; 391	The study group included newly enlisted recruits entering active duty with a medical waiver for myopia (and no other disqualifying medical condition) in the Army, Navy, Air Force, or Marine Corps between January 1, 1999, and December 31, 2001. A comparison group of fully qualified (no waivers for any medical condition) newly enlisted recruits were randomly selected with matching to the study group on age, month entering active duty, branch of service, race, and sex at a 3:1 ratio. Subjects were prospectively monitored for attrition within their first 2 years of service.	The distribution of females entering service with and without a waiver was reported. Female subjects with a waiver were similar to fully qualified female subjects.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Owens 2007[93] Rating: VI Quality: B	Are there sex differences in anterior cruciate ligament injuries in the military?	70532; 8020	Data from 1997 to 2003 were abstracted from the Defense Medical Epidemiology Database (DMED). All injuries with ICD-9-CM codes of 717.83 (old disruption of ACL) and 844.2 (sprain, strain cruciate ligament of the knee) were included. Only ambulatory encounters were included, and events were limited to first occurrences to exclude repeat coding of the same initial injury. DMED was used to determine the total number of service members on active duty during the study period.	The injury rate was higher for men than for women for old disruption of an ACL. There was not an observed increase in the incidence of ACL injuries among female soldiers
Parrish 2005[253] Rating: VI Quality: B	What injuries were experienced by Navy aircraft carrier personnel during 2 consecutive 6-month deployments?	5100; 100	Relevant fields from the paper accident and injury forms completed by the duty corpsman were entered into the ship's injury databases by the ship's Safety Department. The injury database was used track all reported injuries experienced by personnel of a US Navy aircraft carrier during 2 consecutive 6-month deployments. The cohort, with replacement and without a control, described was based on manning during peacetime operations. Injuries in the database reflected only those occurring on the ship and recorded by the Medical Department; only cruise injuries in a fairly stable population were part of the database.	No female specific findings were noted.
Petersen 2007[108] Rating: VI Quality: C	Does a musculoskeletal screening examination provide recruits the proper treatment and rehabilitation during the early training phase, assist them in graduating on time, and put them in a readiness state in their next duty assignment?	105; 74	Subjects were US Army soldiers reporting for Initial Entry Training (IET) at Fort Lee, VA, during a consecutive 5-week period who had been injured during basic training or were currently experiencing a musculoskeletal problem that would prevent them from passing a standard Army Physical Fitness Test. The screening consisted of a questionnaire providing a brief overview of the location, duration, and past treatment of the soldier's injury and an evaluation that included 10 functional movements that stressed various body parts.	There were a significantly larger number of females who reported for the medical screening and were found to have physical restrictions upon examination.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Pflanz 2002[239] Rating: VI Quality: C	What is the prevalence of reported occupational stress among Air Force personnel? What is the relationship between work stress and emotional health in this population? What are the most common kinds of occupational stressors endorsed by these individuals?	472; 77	Surveys were offered to consecutive active-duty US Air Force personnel stationed at FE Warren Air Force Base in Cheyenne, WY, and attending a suicide prevention training. Participants completed the investigator-developed survey in the base theater prior to the beginning of the training. The 65-item self-report survey included demographics (2 items), perception of occupational stress (1 item), perception of relationship of occupational stress to mental health (2 items), and an inventory of life events. The Schedule of Recent Events (SRE) (43 items) and 17 additional life events with relevance to military personnel (developed from previous attempts by the authors and other researchers to adapt the SRE to the military) made up the inventory of life events. Reliability and validity were reported on the SRE. No additional reliability and validity of the modified instrument was reported.	Work stress was independent of several demographic data points: age, sex, education, years of military service, rank, and marital status.
Pflanz 2006[227] Rating: VI Quality: B	What is the relationship among job stress, depression, work performance, types of stressors, and perceptions about supervisors in military personnel?	809; 153	Surveys were offered to consecutive active-duty US Air Force stationed at F.E. Warren Air Force Base in Cheyenne, WY, and attending a suicide prevention training. Participants completed the investigator-developed survey in the base theater prior to the beginning of the training. The instrument included items on demographics (sex, age, rank, time in service, educational level, and marital status), work stress, depression, work performance, and attitudes about supervisors and commanders.	Reports of job stress and depression were independent of sex. More than one-quarter reported suffering from significant job stress. Both the report of work stress and depression were significantly related to impaired work performance, more days of missed work, poorer physical health, and negative perceptions about the abilities of supervisors and commanders. Depression and job stress were significantly related.
Pollack 2009[42] Rating: VI Quality: C	What are demographic and health-related predictors of attrition during the first year for female Marine Corps recruits?	2157; 2157	All female Marine Corps Recruits entering recruit training (RT) at Parris Island, SC, between June 1999 and June 2000 were asked to participate voluntarily in this study in the experimental intervention of a cognitive behavioral intervention to prevent unintended pregnancies and sexually transmitted infections or the control intervention focusing on nutrition and injury prevention. All study participants competed a self-administered questionnaire about demographics, health risk behaviors, and health promotion behaviors during the first week of training, at the conclusion of follow-up training (approximately 17 weeks after entry in RT), and an average of 11.4 months after training. The Marine Corps provided information on service separation, recruiting status, and zip code of residence prior to enlistment.	At the first time point, never engaging in regular exercise and a low body mass index (BMI) predicted discharge from the Marines. During the following year, marriage, active-duty status, and no prior regular exercise predicted attrition. Cumulative 1-year discharge health risk behaviors that were predictive of discharge were smoking and unsafe sexual behaviors in the 3 months prior to recruit training. The only health marker that predicted discharge was low BMI.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Poston 2002[41] Rating: IV Quality: B	Are overweight and obese airmen at a greater risk of discharge during basic military training (BMT) and the first year of Air Force service?	32144; Undefined	Subjects included all individuals entering US Air Force (USAF) BMT between August 1995 and August 1996 and who were involved in a tobacco use prevention trial. All participants completed a 53-item health survey designed to provide population-based estimates of anthropometric variables (e.g., weight, height) and health practices (e.g., smoking, alcohol use, physical activity, diet). Weight status was assessed using self-report height and weight. BMT discharge status was obtained from the USAF Biographical Evaluation and Screening of Troops database; discharge status at 1-year follow up was obtained from the USAF Survey Branch of the Air Force Personnel Command.	Underweight airmen were more likely to be discharged within the first year of service compared with those in the normal range. The underweight group had a larger percentage of women than any of the other weight groups, but it was not substantially different on other demographic factors.
Potter 2002[82] Rating: IV Quality: B	Among Army airborne soldiers, what are the rates of overuse injuries, traumatic musculoskeletal injuries, stress fractures, and days lost? What types of injuries cause morbidity in this population?	1849; 116	Data were collected by study personnel and were extracted from medical records for members of the US Army 82nd Airborne Division, Fort Bragg, NC, for April 1, 1996 through March 31, 1997. Clinic data included: date of visit, type of appointment (new or follow-up), type of injury, site, circumstantial cause of injury, anatomical site, disposition, and resultant limited duty days. Demographics collected included race, sex, weight, height, unit, and rank.	Military activities resulted in the highest injury rates in women.
Powell-Dunford 2003[137] Rating: VI Quality: B	What are the attitudes of military women towards menstruation in the field setting, the knowledge of women regarding oral contraceptive pills (OCP), the desire for choosing to induce amenorrhea with OCP, and the associations of these variables with desired continuous OCP use?	143; 143	Questionnaires were available to female soldiers during normal working hours at tables in the Walter Reed Army Medical Center's cafeteria, main lobby, and administrative building from May 12-17, 2001. The investigator-developed survey with 53 questions about menstruation, use of birth control, knowledge and attitudes towards OCP, and logistics of menstruation during field training and deployment was distributed by a third party. Participants placed completed questionnaires in postage-paid envelopes and deposited them at the distribution table for return mailing.	Obtaining, changing, and disposing of sanity products were most bothersome in a field environment. The majority of participants reported that the menstrual symptoms of cramps, headaches, and nausea were bothersome during the performance of duties in the field. Logistical burdens of menstruation in the field were positively associated with the desire to use OCP to induce amenorrhea. There was a high desire for amenorrhea while in the field and deployed, yet over half of the participants had never heard of OCP-induced amenorrhea. The majority desired education on the topic.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Powell-Dunford 2009[129] Rating: VI Quality: B	What is the basic level of knowledge about and desire to use oral contraceptive pills (OCP) for menstrual suppression among female Army aviation personnel? What are their experiences with OCP use in a combat flight environment? What is the relationship between menstrual burden and the combat flight environment?	62; 62	Active-duty Army, Reserve, and National Guard women between the ages of 18 and 45 voluntarily completed an investigator-developed survey during the 25th Infantry Division's postdeployment health assessment between January 2005 and April 2005 and in October 2007 over the course of 20 days; subjects for this analysis were a subset of deployed female aviation personnel. The survey included 44 questions about menstruation, OCP knowledge, attitudes, and experiences, OCP compliance, and menstrual burden (symptoms measured by 6 questions from the Menstrual Distress Questionnaire).	Although women had experience with the use of OCP and desired menstrual suppression, they did not utilize continuous use OCP regimen during their deployment. In continuous users, compliance was higher than in conventional users, and there was less menstrual burden. Menstrual burden was overall low in this sample, and the majority of women did not report lost duty time due to menstruation.
Rauh 2006[15] Rating: VI Quality: B	Can selected anatomical measures identify women at increased risk of patellofemoral pain syndrome and shin splints?	824; 824	Subjects were female Marine Corps recruits 17-31 years of age arriving at Parris Island, SC, for recruit training (RT) in 1999 who volunteered to participate. Height, weight and performance on a 1.5-mile timed run were obtained before the start of RT. Subjects completed a study questionnaire prior to RT that included demographics, injury history, physical activity, fitness practices, and menstrual history. Medical records were reviewed at the conclusion of training or following separation to collect information on injury occurrence, site, onset, and diagnosis. Only first reported injuries were analyzed.	There was an overall injury rate of 12.6/1000 TDE. Rates for initial and subsequent injury were 8.7/1000 and 20.7/1000 TDE, respectively. There were 66 confirmed lower-extremity stress fractures among 56 women. Low aerobic fitness, no menses in 6 or more consecutive months, and less than 7 months of lower extremity weight training were significantly associated with stress fracture incidence.
Rauh 2010[99] Rating: VI Quality: B	Is there an association between selected anatomical measures and 2 common types of overuse injuries (patellofemoral pain syndrome [PFPS] and shin splints [SS]) among female Marine Corps recruits?	748; 748	Subjects were female Marine Corps recruits arriving at Parris Island Marine Corps Recruit Depot (MCRD) from March 1995 to September 1996 who volunteered to participate in a pretraining study of exercise, health, and nutritional habits. Prior to beginning basic training, age, race/ethnicity, height, weight, and anatomical measurements (pelvic width, knee alignment, navicular height and foot absolute leg length, Q angle, knee extension, ankle dorsiflexion, internal hip rotation, hindfoot eversion, and Ober's Test) were recorded. Subjects were monitored during 13 weeks of recruit training for the development of PFPS and shin splints SS.	Logistic regression modeling indicated that a left hip internal rotation range of motion (ROM) <25° and >46°, a right Q angle >20°, and left knee hyperextension ROM >6° were associated with PFPS. A left dorsiflexion ROM >20° was associated with shin splints and a right Q angle >20° was inversely associated with SS. Anatomical measures may be used to identify female recruits at risk for lower extremity overuse injuries.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Rehme 2002[33] Rating: VI Quality: B	Are vaccinated persons who deployed to Southwest Asia more likely to seek medical care upon their return than their unvaccinated counterparts?	62; 62	Active-duty Army, Reserve, and National Guard women between the ages of 18 and 45 voluntarily completed an investigator-developed survey during the 25th Infantry Division's postdeployment health assessment between January 2005 and April 2005 and in October 2007 over the course of 20 days; subjects for this analysis were a subset of deployed female aviation personnel. The survey included 44 questions about menstruation, OCP knowledge, attitudes, and experiences, OCP compliance, and menstrual burden (symptoms measured by 6 questions from the Menstrual Distress Questionnaire).	Although women had experience with the use of OCP and desired menstrual suppression, they did not utilize continuous use OCP regimen during their deployment. In continuous users, compliance was higher than in conventional users, and there was less menstrual burden. Menstrual burden was overall low in this sample, and the majority of women did not report lost duty time due to menstruation.
Rennix 2005[178] Rating: IV Quality: A	Is the incidence of breast cancer higher among Army women who are exposed to volatile organic compounds?	274596; 247596	The study cohort was identified using the personnel record database portion of the Total Army Injury and Health Outcomes Database (TAIHOD) for enlisted Army women who served at least one year on active duty between January 1, 1980, and December 31, 1996. The sources for identifying cases of invasive breast cancer on active duty at the time of diagnosis were hospital admission (ICD-9-CM code 174) and the automated central tumor registry (ACTUR), a Department of Defense managed database containing histolopathology records. Demographic characteristics and occupational codes were collected from the personnel database. Workplace chemical information was collected from the health hazard information management system (HHIMS).	There was an increased incidence in breast cancer rate among active-duty Army compared with the general population. There was a 48% increase in breast cancer in Army women with jobs with exposure to volatile organic compounds
Rentz 2008[319] Rating: VI Quality: A	What is the occurrence of child maltreatment, the characteristics of child victims, and that of their perpetrators in military and nonmilitary populations? Are there significant differences across the 2 populations?	228986; 123478	Archival data were collected from the Child File of the National Child Abuse and Neglect Data System (NCANDS) for all reports of substantiated child maltreatment in the state of Texas between January 1, 2000, and December 31, 2002. NACANDS data identified children in military families as legal dependents of an individual on active duty in the Armed Services of the US, which includes Army, Navy, Air Force, or Marine Corps; military perpetrators were defined as being on active duty in the US Armed Services. Other information pulled from NACANDS included type of maltreatment (e.g., physical only, neglect only, more than 1 type of maltreatment), demographic data on both children and perpetrator (age, sex, race/ethnicity), and other associated factors (e.g., inadequacy of housing, relationship of perpetrator to child).	The rate of occurrence of substantiated maltreatment in nonmilitary families was greater for female children compared with males; no sex difference found in military families. Being female was 1 of 3 characteristics most associated with the highest rate of substantiated child maltreatment in military and nonmilitary families. For military families, 20% of active-duty perpetrators of child maltreatment were female; the rate of occurrence was not significantly different for sex of the active-duty perpetrator.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Reutman 2002[276] Rating: VI Quality: B	What are the potential reproductive endocrine effects of low-dose hydrocarbons encountered by female Air Force personnel with fuel and solvent exposures?	100 provided completed diaries and urine samples. A subset of 63 provided breath samples; 100	Potential participants were female US Air Force (USAF) employees recruited for initial interviews by phone and in person at 10 USAF bases. Women age 18 to 42 who for the previous 3 months had not: used hormonal medications, oral contraceptives, or hormone replacement; had not used an intrauterine device; had surgery, other than tubal ligation, on reproductive tissues; been pregnant or breast-feeding; or diagnosed with any of a specific list of diseases. During an initial interview, participants completed a questionnaire that collected information about their work, socioeconomic status, pregnancy, lifestyle, major life events, and reproductive and menstrual histories; height and weight were measured. First-void urine endocrine measurements and menses dates obtained from daily diary entries. A subset of 63 provided breath samples to measure internal doses of aliphatic and aromatic hydrocarbons (HC) in solvents and fuels.	Toluene was the most frequently found analyte in the breath. Preovulatory LH levels were significantly lower among women whose total aliphatic HC levels were above the median. The relationship between elevated aliphatic HC exposure and lowered preovulatory LH levels in the present study suggests that compounds in fuels and some solvents may act as reproductive endocrine disruptors.
Ricciardi 2007[56] Rating: III Quality: B	What are the physiological responses of military women and men during simulated service-related tasks? Does body fat differentially impact the physiological responses among military personnel throughout simulated service-related tasks when body armor is being worn or not?	34; 17	Subjects, recruited through fliers posted around the local military installation, participated in a 30 minute treadmill protocol consisting of walking at a 2.5mph pace at 2% grade for 5minutes, 2.3mph women/2.4mph men at 5% grade for 10 minutes, 3.6mph pace women/3.8mph men at 10% grade for 10 minutes, and 2.5mph for 5 minutes followed by a physical performance battery (callisthenic exercises) while wearing or not wearing 11kg of body armor in 2 sessions separated by at least 5 days. Anthropometric measures included height, weight, body fat percentage were measured by bioelectrical impedance, and waist and hip circumference were measured by taping. Physiological measures were heart rate, oxygen consumption, respiratory exchange ratio, blood lactate levels and ratings of perceived exertion (RPE) taken before treadmill testing, after treadmill testing, and after the physical performance battery.	A significant difference between body armor/no body armor between men and women was seen in blood lactate levels. Women reported a greater increase in RPE during the slow walking condition when wearing armor compared with when not wearing armor that was greater than the increase in RPE reported by men; however, this was not clinically important.
Ricciardi 2008[267] Rating: III Quality: B	What are the physical work performance, energy costs, and physiological fatigue with and without body armor during simulated operations?	34; 17	Fliers posted around a local military installation were used to recruit military personnel. Individuals participated in two sessions, separated by at least 5 days; 1 session was completed with body armor and the other without. Wearing a t-shirt, exercise shorts, socks, and jogging shoes with controlled temperature, subjects walked a 30 minute treadmill protocol consisting of walking at a 2.5mph pace at 2% grade for 5minutes, 2.3mph women/2.4mph men at 5% grade for 10 minutes, 3.6mph pace women/3.8mph men at 10% grade for 10 minutes, and 2.5mph for 5 minutes. Heart rate, minute ventilation, oxygen uptake (VO2), carbon dioxide, and respiratory exchange ratio were constantly monitored during the treadmill testing. Next, a physical performance battery, including hand grip strength, stair step test, pull-ups (men) or hang time (women) was completed. Blood samples were taken before and after completing the treadmill testing and after the physical performance battery. Height, weight, waist and hip circumference, and percent body fat were measured. The study was completed in the Human Performance Laboratory at the Uniformed Services University of the Health Sciences.	Women had significantly decreased hang time on the pull-up bar with body armor.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Rice 2009[85] Rating: VI Quality: B	What is the self-reported health status among soldiers entering advanced training after completing basic combat training? Among soldiers who arrive with injuries, are any basic combat training sites overrepresented?	4528; 41% of total	Subjects were Advanced Individual Training (AIT) student volunteers from the 232nd and 187th Medical Battalions, Center Brigade, US Army Medical Department Center and School, Fort Sam Houston, TX. Medical surveillance data gathered by questionnaires administered to soldiers during in-processing included demographics, general health status, use of prescription and non-prescription medications, alcohol and tobacco use, history of recent musculoskeletal injury, and current musculoskeletal complaints; a subgroup of the sample indicated how often over the last 72 hours musculoskeletal symptoms interfered with daily activities.	A greater number of women reported that musculoskeletal symptoms interfered with daily activities than men.
Riddle 2004[254] Rating: IV Quality: B	What factors are associated with differential disease and nonbattle injury and morbidity aboard Navy Fifth Fleet ships during peacetime deployment?	76476; 20424	Weekly initial disease and nonbattle injuries (DNBI) visit count (for all ships within the Commander of US Naval Forces Central Command) data were abstracted for the period covering October 2000 through September 2001 for each ship. Integrity checks were conducted on all data to ensure validity. Data on initial visits for 15 DNBI categories were compiled at the individual ship level, and event data on morbidity measures for each DNBI category were aggregated for all reporting ships on a weekly basis. Data on variables including total number of shipboard personnel, week of calendar year, number of female sailors aboard, and class of ship for each report were abstracted. The four DNBI categories of injury (not including heat/cold injury) were collapsed into a total injury category, and DNBI categories of combat/operational stress and other psychiatric disorders were collapsed into a single category of mental health.	The total weekly initial visit DNBI rate excluding gynecological visits did not differ statistically from the JCS referent rate. The gynecological DNBI category was the highest. DNBI categories found to have higher rates associated with increasing percent of female crew aboard ship (POFCAS) included infectious GI disease, ophthalmologic, other psychiatric, and other medical/surgical. A small, non-statistically significant increase in total DNBI initial visit rate, excluding gynecological rates, was found to be associated with increasing POFCAS. No DNBI category was found to have a statistically significant lower initial visit rate with increasing POFCAS. Decreased gynecological initial visit rates were associated with the amphibious ship class but increased rates tended toward an association with increasing POFCAS. Decreased rates of combat/operational stress initial visits were associated with increases in POFCAS; however increased rates of other psychiatric initial visits were associated with increases in POFCAS. Total DNBI initial visit rate, excluding gynecological visits, was not associated with ship class, season, or POFCAS in the multivariate analysis.
Riddle 2007[192] Rating: IV Quality: A	What is the baseline prevalence of mental health disorders in a large military population between 2001 and 2003?	76476; 20424	Mental health measures were abstracted from the Millennium Cohort Study questionnaire. Data were collected from responses to the Primary Care Evaluation of Mental Disorders Patient Health Questionnaire (PHQ) and the Post- traumatic Stress Disorder Checklist - Civilian Version (PCL-C), and demographics from the Cohort database. Demographic data included age, sex, educational level, marital status, race/ethnicity, service branch, length of time in service, and rate/rank.	Prevalence for all MH disorders (with exception of alcoholism) was higher in women than men.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Rishel 2005[294] Rating: VI Quality: B	What impact do lactation consultants have on breastfeeding initiation and continuation rates during the first 6 months of life at military treatment facilities?	261; 261	The study reviewed 261 charts for TRICARE-eligible patients who delivered live infants at 2 Air Force medical treatment facilities (AFMTFs) and 1 Navy MTF (NMTF) between July 1, 2001 and September 30, 2001. Data collected included initiation of breastfeeding, breastfeeding at 4 and 6 months, number of prior infant deliveries the mother had experienced, Apgar scores at 1 and 5 minutes, marital status, military status (active duty or non active duty), educational level, and age.	Breastfeeding initiation rates were highly significant at the AFMTF with a lactation consultant (LC). Among women visited by the LC, 97.8% initiated breastfeeding, compared with 14.3% who did not. At the time of discharge, 80% non active-duty mothers and 80.4% active-duty mothers were breastfeeding. At 4 months, there were 53.3% non active-duty mothers still breastfeeding compared with 11% active duty still breastfeeding. Level of education significantly affected breastfeeding rates at all 3 times measured.
Ritchie 2003[199] Rating: VI Quality: C	How well do previously reported demographics and information including medical status, history of suicide attempts, and gestures about suicidal active-duty military members align with information from a retrospective chart review of 100 military members who received inpatient care for suicide attempts and suicidal ideation? Are there specific predictors or correlates that distinguish across different suicidal motivations (e.g. manipulative versus serious intent)?	66; 34	Records were reviewed of 100 consecutive cases admitted to inpatient psychiatry at Walter Reed Army Medical Center between July 1998 and January 1999; cases of patients hospitalized for suicidal ideation or for a suicide attempt were included in the study. Patients were active-duty Army, Navy, Marine Corps, Air Force, Coast Guard, or Public Health service members. The following data were collected: demographics, motives for suicidal ideation, stressors, support systems, psychiatric illness history, medication history, previous suicidal activity, use of drugs, tobacco and alcohol, hospital course, and military disposition.	The rate of women in the study (34%) was higher than the percentage of women in the military at the time (14%), which led the authors to argue that servicewomen attempt suicide at higher rates than servicemen.
Robbins 2002[39] Rating: VI Quality: B	What is the financial cost of health care services associated with excess body weight among active-duty Air Force personnel?	4974; 1137	Data were collected on active-duty men and nonpregnant women residing in Arkansas, Louisiana, Oklahoma, and Texas enrolled in the military's active-duty managed health care plan, who completed the Health Enrollment Assessment Review (HEAR) survey from September to December 1996, and who remained enrolled in the health plan for 12 continuous months after the survey. Data regarding height weight, exercise, smoking, and alcohol consumption were collected from the HEAR. Data on inpatient and outpatient visits, clinical diagnoses, bed days and encounter costs were collected using the Corporate Executive Information System.	No sex-specific findings reported; however, approximately 20% of both male and female active-duty Air Force personnel exceeded body weight for height standards. When extrapolated to the entire Air Force population, excess body weight resulted in a significant financial burden.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Robbins 2003[176] Rating: VI Quality: B	What costs are attributed to increased screening from 72% to 86% (20% increase) and first year treatment for breast cancer at Air Force military treatment facilities under the 2 different financial models, Primary Care Optimization and TRICARE Prime Benefit?	Unidentified – cost estimates	Rate estimates from age-specific tables of cumulative risk published by the National Cancer Institute, published likelihood ratios for screening mammography, and the Behavioral Risk Factor Surveillance System were combined. Cost estimates of increased screening and treatment for breast cancer combined probability and cost using a decision-analytic model. Two approaches were used: the Primary Care Optimization (PCO) approach and the TRICARE Prime benefit (TPB).	Additional 1-year cost was estimated at $447K for the PCO approach and $1.34M for the TPB approach. The TPB approach would cost 3 times more but the number of additional cases detected by screening would be 24% higher. The balance between additional cases detected and additional harms (false-positive and false-negative mammograms) is more heavily weighted toward harms under the TPB approach.
Robbins 2005[141] Rating: VI Quality: B	What are the key findings regarding measures of occurrence and demographic risk factors for unplanned pregnancy among active-duty Air Force personnel?	2348; 2348	Telephone interviews were conducted by female civilian contractors in February 2002; a random sample of 10939 active-duty Air Force (ADAF) women <=45 years old and stationed at a US Air Force installation in the contiguous United States (and not a student or in a training program) was selected with data collection continuing until 2300 interviews were completed. Data were collected on all pregnancies occurring to these women during 2001, contraceptive practices, risk factors for unplanned pregnancy, and knowledge and attitudes relating to emergency contraception; survey items concerning unplanned pregnancy were closely based on the 1995 National Survey of Family Growth.	Unplanned pregnancy is a serious and frequently occurring problem among ADAF women, with many opportunities for prevention. Seven percent had unplanned pregnancy. Approximately half represented contraceptive nonuse and the other half were contraceptive failure or misuse. Junior enlisted and AA women had a higher proportion. Younger age and being unmarried were the only independent predictors.
Robbins 2006[19] Rating: III Quality: C	Will a low intensity intervention using self-directed behavior change booklets augmented by weekly e-mail messages to educate, motivate, and sustain behavior change prevent weight gain in active-duty Air Force members?	68591; 13% of total	An intervention designed to prevent weight gain in active-duty Air Force (ADAF) service members was offered to active-duty personnel whose body mass index (BMI) ranged from 24.0 to 29.9 kg/m2 between January and December 2002 at Brooks City-Base (TX), Davis-Monthan Air Force Base (AFB, in AZ), Peterson AFB (CO), Randolph AFB (TX), and Vance AFB (OK). Controls consisted of ADAF personnel meeting the BMI criteria at all other US AFBs during the same time period. Subjects and controls were enrolled into the study in 52 cohorts corresponding to the week number during 2002. Fitness assessment monitors measured pre- and post-intervention weights when personnel reported for mandatory annual fitness testing. Subjects who received the entire intervention (intervention workbooks and weekly e-mails over 12 months) were considered part of the study group. An in-depth telephone survey was conducted among subjects in cohorts 1 through 5 who completed the intervention (had returned for follow-up testing at an intervention base and were listed on the investigators' record as active).	Men lost more weight than women in the intervention groups. Both men and women gained weight in the control groups.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Robinson 2008[320] Rating: VI Quality: B	What are the service members' and spouses' perceptions regarding the inclusion of adverse childhood experiences (ACE) domains in active military health surveillance?	41; 25	Participants were recruited from primary care patient waiting areas at Womack Army Medical Center Family Medicine Clinic and Robinson Health Clinic at Fort Bragg, NC. Individuals interested in participating were given a study packet that included an anonymous ACE screening questionnaire. Those who positively endorsed one or more ACE items were asked to consent to an interview. Moderators were blinded to the subject's specific ACE. Semi-structured interviews (approximately 30 minutes) were audio-recorded and conducted in a private office by experienced interviewers; transcripts were analyzed and themes were identified.	Four main themes were reported in the article. Active-duty female narrative comments were included.
Robinson 2009[206] Rating: VI Quality: B	Do symptoms of depression, anxiety, and suicidal ideation reported by soldiers enrolled in combat medic training vary across a twelve week period? Is it possible to identify predictors for baseline mental health symptoms as well as individuals likely to experience changes in symptoms over time?	3792; 1100	Secondary analysis of data collected from the first 18 companies of soldiers who participated in a randomized controlled trial of an intervention designed to prevent lower back pain among military members. Participants were entering the combat medic 12-week Advanced Individual Training (AIT) program at Fort Sam Houston, TX. Instruments used included the Beck Depression Inventory and the State Trait Anxiety Inventory form Y-2. Other data of interest included length of time in the Army, whether the individual had previously been in the Navy, Marines, or Air Force, whether the soldier was full-time active duty, sex, race, educational level, and household income.	Higher percentages of symptoms were associated with female sex. Female soldiers had significantly higher risk for depression and anxiety outcomes compared with males. Specifically, female soldiers had 1.73, 1.64, and 1.62 greater odds of depression at intake, follow-up, and worsening, respectively, compared with male soldiers. With regard to anxiety, female soldiers had 1.39, 1.49, and 1.36 greater odds at intake, follow-up, and worsening compared with male soldiers.
Rompalo 2001[153] Rating: III Quality: A	What is the performance of use of a single intravaginal swab (SIS) for simultaneous detection of *Neisseria gonorrhoeae*, *Chlamydia trachomatis*, *Trichomonas vaginalis*, and human papillomavirus infections among military women on active duty? What is the sensitivity and specificity of assay of SISs compared with those of standard clinical diagnostic methods?	793; 793	Subjects were active-duty military women, age 18 to 59, who visited the Epidemiology and Disease Control Clinic at Womack Army Medical Center, Fort Bragg, NC, for evaluation of genitourinary symptoms, for therapy as a known contact of person with a diagnosed sexually transmitted infection (STI), or for routine STI screening from March 1997 through September 1998, who volunteered to participate. Trained clinicians collected demographics, risk behaviors, and clinical symptoms and signs. Additional data were obtained from clinic records. Initial program (12 months) tested the intravaginal swab when collection was administered by clinician during a pelvic exam and compared with clinician obtained cultures. The second phase (7 months) included women receiving verbal and written instructions regarding self-collected swab and compared with clinician obtained culture at same visit.	The intravaginal swab resulted in detection of more gonorrhea, Chlamydia, and trichomoniasis via polymerase chain reaction compared with standard cultures. Sensitivity and specificity of intravaginal swabs, compared with adjudicated true-positive diagnoses, were 95.8% and 97.8%, respectively, for gonorrhea, 94.6% and 99.3% for Chlamydia, and 92.2% and 98.2% for *Trichomonas vaginalis*. Results for human papillomavirus detection were comparable to those with cervical swabs. Assay of clinician-collected and self-collected swabs yielded prevalence similar to those of standard diagnostic tests for all sexually transmitted infections.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Rosen 2002[226] Rating: VI Quality: B	What is the prevalence of seasonal affective disorder (SAD) among Army service members in Alaska, comparing classic SAD criteria (months of January and February) to arctic SAD criteria (months of November and December)?	1307; 191	Subjects were active-duty Army personnel stationed at an installation in the interior of Alaska during the summer of 1998. The survey was administered in group settings by battalion and family life chaplains. The survey included the Seasonal Pattern Assessment Questionnaire (SPAQ) and the Center for Epidemiological Studies Depression Scale and demographic characteristics (age, sex, rank).	Results demonstrated that 22% of men and 29.3% of women met classic SAD criteria, whereas 28.4% of men and 38.7% of women met arctic SAD criteria. Women had a higher rate of both classic and arctic SAD. Global seasonal severity scores were positively correlated with depression scores, but there were no significant sex differences in depression.
Rosen 2002[307] Rating: VI Quality: B	Are there sex differences in the psychological correlates of intimate partner violence (IPV) after controlling for psychological abuse, marital adjustment, and demographic variables? Does support from peers and/or leaders mediate or moderate these effects?	576; 99	Survey administered in summer of 1998 to active-duty Army personnel at an installation in Alaska. Battalion and family life chaplains administered the anonymous and voluntary survey to soldiers in group settings. Data analyzed for study included only married personnel from mixed sex units. The Modified Conflict Tactic Scale (MCTS) measured IPV; the Center for Epidemiological Studies Depression Scale measured psychological distress; the 14-item marital subscale of the Dyadic Adjustment Scale assessed the degree of conflict and adjustment problems in marriage; the Walter Reed Army Institute of Research horizontal cohesion scale; and the Walter Reed Institute of Research vertical cohesion scale measured social support.	Among women, psychological abuse inflicted by a partner was significantly associated with greater psychological distress. Among men, poor marital adjustment was associated with greater psychological distress. Among women who indicated they were violent toward their partners under conditions of high peer support, greater psychological distress was reported.
Rowan 2006[247] Rating: VI Quality: B	Are self-referred service members more likely to complete mental health treatment than service members referred by supervisors or those undergoing commander-directed evaluations?	1205; 393	Data for this study were obtained retrospectively from Air Force Life Skills Support Centers (LSSCs, outpatient behavioral health facilities) at Andrews Air Force Base (AFB), MD; Charleston AFB, SC; Eielson AFB, AK; Moody AFB, GA; Robins AFB, GA; Kadena AFB, Japan; Hickum AFB, HI; and McConnell AFB, KS. All LSSCs were invited to participate. Demographics, referral source, and clinical factors were obtained through a record review for active-duty Air Force personnel closed during calendar year 2002; coders were staff members of the respective clinics.	Females were among those most likely to self-refer for military behavioral health.
Ruble 2005[126] Rating: VI Quality: B	What is the state of physical and medical readiness of Army Reserve troops mobilized for Operation Enduring Freedom I/ Operation Iraqi Freedom I?	1166; 310	Medical waivers and medically nonavailable for deployment data were collected January 2003 through May 2003 from mobilization sites: Forts Hood, Dix, Lewis, Benning, Buchanan, Rucker, Stewart, and Aberdeen.	No sex-specific findings reported; however, the most common problems were orthopedic, psychiatric, diabetes, asthma, obstetrical-gynecological, and cardiac. Chronic illness was the leading cause of troops being unable to be deployed.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Rundell 2006[196] Rating: IV Quality: B	What are the demographic and clinical characteristics of personnel evacuated from Operation Iraqi Freedom (OIF)/ Operation Enduring Freedom (OEF) theaters for psychiatric causes?	1264; 237	Medical records were reviewed for all OIF/ OEF military personnel primarily evacuated for psychiatric reasons after being evaluated by psychiatry personnel at Landstuhl Regional Medical Center (LRMC), Germany, between November 4, 2001, and July 30, 2004. Data were collected from the standard clinical data sheet completed by a mental health provider. Demographic information (sex, age, rank, unit type, ethnicity, service branch, time in service, time deployed) for the study group was compared with the same information for all OIF/OEF personnel (obtained from the Defense Eligibility Enrollment System) who returned from deployment between January 7, 2002, and June 23, 2004. Other data collected from medical records included all DSM -IV psychiatry diagnoses and disposition.	A higher percentage of psychiatric evacuees were female when compared with all returned OEF /OIF veterans.
Russ 2006[145] Rating: VI Quality: A	How can we understand the obstacles to preventing or coping adequately with sexually transmitted diseases and unplanned pregnancies in the Navy? In particular, 1) what are the cultural and institutional impediments to promoting safer sex in the shipboard setting and deployment experience, and 2) we wish to explore the conundrum that prevention and response efforts are sometimes weakened by the policies that regulate sexual behavior among Navy personnel.	58; Unidentified	Semistructured interviews were conducted with US Navy personnel at 4 naval bases and on 1 aircraft carrier underway; those with key informants (medical providers, counselors, chaplains, master chiefs) were designed to elicit information about aspects of the occupational culture shaping risky or protective sexual practices among young recruits, policies and educational programs, and access to medical care for pregnancy and sexually transmitted infections. Interviews with young enlisted members in their first enlistment period were designed to elicit information about sex/ sexual relations, practical definitions of 'safe' and 'unsafe' sex, environmental factors affecting the use of safety measures, their experience/evaluation of current sexual health programs, and access to medical care. The primary author observed sexual health training at the Naval Training Center (NTC) in Great Lakes, IL, and was a guest for 1 week in the medical center of a Navy aircraft carrier underway.	Five themes emerged from the study. 'Red light, green light': Navy rules governing sex; the realities and ambiguities of intimacy; deployment and the loosening of fraternization rules; 'Standing on grease': Women, shipboard life, and the pressures on sexuality; secrecy and the displacement of risk.
Ryan 2008[35] Rating: IV Quality: A	Is there a relationship between the smallpox vaccination and preterm births, as well as the smallpox vaccination and birth defects among infants born to active-duty military women?	31420; 31420	Multiple online data sources of electronic hospitalization and outpatient care records from all military and civilian facilities that provided care to members under the military health care system from 2003-2004 were used to capture all birth and health outcomes (using ICD-9-CM codes) in the first year of life for infants born to military women. Demographic data and occupational history of parents were obtained from military personnel systems. Smallpox vaccination dates were determined through electronic vaccination records.	Maternal smallpox vaccination was not associated with preterm delivery or extreme preterm delivery. Maternal smallpox vaccination during the first trimester of pregnancy was associated with an odds ratio of 1.40 for infants having at least 1 major birth defect when compared with those vaccinated outside the first trimester, but the finding was not statistically significant.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Ryan 2008[36] Rating: IV Quality: A	Are birth defects associated with administration of the anthrax vaccine?	115169; 115169	The Department of Defense Birth and Infant Health registry was used to identify all live births from January 1, 1998, through December 31, 2004, born to women serving in the US military as well as all available health-care encounters, inpatient and outpatient, for infants in the first year of life. Birth defects were identified by ICD-9-CM codes with additional confirmation of birth defects diagnoses performed by a dysmorphologist (C.A.M.) for infants born in 1998 and 1999. Anthrax vaccination data were extracted from the central DoD electronic database and verified for a subset of women who had left the military service.	Birth defects were slightly more common in first trimester-exposed infants when compared with infants of women vaccinated outside of the first trimester, but this association was statistically significant only when alternative referent groups were used. Although the small observed association may be unlikely to represent a causal relation between vaccination in early pregnancy and birth defects, this information should be considered when making decisions about administering anthrax vaccine to pregnant women.
Ryan-Wenger 2000[114] Rating: VI Quality: A	How do military women perceive health care services available during deployment? What barriers to adequate diagnosis and treatment of gynecological infections do they perceive to exist within austere deployment environments?	841; 841	Eighty-eight units with 10 or more active-duty and Reserve Army and Navy women who had been deployed for at least 2 weeks of sea, field, or temporary duty in a foreign country in support of military operation women were randomly selected from a list provided by Defense Manpower Data Center. The subjects could either return the completed survey to the unit staff member for bulk mailing or return it to the researcher in a postage-paid envelope. Surveys (4254) were sent out to the different units. An investigator-generated survey that included information about deployments, available health care providers, risk factors for genitourinary infections, symptoms of genitourinary infections, and demographic characteristics was used; expert reviews supported the content validity of the survey, and it was pilot-tested with 16 Army Reserve females.	The provider at the home duty station and during deployment was most likely to be a male or female corpsman, an enlisted rank, age 21-30 years. Women were significantly less likely to go to the available health care provider during deployment than when at the home duty station with significantly less comfort going. Over half of the women reported being uncomfortable going to sick call during deployment, and nearly one-quarter would not even go. Overall, the barriers that the women perceived centered on provider issues and quality, cleanliness, and privacy of the health care facilities.
Ryan-Wenger 2010[162] Rating: VI Quality: B	What is the accuracy of women's self-diagnosis of vaginal symptoms and 8 diagnostic algorithms to predict potential self-medication omission/commission error rates for self testing?	546; 546	Deployable active-duty Navy and Army women presenting to 4 separate troop medical clinics for vaginal symptoms (exclusion criteria included pregnancy, menstruating, or sexual intercourse within past 24 hours) were eligible. Women were recruited via posters, flyers, and advanced practice nurses (APRNs). Women could choose to see provider or research APRN. Women who chose to see the research APRN received training on the self-diagnosis kit. Women followed directions for self-collection of vaginal sample, reported symptoms, and results of self-diagnosis. Experienced APRNs then performed a pelvic exam and used FemExamA card, nitrazine strip, whiff test, and wet mount microscopy. Tests for Chlamydia and gonorrhea (GC/CT) were also completed. APRNs treated according to clinical expertise and were blind to the results of the GC/CT DNA testing. Women's reaction to the kit was evaluated at the end of their appointment and 2-5 days later.	None of the algorithms reached the goal of 95% accuracy due to nonspecific nature of vaginal symptoms, mixed infections, and a faulty device intended to measure vaginal pH and amines.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Rychnovsky 2006[223] Rating: VI Quality: B	Is the Postpartum Depression Screening Scale (PDSS) a valid and reliable instrument for clinical use with active-duty military women? What percentage of active-duty women screen positive for depressive symptoms from the first day postpartum to 6 weeks following birth?	109; 109	The study group was a convenience sample of active-duty women giving birth at the largest military medical treatment facility in southern California. Participants completed and returned a paper and pencil Postpartum Depression Screening Scale PDSS prior to hospital discharge. At 2 weeks and at 6 weeks postpartum they were mailed the PDSS and brought it to their 2-week well-baby check and 6-week postpartum appointment Those who were unable to bring the survey to appointments were given pre-addressed stamped envelopes to return instruments.	The PDSS was found to be a valid and reliable instrument in this military sample. At Time 1, nearly half of participants displayed significant symptoms of depression, which decreased at Time 3, although there was not a significant effect of time on PDDS scores. Nearly one third of the women were still experiencing symptoms of depression at 6 weeks postpartum. PDSS subscales were analyzed, and results indicated that participants were experiencing the greatest severity of symptoms in the category of sleeping and eating disturbances.
Rychnovsky 2007[280] Rating: VI Quality: B	What are the patterns of postpartum fatigue among military women in the first 6 weeks after delivery? What is the relationship among fatigue and selected physiological, psychological, situational, and performance variables?	109; 109	Subjects were active-duty women who were recruited from the postpartum unit of a large military medical treatment facility in Southern California who volunteered to participate; inclusion criteria were delivery of a single, healthy term infant with no complications preventing mother/infant rooming in, and women were considered well. Data were collected at 3 time points: prior to hospital discharge and at 2 weeks and 6 weeks postpartum. Measures included the Fatigue Continuum Form, maternal self report of feeding method, the Post-partum Depression Screening Scale (PDSS), the anxiety subscale from the PDSS; the Verran Synder-Halpern Visual Analogue Sleep Scale, the Early Infant Temperament Questionnaire mood subscale, and the Inventory of Functional Status After Childbirth. Completed instruments were retrieved at scheduled appointments or by mail.	Mean fatigue was highest after delivery. Breastfeeding dropped from 70% at delivery to 40% at 6 weeks. One-third reported significant symptoms of postpartum depression. Significant differences in sleep disturbance were found at all time points. Only 25% reported to have fully resumed functional status at 6 weeks. Military women may be particularly vulnerable to fatigue due to the requirement to return to work at 6 weeks and limited support systems.
Rychnovsky 2009[281] Rating: VI Quality: B	What is the relationship between sleep characteristics and postpartum fatigue during the first 6 weeks after birth?	109; 109	All subjects were active-duty military females. Secondary analysis of a larger postpartum study. Subjects completed the scales at 1-2 days after birth (prior to hospital discharge; Time 1), at 2 weeks postpartum (Time 2), and at 6 weeks postpartum (Time 3). Postpartum sleep was measured using the Verran Snyder-Halpern (VSH) Sleep Scale (16-item subjective sleep characteristics scale) and the Fatigue Continuum Form (FCF, a 30-statement subjective fatigue instrument).	Fatigue was positively correlated with sleep disturbance at all time points. Fatigue was negatively correlated with sleep effectiveness at all time points indicating women reported more fatigue if they perceived the quality and adequacy of their sleep to be poor or the time spent sleeping to be short. No significant associations between fatigue and sleep supplementation were noted.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Sanchez 2001[124] Rating: IV Quality: B	What are the epidemiologic and immunologic correlates of adenovirus-induced respiratory illnesses during a large outbreak at an Army basic training installation in Southeast US during a 9 day period in November 1997?	383; Unidentified	Epidemiologic and clinical data were collected on all recruits hospitalized for an acute respiratory illness at Moncrief Army Community Hospital, Fort Jackson, SC, November 17-25, 1997 (cases). Control groups were selected at random during unit briefings and at aid stations for other non-respiratory conditions. All hospitalized cases were interviewed at hospital admission; nasopharyngeal throat swabs and acute serum samples were also collected at admission. Controls were administered a similar survey in an anonymous fashion and serum samples were collected. The questionnaires provided demographics, smoking history, immunization status, symptom information, frequency and type of handwashing practices, frequency of use of soap and towel, availability of soap and water in the training environment, and sharing practices. Indoor air quality for CO2 levels, room temperature, and relative humidity were collected every 15 minutes for a 48-hour period in 3 recruit sleeping areas during the period of November 20-25, 1997.	Admission rates for acute respiratory illnesses were significantly higher in males than females. Females were ill for a longer period than males and waited longer than males before seeking care.
Savitala 2004[260] Rating: VI Quality: B	What are the prescription requirements for Army Reserve soldiers preparing for deployment in support of Operation Iraqi Freedom?	181; 109	Army Reserve soldiers from the 396th Combat Support Hospital that was mobilized in January 2003 in support of OIF were surveyed. The survey instrument identified participants' demographic data and any prescription taken on a chronic basis and requiring continuous refilling while in a deployment status. Medication data were then verified by the unit pharmacist through an interview with each individual who identified a prescription requirement; during the interview, the pharmacist verified the medication requirements and sought to resolve availability and usage issues.	On average, women had more prescriptions. Higher use was associated with the 51-60 year old age groups for men and the 41-50 year old age group for women. Men most often identified CNS prescriptions, whereas women most often identified hormones and synthetic substitutes.
Scher 2009[89] Rating: IV Quality: B	What are the incidence and demographic risk factors of hip osteoarthritis (OA) in a population of military service members?	4262; 945	Using of the Defense Medical Epidemiology Database (DMED), demographic (including age, sex, race, rank, and military service) and ambulatory visit data with the ICD-9 code (first encounter only) for hip OA (715.95) for 1998-2006 was collected. The DMED also provided the total number of active-duty service members during the study period.	Women had a significantly increased incidence for hip OA than men, which was statistically significant at all age subcategories.
Scher 2010[304] Rating: VI Quality: B	What is the incidence of joint hypermobility syndrome (JHS) in a large military population? Does incidence of JHS vary by sex, ethnicity, or age?	790; 303	Ambulatory care first occurrence cases with ICD-9 code 728.5 for the years 1998-2007 were pulled from the Defense Medical Epidemiology Database; inpatient records and repeat coding with ICD-9 728.5 were excluded. Data were stratified by sex, race, age, rank, and military service.	Women were more likely than males to have JHS.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Scott 2005[271] Rating: VI Quality: B	What is the prevalence of an antibody to hepatitis B surface antigen in Army, Navy, and Marine Corps recruits?	2400; 443	Banked serum samples (stored at the DoD Serum Repository) collected from a stratified random sample of males and females, age 18-35, who entered enlisted service in the US Army, Navy, or Marine Corps in 2001 were tested for antibody to hepatitis B surface antigen (anti-HBs) by AUSAB enzyme-linked immunoassay (EIA); laboratory personnel were blinded to all personal information. Demographic and service-related data were collected from data linked to the serum samples. The Immunization Action Coalition, St Paul, MN, provided information on laws requiring childhood hepatitis B immunization.	Anti-HB seropositivity prevalence was significantly higher in women than men.
Scoville 2004[120] Rating: VI Quality: B	What is the epidemiology of nontraumatic military recruit deaths from 1977-2001?	199; 20	Redundant sources supporting the Department of Defense Medical Mortality Registry were used to identify potential recruit deaths between 1977 and 2001, then confirmed using: Reports of Casualty (DD Form 1300) and death certificates; autopsy reports, Armed Forces Institute of Pathology consultation, and toxicology studies; legal and criminal investigative reports; Army Risk Management Information System accident reports; Army psychological autopsies; medical records; and personnel records. Demographic, circumstantial, and medical information were abstracted into a primary data abstraction form for each confirmed recruit death. Cause of death (COD) was determined after review of all available records and categorized as nontraumatic or traumatic; nontraumatic deaths were then placed into 1 of 7 categories based on COD. The Defense Manpower Data Center was used to determine demographics of Annual Active Component Accessions. The US civilian mortality rates were determined by the annual *Health, United States*.	Males had higher age- and race-adjusted mortality rates than females in the Army and Navy, there were no deaths of female Air Force recruits, and there was no sex difference among Marine recruits.
Scoville 2004[202] Rating: VI Quality: B	What is the epidemiology of traumatic deaths among Basic Military Training recruits from 1977-2001?	77; 3	Redundant sources supporting the Department of Defense Medical Mortality Registry were used to identify potential recruit deaths between 1977 and 2001, then confirmed using: Reports of Casualty (DD Form 1300) and death certificates; autopsy reports, Armed Forces Institute of Pathology consultation, and toxicology studies; legal and criminal investigative reports; Army Risk Management Information System accident reports; Army psychological autopsies; medical records; and personnel records. Demographic, circumstantial, and medical information were abstracted into a primary data abstraction form and a supplemental traumatic death abstraction form for each confirmed recruit death. Abstracted information included duty status activity location, type or method, circumstances, and information about firearms or items used in hanging. The Defense Manpower Data Center was used to determine demographics of Annual Active Component Accessions. The US civilian mortality rates were determined by the annual *Health, United States*.	The age-adjusted mortality rate was more than 3 times higher for men than women in all services. The only 3 female recruit deaths were in Army recruit training.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Scoville 2007[200] Rating: VI Quality: B	What is the epidemiology of recruits' onsite basic military training suicides across all branches of service from 1980 through 2004?	46; 2	Recruit suicides from 1980 through 2004 were identified through the Department of Defense Recruit Mortality Registry (DoDRMR), a database containing variables specific to the recruit population. Other information extracted from the DoDRMR included manner and cause of death and circumstantial information about the fatal incident (e.g., training duration, activity, location, method). The Defense Manpower Data Center (DMDC) provided data from the Military Entrance Processing Command file (e.g., educational level, Armed Forces Qualifications Test percentile score, drug/alcohol test results, physical profile results). Annual active population data by service branch, sex, age and race/ethnicity for fiscal years 1984-2004 were obtained from the DMDC.	In a sample of completed suicides, men greatly outnumbered women. This reflects the significant difference in suicide rates by sex, with the rate among men being triple the rate of women. Men are overrepresented among gunshot suicides.
Shafer 2008[154] Rating: IV Quality: B	What is the acquisition rate of Chlamydia trachomatis among a cohort of young, non-healthcare seeking, sexually active women over a defined twelve month exposure period?	322; 322	Subjects were women enrolled in Marine Corps recruit training (RT) at Parris Island, SC, between June 1999 and June 2000 who volunteered to participate. Participants completed a baseline self-administered health survey and were screened for C. trachomatis, Neisseria gonorrheoeae, and Trichomonas vaginalis (during week 1 of training) via clinician-collected endocervical specimen, first-void urine sample, and self-administered vaginal swab. A post intervention assessment was completed approximately 4 weeks after graduation from RT and again approximately 11.4 months after graduation; both included a self-administered health survey and laboratory rescreening for the same 3 microorganisms (via first-void urine sample and self-administered vaginal swab only). The health surveys collected demographics, self-reported history of sexually transmitted infections since completing RT (at the 2nd follow-up assessment).	The acquisition rate from a combination of positive screening tests and self-reported diagnosis during the 1 year follow-up period was nearly 20%.
Shaffer 2006[14] Rating: IV Quality: B	What are the pre-training risk factors for lower extremity or pelvic stress fracture in female Marine Corps recruits?	2962; 2962	Subjects were female Marine Corps recruits aged 17-33 who entered recruit training (RT) at Parris Island, SC, from March 1995 to September 1996, who volunteered to participate. Height, weight, and performance on a timed run were recorded at the beginning of RT. Participants completed a questionnaire prior to the start of training; demographics, history of previous clinically diagnosed stress fractures and other lower extremity overuse injuries, self-assessed physical activity and aerobic fitness practices before RT, menstrual status, oral contraceptive use, and pregnancy status were collected. Subjects were observed throughout RT for lower extremity injuries. Injury data were extracted from medical records of participants after the 13 weeks of RT.	Nearly 5% of the women had a stress fracture during the training. Women who reported no menses during the past year and who had a slow run time were at risk for stress fracture during recruit training.
Shah 2001[174] Rating: VI Quality: B	What are the evaluation results comparing 3 methods of specimen collection for Human Papillomavirus (HPV) diagnoses in female Army soldiers?	165; 165	Subjects included consecutive active-duty military women, aged 18 to 59, attending the Epidemiology and Disease Control (EDC) clinic at Womack Army Medical Center, Fort Bragg, NC between March and September 1997, who volunteered to participate. Demographic characteristics were extracted from clinic records. Three different methods for genital specimen collection were used by clinicians: a dry vaginal swab (v-DRY), a vaginal swab in specimen transport medium (v-STM), and a cervical swab in transport medium (c-STM).	A dry vaginal swab may be an acceptable method of HPV diagnosis.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Sheehan 2003[16] Rating: VI Quality: B	Is bone resorption affected by Marine recruit training (RT)?	213; 155	Study participants were male and female Marine recruits from the 4th and 2nd battalions at the Marine Corps Recruit Depot, Parris Island, SC. Prior to the start of RT, baseline height, weight, and physical training score were obtained and baseline urine samples were collected from the first morning void for 3 consecutive days. First morning urine samples were collected every 3 days during the 11 weeks of training. Drill sergeants provided daily training schedules to determine weekly weight-bearing exercises. Medical clinic staff provided stress fracture information.	The incidence of stress fracture and reaction were higher for women than men, though not statistically significant. There were some limited sex differences: Men scored higher and had shorter run times on a physical training test than women. DPD:CR concentrations for men and women were significantly related to the week of training. The overall mean for women was significantly greater than that of men. Men performed more mileage than women, particularly early in training. There was no significant difference between women with stress fractures or stress reactions and the healthy group, in regards to DPD:CR. Both men and women had significantly higher concentrations of DPD in the final weeks.
Shen 2009[185] Rating: VI Quality: B	How does a deployment to Iraq or Afghanistan affect the probability of screening positive for posttraumatic stress disorder (PTSD)? How does deployment duration affect the probability of screening positive for PTSD? Is there an interactive effect between deployment duration and deployment location?	112720; 12% of total	The sample for this study included all Navy personnel with deployments outside the US between October 2002 and December 2006 and valid mental health outcomes. Screening questions for PTSD and the location and duration of the deployment were obtained from the DD2796 Post-Deployment Health Assessment (PDHA) survey (maintained by the Army Medical Surveillance Activity). Demographic and service characteristics (e.g., age, sex, race, marital status, number of dependents, educational level, years of service, specialty, and rank) and deployment history for the previous 36 months were extracted from the Active Duty Personnel Extract Files (PER [from the Defense Manpower Data Center]).	The probability of screening positive for PTSD is 1.5 percentage points higher in females.
Shen 2010[190] Rating: IV Quality: B	How do the rates of posttraumatic stress disorder (PTSD) among all active-duty enlisted personnel differ by service and deployment location? How do deployment location and length of deployment affect the probability of being diagnosed with PTSD? Is there an interactive effect between a deployment's length and location?	678227; Unidentified	Data were extracted from Defense Enrollment Eligibility Reporting System (DEERS), Contingency Tracking System (CTS), Standard Inpatient Data Record, Standard Ambulatory Data Record, TRICARE Encounter Data. Variables collected included: demographics and service information, diagnosis of PTSD, and Operation Iraqi Freedom (OIF)/Operation Enduring Freedom (OEF) deployment characteristics.	The odds of receiving a PTSD diagnosis was greater among females than males. There was a sex effect of deployment location and duration on the rate of PTSD diagnosed; females in the Army, Navy, Air Force, and Marines were more likely to have a diagnosis.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Skeehan 2009[249] Rating: VI Quality: B	What are the self-reported incidence, cause, and impact of nonbattle injuries (NBI) of service members deployed to Operation Iraqi Freedom (OIF) and Operation Enduring Freedom (OEF)?	3367; 486	Subjects included military personnel passing through Incirlik Air Base, Turkey, or at Camp Arifjan, Kuwait, Camp As Sayliya, Doha, Qatar, from January 2005 through May 2006. This study utilized 2 single-page forms from a large 148 item questionnaire that had been subdivided into 12 single-page forms; researchers sequentially distributed the different forms to participants, with every 13th person in a group receiving the same form. Each volunteer completed only 1 form. The 2 sub-forms contained demographic questions and questions to evaluate NBI incidence, cause, and impact.	Nearly 13% of the sample was female; there was no sex difference in NBI incidence.
Slusarcick 2001[228] Rating: VI Quality: A	What factors are associated with depressive symptom reports by health care providers onboard the hospital ship USNS Comfort during a 1990 Gulf War I deployment?	250; 44% of total	Self-administered surveys were distributed to Navy health care providers deployed to the Persian Gulf aboard the USNS Comfort in August 1990 and in January 1991, days prior to the start of the Persian Gulf War. The survey items included questions about their military training, military experience, occupational experience, stress factors, the Zung Self-Rating Depression Scale, a modified version of the Schedule of Recent Life Experiences, and demographic information (age, sex, race, marital status, number of children, educational level, rank, and occupation).	Female sex is a risk factor depression when not accounting for occupational experience, injury, and stress in the model. No sex difference in depression in the final model.
Smith 2004[259] Rating: IV Quality: A	What were the epidemiologic findings of US and coalition in-theater hospitalizations that were medically evacuated to medical treatment facilities during the Gulf War?	683479; 48975	Active-duty, Reserve, or National Guard personnel deployed to the Gulf War region for at least one day between August 1, 1990, and July 31, 1991, were the population for this study. The Defense Manpower Data Center provided demographic and deployment data, including service branch, military component, primary military occupational specialty, military rank, date of separation from military service, and dates in and out of theater. Hospitalization in any military medical treatment facility during the 12-months prior to August 1, 1990, was recorded. Environmental exposures were estimated. In-theater hospitalizations for any reason of the study population that occurred within the Kuwaiti theater of operations and those medically evacuated to DoD treatment facilities in Europe were extracted from a database containing all archived Gulf War inpatient treatment records.	Female sex was among the risk factors for in-theater hospitalization.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Smith 2005[76] Rating: VI Quality: B	Do demographic differences in eye injury rates persist after adjusting for occupational exposure?	3690; 139	Active duty US Army personnel from 1980-1997 made up the study population. Denominator data (including demographic characteristics and current occupation specialty) were obtained from Defense Manpower Data Center (DMDC) personnel files. Eye injury cases were identified from the Patient Administration Systems and Biostatistics Activity hospitalization database; eye injuries occurring at work and requiring hospitalization based on a principal or secondary diagnosis were included. Records were merged with the Total Army Injury and Health Outcomes Database.	Eye injury rates were higher for white soldiers, men, and for younger soldiers, even after adjusting for occupational group and specific job titles.
Smith 2007[29] Rating: VI Quality: B	What is the prevalence of complementary and alternative medicine (CAM) therapy use among Navy and Marine Corps personnel? What are the characteristics of CAM users?	1305; 325	A random sample of Navy and Marine Corps active duty and Reserve/ Guard was obtained in December 2000. A postal survey was developed, based on a previously published survey used in the civilian population. Survey assessed self-perceived health status, conventional health care use and satisfaction, and use of CAM and other treatments. Demographic data were collected from DMDC.	Women were more than twice as likely to report CAM use as men.
Smith 2007[275] Rating: IV Quality: A	What is the concordance between self-reported and electronically maintained occupation codes in military women participating in the Millennium Cohort? What are the reliability of self-reported occupational codes and the baseline of self-reported potentially toxic environmental exposures or disturbing experiences across occupation categories of military servicewomen?	20139; 20139	Participants were randomly selected from all US military personnel serving in October 2000, representing 11.3% of men and women in the service. Electronic personnel data available included demographic characteristics and service related information (e.g., service branch, military occupation, deployment to southwest Asia, Bosnia, or Kosovo between January 1, 1998, and October 1, 2000, deployment to the 1991 Gulf War) Participants completed a questionnaire of 67 items regarding demographics, exposures, and occupation.	Women's self-reported occupational codes were concordant with electronically maintained occupation codes from DoD personnel files. Findings were stratified by active-duty and Reserve/Guard status. There were significant differences among occupational categories in exposure to witnessing trauma or death, exposure to depleted uranium, pesticides, and chemical or biological warfare.
Smith 2008[188] Rating: III Quality: A	What are the effects of military deployment and self-reported combat exposure on new onset and persistent symptoms of posttraumatic stress disorder (PTSD) in a large, population-based military cohort?	50128; 13849	US military personnel serving in October 2000 were randomly selected, representing 11.3% of men and women in the service. DMDC provided demographic characteristics and service related information. Participants completed a 67-item survey including demographics, exposures, and occupation. Participants deployed in support of the wars in Iraq and Afghanistan prior to submitting the baseline questionnaire, and those who submitted their follow-up questionnaires during their first deployment were excluded from this study. The score from the standardized PTSD Checklist-civilian version was used with the Diagnostic and Statistical Manual of Mental Disorders, fourth edition (DSM-IV), criteria to determine PTSD status. The follow-up questionnaire asked about new onset PTSD symptoms and a diagnosis of PTSD within the previous 3 years. Tobacco and alcohol use and combat exposures were also collected.	New onset PTSD was higher among women than among men in all branches of service.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Sobieraj 2009[74] Rating: VI Quality: B	Are there significant hearing threshold differences between Army service components and the general population separated by sex?	16835; 3304	Sex, age, military status (Army active duty, National Guard, Reserve), and mean hearing thresholds at 4 kHz were collected from audiometry results from January 2003 to March 2005, at the Fort Bliss Hearing Conservation Service clinic. Comparative national data were obtained from the 2001-2002 Centers for Disease Control and Prevention's National Health and Nutrition Examination Survey (NHANES).	Females, regardless of status or age, had lower hearing thresholds than males. Active-duty males less than 40 years old had significantly lower hearing thresholds than age matched NG. There was no difference between female military and civilian populations.
Soltis 2009[255] Rating: VI Quality: A	What are the self-reported incidence and morbidity rates of acute respiratory illness among military personnel deployed to Iraq and Afghanistan during 2005-2006?	15463; 2090	There were 2 sources of data: (1) an anonymous questionnaire was distributed by NAMRU-3 investigators to personnel on rest and recuperation leave or during their end of deployment rotation at Camp As Sayliyah in Doha, Qatar (n =2473); and (2) the Troop Medical Clinic health screening form, completed during check-in for a mid-deployment rest and recuperation leave, that asked about any current or recent health problems that may require medical attention (n=15463). The health questionnaire asked currently or in the last week have you had "any respiratory infections," and "any fever," as well as demographics, location of deployment, and current medications.	Female sex was among risk factors for increased respiratory infection.
Sonna 2001[299] Rating: VI Quality: B	What is the prevalence of exercise-induced bronchospasm (EIB) `in Army recruits and its effect on the physical performance response to training?	137; 71	Subjects were US Army recruits from 2 basic training battalions at Fort Jackson, SC, between May and July 1998, who volunteered to participate. At the beginning and end of basic training, subjects had their peak oxygen uptake levels measured after exercise challenge testing by running on a treadmill; scores on the Army Physical Fitness Test (APFT) at the end of basic training were recorded. Screening for exercise induced bronchospasm was completed at the end of basic training.	More males than females tested positive and baseline peak oxygen consumption was higher in males than females.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Stander 2002[321] Rating: VI Quality: B	What are the characteristics of childhood sexual experiences (CSE) that are associated with individuals defining themselves as a victim of childhood sexual abuse?	11195; 5226	Subjects were males and females assigned to sex-integrated recruit training (RT) units at Great Lakes, IL, who agreed to participate. Participants completed the survey during the first week of basic training; it included a question used to identify subjects who considered themselves victims of childhood sexual abuse, the Demographic and Family History Questionnaire (DFHQ), and the Childhood Sexual Experience Checklist (CSE Checklist). Half the respondents participated anonymously; the other half were asked for social security numbers so that their military records could be matched to their responses, and they could participate in a longitudinal study.	Approximately 27% of women reported CSEs compared with 10% of men. Of those with CSE, 49% of women and 15% of men self-identified as victims of childhood sexual abuse. Women were more likely than men to have been sexually coerced by threats and/or force, to have been abused by a family member, and to have been younger when abuse first began. Predictors of self-defining as being a victim of childhood abuse included female sex, white race, coercion by threats and/or force, CSEs with family members, younger age when CSEs began, and the number of CSEs involving penetration. There were interactions between sex and the number of CSEs involving penetration such that females reporting greater numbers of CSEs involving penetration were more likely to report being a victim of sexual abuse than women reporting fewer acts of penetration, whereas men who identified fewer acts of penetration were more likely to identify being a victim than men who reported more such acts. There was also an interaction between reporting intra-familial CSEs and whether the research participant was anonymous or identifiable, such that anonymous participants were more likely to self-identify as a childhood sexual abuse victim than identifiable participants.
Stander 2007[317] Rating: IV Quality: B	Do premilitary experiences of adult sexual assault among female Navy recruits predict their premature attrition from military service?	2431; 2431	Female Navy basic trainees at the Recruit Training Command, Great Lakes, IL, were recruited to complete a set of self-report survey instruments during their first week of training between June 1996 and June 1997. The participants completed the Sexual Experiences Survey (SES) and provided their names and other identifying information to allow for tracking longitudinally. Baseline data from longitudinal study participants were compared with 4-year attrition data obtained from the Career History Archival Medical and Personnel System database. Demographic information collected included age, educational level, race, and family income.	Thirty-five percent of the participants attrited before completing their 4-year obligation. Attrition was more common in the first year of service than in subsequent years. Only 29% of women reporting lower-level unwanted sexual contact attrited from service, while 33% of women reporting attempted rape attrited, and 44% of women with a history of completed rape attrited. The attrition rate for women reporting no premilitary sexual assault history was 32%. Premilitary adult rape significantly predicted risk for attrition,

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Stander 2008[318] Rating: VI Quality: B	What is the extent of premilitary sexual assault within a distinct population of those entering the military?	10337; 4910	Navy recruits, entering at the Recruit Training Center, Great Lakes, IL, between June 1996 and June 1997, voluntarily completed anonymous or identified self-report surveys in groups of same-sex recruits. The survey included demographics (age, education, race, state of origin, marital status, family of origin income). The Sexual Experiences Survey (SES) completed by women asked about sexual assault (SA) victimization; the SES completed by men asked about SA perpetration. The male and female forms were otherwise identical. Three SES items assessed rape experiences, 2 assessed attempted rape, and 5 assessed lesser form of unwanted or coercive sexual activity.	Thirty-nine percent of female respondents reported sexual victimization. Rates of SA were higher among cohabitating women than among single women in the identified condition and in the sample as a whole but not in the anonymous condition. Rates of sexual victimization were significantly higher among white women than among Asian, Hispanic, or African American. Women in the highest income group were more likely to report SA than those in the moderate income group.
Steenbergh 2008[63] Rating: II Quality: B	What is the rate of past-year gambling and problem gambling within a large sample of young military personnel? How are gambling behaviors, demographic variables, and a number of health risk behaviors related?	31104; 7838	The data used in this study were drawn from a randomized clinical trial for US Air Force recruits and included active-duty Air Force recruits completing basic military training at Lackland Air Force Base, San Antonio, TX. Participants completed a 68-item self-report health survey that included demographic characteristics (including date of birth, race/ethnicity, marital status, educational attainment, family income, and number of individuals within the household), health risk behaviors (e.g. tobacco use, binge drinking, risky driving, physical fighting), and gambling behavior (e.g., frequency of gambling, efforts to stop gambling).	Males were more likely than females to report frequent level 2 and level 3 gambling.
Stephens 2001[53] Rating: VI Quality: B	What is the prevalence of ergogenic supplements in a young healthy population and what is the association with specific health behaviors?	499; 60	Individuals entering military basic training at Lackland Air Force Base, TX, and Parris Island, SC, from June - September 1999, were randomly selected to participate. No exclusion data. The Youth Risk Behavior Survey (YRBS) was modified to included questions about nutritional ergogenic supplement use for the purpose of this study. Demographic data collected included age and sex.	Overall, men were more likely to use ergogenic nutritional supplements than women. Younger men were more likely to believe in the effectiveness of creatine, androstenedione, and steroids.
Stephens 2003[66] Rating: VI Quality: C	What is the prevalence of tattoos among new Air Force and Marine recruits, and to what extent are tattoos associated with high-risk behaviors?	499; 54	Individual classes of recruits entering basic training at Lackland Air Force Base, TX, and Parris Island, SC, June-September 1999, were selected at random to participate in an anonymous survey; subjects were individuals in these classes who volunteered to participate. Participants completed the Youth Risk Behavior Survey (YRBS) modified to include a question about tattooing and returned it to a central collection site where the surveys were then mailed back to the primary investigator.	Women were twice as likely to have tattoos as men.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Stevens 2003[291] Rating: VI Quality: B	What are the experiences of breastfeeding in active-duty military mothers?	9; 9	Each participant was asked "Tell me about your breastfeeding experiences as an active-duty military mother" using an unstructured interactive interview method. Interviews were audio taped and transcribed.	Women described issues with pumping, temporary duty issues, common breastfeeding issues, military and civilian differences. Overall results demonstrated that combining breastfeeding and employment in the military was a good experience. Most were successful breastfeeding for 6 months and had the work support and commitment needed to overcome obstacles.
Stinner 2010[84] Rating: VI Quality: B	What is the return-to-duty rate of amputee soldiers injured in Operation Iraqi Freedom (OIF)/ Operation Enduring Freedom (OEF)?	395; 11	Electronic records of military personnel who presented to the Physical Evaluation Board (PEB) between October 2001, and June 1, 2006, with a combat-related amputation sustained a minimum of 2 years before presenting to the PEB were analyzed. Individuals with a major limb amputation were identified within the PEB database and cross-referenced with data from the Military Amputee Database; data were extracted from both databases and included demographic and service-related data, amputation level, and final disposition.	No sex-specific findings reported, presumably due to the small sample size. Approximately 17% returned to active duty and were typically older than those who separated.
Stinson 2003[231] Rating: VI Quality: B	Is stress, sleep disturbance, or fatigue at 22 to 26 weeks of gestation related to the incidence of preterm labor and birth in military women?	359; 359	Active-duty military women at 22 to 26 weeks gestation were asked to complete a questionnaire packet during a clinic visit. After completion, it was mailed to the investigator in a prestamped envelope. A monthly phone call (5 measurement times) was made to each woman to ask about any change in weekly work hours and job type and the duration (in weeks gestation) she worked during the pregnancy.	There was a trend for preterm labor to be associated with lower perceived fatigue severity, low sleep disturbance, and more negative life events. Officer rank was related to both preterm labor and delivery. Findings indicated that the perception of fatigue may be protective against preterm birth and that military officer rank was a factor for preterm labor and birth. Gestational age at delivery was determined by a medical record review.
Street 2009[189] Rating: V Quality: A	What are the emerging issues relevant to the development of posttraumatic stress disorder (PTSD) among female military personnel deployed to Iraq and Afghanistan?	Undefined – literature review	A systematic review of gender relevant articles on PTSD in female service members who deployed to Iraq or Afghanistan.	Women experienced less combat maneuvers when deployed, but 12% of women experienced medium combat exposure, and 3% experienced high combat exposure. Among UK Armed Forces, 16% of women were exposed to small arms fire, 40% to mortar fire, and 37% witnessed a comrade seriously hurt; the proportions were higher for men. Women were more likely to report handling human remains than men. More men were in fire fights and reported shooting at or directing fire at the enemy. There was a marginally significant difference in women compared with men in reported PTSD; women had more mental health problems. More women met the criteria for PTSD when they had combat exposure and there were similar rates when they were in combat support units. Women had a higher risk of experiencing sexual assault. Military moms were 3 times more likely to be single parents and 5 times more likely to be a spouse of a deployment eligible active-duty service member.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Sulsky 2000[95] Rating: IV Quality: B	What is the contribution of sex, race/ethnicity, and age in the odds of discharge from the Army for a disabling knee injury?	7454; 3440	Cases were US Army enlisted personnel with at least 1 of 11 disability codes indicating a primary or secondary reason for disability broadly related to a knee problem in the Total Army Injury and Health Outcomes Database (TAIHOD). Controls were a random sample, stratified by sex, from all enlisted soldiers with a record in TAIHOD. Demographic and service-related data were extracted from TAIHOD.	Caucasian females had higher risk than Caucasian males at all ages except those aged 23-27 years, and non-Caucasian women were at lower risk than non-Caucasian men at all ages except 30-54 years for discharge with disabling knee injury. However, the odds ratios for females/males were low at all age groups and close to 1, without findings of significance.
Sulsky 2002[94] Rating: IV Quality: B	What are the sociodemographic and occupational determinants of knee-related disability discharges of enlisted women from the Army?	2772; 2772	Cases were enlisted females with a knee injury identified (using 11 Veteran's Administration System for Rating Disability codes that might indicate a functional disability related to a knee problem) from the Total Army Injury and Health Outcomes Database (TAIHOD) from 1984 to 1994. Controls comprised a simple random sample of all enlisted women with a record in the personnel file for a given year; three controls for each case were included. Demographic characteristics, service-related data, and primary military occupational specialties were extracted from TAIHOD.	Enlisted women at higher pay grades were at reduced risk of knee related disability discharge from the Army even after controlling for age, race, duration of service, and job characteristics. Sociodemographic factors had larger effects than occupational characteristics on risk of knee related disability discharge from the US Army.
Summer 2001[113] Rating: VI Quality: B	Do women serving on Navy ships utilize the ship's medical services more than men?	1150; 250	Information on visits and diagnoses from a 6-month period (October 1996 through March 1997) was collected for all crew from a forward-deployed ship's medical department log books (patient medical visit records). Routine exams were excluded.	Female sailors accounted for the majority of the clinical workload of a Navy ship medical department.
Sylvia 2000[287] Rating: VI Quality: B	What is the experience of prenatal care from the military mother's perspective?	16; 16	The qualitative portion of a larger evaluation study, subjects were chosen to obtain a heterogeneous sample in which patterns or commonalities of prenatal experience could be described. Participants were active-duty or beneficiary mothers who received prenatal care and delivered while assigned at a military site within the United States, both at civilian and military facilities. Within 2 months of giving birth, participants were contacted for 1-hour long interviews conducted by 1 of 2 coinvestigators, using an interview guide.	The major categories identified include services, information, staff, office/clinic environment, and preferences. Satisfaction and barriers were also described. Mothers were found to look to their providers for support in decision-making and wanted a positive caring relationship during pregnancy. Barriers included accessibility, dissatisfaction with care, lack of rapport, and confidence in providers.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Sylvia 2001[286] Rating: VI Quality: C	What are the needs, availability, accessibility, use, satisfaction, and preferences for prenatal care services from a mother's perspective? Is there a difference between prenatal care and birth outcomes between CONUS and OCONUS women?	328; 328	Subjects were women who received prenatal care and gave birth at one of 6 military sites during the collection period who met eligibility criteria. Participants completed the Prenatal Care Client Assessment Form, a questionnaire to measure prenatal care needs, availability, accessibility, use, satisfaction, and preferences among services received.	The study provided insight into the needs, availability, accessibility, and use of prenatal care via comparisons of information provided by CONUS and OCONUS. Both groups reported a high degree of satisfaction with services, staff, and clinics. Significant group differences were reported in transportation, length of travel time, and cost of traveling, with the CONUS group reporting greater problems with each. For both groups, quality and consistency of health care were the 2 most important factors in their preference of provider. There were no significant differences with regard to length of stay, birth weight, or length. More than 20% reported receiving no information on common pregnancy concerns.
Talbot 2009[7] Rating: VI Quality: B	What is the association between physical fitness, reported physical activity, and coronary risk factors to calculated ten year hard coronary heart disease (CHD) risk?	136; 20% of total	Participants included Army National Guard members (males and females), age 18 to 53, who failed the 2-mile run portion of the Army Physical Fitness Test (APFT); exclusionary criteria included history of diabetes, stroke, CHD, hypertension, and hyperlipidemia, and women who were pregnant or post-menopausal and taking hormone replacement therapy. The 7-day physical activity recall (PAR) interview, a semistructured interview, was used to estimate energy expenditure. Weight, height, seated blood pressure (BP) and heart rate, fasting blood samples, and smoking status were collected. Demographic characteristics obtained were age, sex, race, and rank.	No sex-specific findings reported.
Taylor 2001[7] Rating: VI Quality: B	Do conventional risk factors predict subclinical coronary artery disease?	630; 18% of total	Subjects were active-duty Army personnel, age 39-45 and stationed within the National Capital Area of the Walter Reed Health Care System and recruited at the time of a periodic Army-mandated physical examination between October 26, 1998, and November 4, 1999, who agreed to participate; individuals with a history of coronary heart disease (CHD) or angina pectoris were ineligible. Participants provided their medical history, lifestyle behaviors, and psychological history, ethnicity, current medications, tobacco use, and family history of CHD. Resting blood pressure and waist girth were measured, and a fasting blood draw was taken. Coronary risk variables and coronary artery calcium (CAC) were revealed through electron beam tomography.	No statistically significant sex-specific findings reported. The prevalence of CAC was higher in males than females and increased slightly across increasing quartiles of Framingham risk index in males.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Taylor 2005[302] Rating: IV Quality: B	What is the independent predictive value of coronary artery calcium (CAC) detection for coronary outcomes in a non-referred cohort of healthy men and women ages 40 to 50?	1983; 356	Participants were active-duty Army personnel, age 40-50 and stationed within the National Capital Area of the Walter Reed Health Care System between October 26, 1998, and February 19, 2003; individuals with a history of coronary heart disease (CHD) or angina pectoris were excluded. Participants provided their medical history, lifestyle behaviors, and psychological history, ethnicity, current medications, tobacco use, and family history of CHD. Resting blood pressure and waist girth were measured, and a fasting blood draw was taken. Coronary risk variables and CAC were revealed through electron beam tomography. Incident acute coronary syndromes and sudden cardiac death were obtained through yearly structured phone interviews. Detailed interviews on a reported possible CHD event were conducted by experienced nurse coordinators and hospital records requested for review by researchers and a third independent cardiologist who were blinded to cardiovascular risk factors.	In men there was a strong independent relationship between CAC and premature CHD. Women had lower Framingham risk scores, lower CAC, and lower event rates for any given age. There were no events in women.
Tharion 2005[54] Rating: V Quality: B	What are the energy requirements of military females?	501; 77	A systematic review of literature regarding energy use in military personnel.	Mean total energy expenditures were lower than in females than males.
Thomas 2001[133] Rating: VI Quality: B	What are the prevalence and epidemiology correlates of adverse reproductive outcomes using urine-based ligase chain reaction for C. trachomatis and N. gonorrhoeae detection and standard urine-based pregnancy testing for enlisted Navy women?	314; 314	In October 1995, Navy-enlisted women from a shore-based command and a ship-based submarine tender completed a voluntary self-administered questionnaire that included demographics (age, race/ethnicity, education, Navy command type, marital status), STI and pregnancy history, a 6-month history of sexual activity, risk behaviors, and contraceptive use. A first-void urine sample was collected for pregnancy, Chlamydial, and gonococcal diagnostic testing.	The prevalence of Chlamydia was 4.7% and pregnancy was 9.7% with 48.3% of the pregnancies unplanned. Chlamydia infection was multivariably associated with current pregnancy and alcohol misuse. Unplanned pregnancy was univariably associated with single marital status, younger age, having new/more partners in the last 6 months, and inconsistent condom usage.
Thomas 2001[138] Rating: IV Quality: B	What are the attitudes and use of contraception among enlisted Navy personnel, and how are these attitudes related to age, education, marital status, family planning attitudes, and psychosocial variables? Do women and men differ in their attitudes towards family planning?	1379; 714	The Family Planning Supplement assessed use of contraception and measured attitudes towards family planning and was administered to targeted participants from 15 ships. Study participants were matched on the following characteristics: ship, work division, department, race, pay grade group, rating, and date of birth. The survey included questions on family planning attitudes, birth control use, and three items that were for women only: desire to become pregnant, partner's objection to use of birth control, perceived inconvenience of birth control. Study subjects completed the survey in a common area after receiving a briefing and signing informed consent. Those unable to attend the common sessions completed the survey in their work places.	Slightly more men than women reported not using birth control and women had more positive attitudes then men regarding family planning.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Thompson 2005[159] Rating: VI Quality: B	What is the relationship between alcohol use and risk-taking sexual behaviors among military personnel?	17264; 3968	Secondary analyses of a retrospective self-report questionnaire obtained from the 1998 Department of Defense Survey of Health Related Behaviors Among Military Personnel.	The majority of females reported no episodes of alcohol intoxication in the previous 12 months. Nine percent of males and 3% of females reported episodes more than 1 day per week of alcohol intoxication. Men and women who experienced intoxication more than 3 days per week were more likely to have more than 1 sexual partner in the previous year. More than 25% of men and women reported having more than 1 sexual partner. Over two-thirds of men and women inconsistently used condoms with casual sexual partners. Among female respondents, there was no association between frequency of alcohol intoxication and failure to use condoms with either 1-time or casual partners. The majority of men and women reported using a condom consistently with 1-time sexual partners in the past 12 months.
Thomson 2006[131] Rating: VI Quality: B	What are women's perceptions of health care delivery, including predeployment gynecological screening, contraceptive methods used, availability and side effects of these contraceptive methods, availability of gynecological care, predeployment field hygiene education, and smoking status, in an immature theater of operations?	251; 251	A 10- item anonymous questionnaire to assess women's perceptions of health care delivery in Operation Iraqi Freedom was disseminated between July and September 2003 through command channels to female personnel stationed in camps receiving echelon I or II care (front line or aid stations). Surveys were distributed to active-duty, Reserve, and National Guard units that had been deployed in Iraq or Kuwait for between 3 and 8 months. The questionnaire had been pilot-tested for clarity and reproducibility.	Nearly half of respondents would not have met the cervical cancer screening standards of IAW ACOG at the time of publication. One-quarter received counseling about menstrual cycle control prior to deployment. Nearly one-quarter had to change contraceptive methods during deployment due to unavailability of contraceptives, but 60% did not use a contraceptive method during deployment. The most common gynecological complaint was irregular bleeding, which was highest among depomedroxyprogesterone users.
Tiesman 2007[79] Rating: VI Quality: B	How do the occupational and nonoccupational injuries between male and female Army soldiers compare, according to injury hospitalization rates and characteristics? Are female soldiers at an increased risk for both occupational and non-occupational injuries compared with male soldiers? Are female soldiers' injury characteristics similar to that of their male counterparts?	5678; 792	Data was extracted from the Total Army Injury and Health Outcomes Database (TAIHOD). Analysis was performed in 2006 on an 11-year cohort (1992-2002) of active-duty Army personnel with a hospitalized injury in their first 11 months of service. Each hospitalized injury was given up to 8 diagnoses and procedures coded according to ICD-9-CM. Other variables included external cause of the injury and the duty status category (when injury occurred). Injury Severity Scores (ISS) were calculated. Demographic variables included sex, age, education, military pay grade, occupation.	The overall injury rate was higher in men than women. Men were more likely to be hospitalized than women, although women were hospitalized for longer than men; and enlisted men and women were more likely to be hospitalized than officers. Women had more injuries during scheduled training or schemes and exercises than men. Men were more likely than women to experience an injury while on duty and to be injured due to sports, athletics, or fighting. The leading cause of injury for men and women was unintentional falls and the leading cause off-duty was motorcycle crash.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Trego 2007[139] Rating: VI Quality: B	What are the menstrual experiences among military women and awareness of menstrual suppression during deployment?	9; 9	Active-duty, Reserve, or National Guard Army women who had deployed to a US military operation in 1 of 5 locations were eligible to participate. Private interviews were conducted by the researcher using a semistructured interview guide between December 2005 and January 2006. Interviews lasted 15 to 20 minutes, were audiotaped, and transcribed. Transcripts were verified and hard copies were manually analyzed using the content analysis procedures described by Weber and Downe-Wamboldt. Interviews continued until saturation was reached.	Menstruation in deployment was problematic and more education was needed for utilization of suppressive methods
Trego 2009[167] Rating: VI Quality: B	What was the instrument development process for the Military Women's Attitudes Toward Menstrual Suppression scale, a military-unique measure of the attitudes of military women toward menstrual suppression in a deployed environment?	206; 206	The 3 steps in the development of the Military Women's Attitudes Toward Menstrual Suppression scale (MWATMS) were described: 1. construct definition and content domain; 2. generating and judging measurement items; and 3. designing and conducting studies to develop and refine the scale. Content validity was assessed by 3 women's health experts and 3 military women. Face validity was assessed by administering the survey to a small sample of the target population at a large military base in April 2006. A pilot test was conducted with US active-duty, Reserve, and National Guard women with a history of deployment to an operational mission at 1 of many designated OCONUS locations. Data collection was October 2006 through March 2007 at a large US military base during soldier deployment processing and in military health care clinics; the instrument was completed anonymously and on-site. Demographic data collected included age, marital status, educational level, ethnicity, military rank, religion, and method of birth control.	A reliable and valid measure of women's attitudes toward menstrual suppression during deployment was produced.
Trego 2010[140] Rating: VI Quality: B	What are the attitudes among military women toward menstruation and menstrual suppression with oral contraceptives in the deployed environment?	278; 278	Deployed-experienced Army women without history of hysterectomy or menopause before deployment were given data collection packets with anonymous return. Questionnaires used included the 55-item Military Women's Attitudes Towards Menstrual Suppression Scale (MWATMS), the 33-item Menstrual Attitude Questionnaire (MAQ), the 71-question Deployed Menstrual Health Practice Questionnaire (DMHPQ), and a demographic sheet (including age, race, rank, educational level, and occupational specialty).	Measurement development on the MWATMS produced a 9 item scale with 3 components: stress effects, benefits to self, and environmental barriers. Menstrual attitudes were neutral. Menstrual suppression was favored during deployment; reasons included stress during deployment, benefits of suppression, and barriers to menstrual hygiene in deployment environments.
Trone 2007[81] Rating: IV Quality: B	What is the impact of musculoskeletal injuries and stress fractures sustained by enlisted female Marines during recruit training on attrition rates during their first term of service?	2420; 2420	Injury data were gathered from the data of the historical cohort on two measures: 1) any musculoskeletal injury and 2) stress fracture as diagnosed by medical doctors. Outcomes measured from participants with injuries were: failure to complete first term, not promoted to rank of Corporal during first term enlistment, and no reenlistment beyond first term, as collected from the Career History Archival Medical Personnel System (CHAMPS).	Lower extremity injuries and stress fracture(s) during recruit training were associated with failure to complete first-term enlistment and failure to promote to the rank of Corporal in the first term.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Trump 2004[115] Rating: VI Quality: C	What was the self-rated health of military members who completed postdeployment questionnaires upon return from deployments in 1999? What is the association between self-rated health and subsequent health care use? What were the health outcomes in the 6 month period after return from deployment?	16142; 1888	Subjects included Army and Air Force personnel who had completed a deployment of 30 to 365 days duration to Southeast Asia or Europe that ended January 1 - December 31, 1999, and completed the postdeployment questionnaire by December 31, 1999. The Defense Medical Surveillance System (DMSS) database provided demographic characteristics, postdeployment questionnaire responses upon return from deployment, hospitalization history while in military service prior to deployment, date of separation from military service, and health outcomes that occurred within 6 months post-deployment.	There was a significant association between fair or poor self-rated health and high use of outpatient care for men and women. For women, there was a weak association between reporting unresolved medical/dental problems, being on a profile or light duty, and care seeking for mental health.
Uriell 2009[293] Rating: VI Quality: B	What is the rate, duration, and perceived support of workplace breastfeeding reported by active-duty Navy women?	16885; 16885	A stratified random sample was selected from the population of all active component US Navy personnel, paygrades E2-E9 and 01-05, who had been in the service for at least one year. Notification letters sent via US Postal Service mail inviting subjects to complete an online survey consisting of attitudinal questions.	Most officers and two-thirds of enlisted women breastfed. One-third stopped by the time they returned to duty. Almost half of enlisted and over one-third of officers were not given a comfortable, secluded location for breastfeeding or pumping, although most were given time to do so. Two-thirds of enlisted and half of officers stopped breastfeeding because of work-related reasons, including no place to pump at work.
Van Royen 2000[127] Rating: VI Quality: B	How knowledgeable are active-duty Air Force personnel about basic reproductive physiology and emergency contraception? What sorts of opinions, including ethical concerns, might impact the decision to use emergency contraception?	302; 124	Active-duty Air Force service members completed an adapted version of a national survey done by the Henry J. Kaiser Foundation in 1994 while sitting in the waiting room of the primary care clinic at Lackland Air Force Base. Part 1 of the survey included demographic information (age, sex, and educational level) and questions regarding the respondents' basic knowledge about reproduction and emergency contraception. Participants then completed part 2, consisting of a brief explanation of the Yuzpe method of emergency contraception and questions examining attitudes about emergency contraception.	Female sex was among the correlates for better knowledge about emergency contraception. Women were more likely to have heard of emergency contraception. Women were significantly more knowledgeable than men regarding fertile period and that preventive action could be taken after unprotected intercourse.
Vickery 2008[251] Rating: VI Quality: B	What is the prevalence of personal protective measures (PPM) use? What factors affect/promote the use of PPM? What is the impact of PPM use on the self-reported incidence of cutaneous leishmaniasis among military personnel deployed to the Central Command Area of Responsibility?	3446; 551	Surveys were completed by US military personnel on rest and recuperation at Camp As Sayliyah Doha, Qatar, or in transit through Incirlik Air Base, Turkey, or Camp Arifjan, Kuwait. One survey was administered from January 2005 through May 2006. A second survey was used from March 2006 through February 2007. Respondents participated in only 1 survey.	Sex was not associated with regular/always DEET use.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Vogt 2008[237] Rating: VI Quality: A	What was the validity and reliability of the Deployment Risk and Resilience Inventory in a large occupationally and demographically diverse sample of Operation Iraqi Freedom active-duty Army personnel?	640; 49	Data were derived from the Neurocognition Deployment Health Study, a larger longitudinal study focused on neuropsychological outcomes of Iraq War participation. Iraq-deployed active-duty Army personnel completing full tours who participated in the project prior to deployment in 2003 to 2004 (at Fort Lewis, WA, or Fort Hood, TX) and shortly following return from deployment in 2005 to 2006 comprised the study group. Pencil and paper surveys were administered in groups; survey included 9 of 14 scales of the Deployment Risk and Resilience Inventory (DRRI) and demographic data (age, sex, race/ethnicity, sample site, deployment role).	Women veterans were not specifically addressed in this work. The roles of women in military were different during the period of this study and not studied at all as a separate group for this study.
von Sadovszky 2007[160] Rating: VI Quality: C	What are the specific sexual health information needs for Army women prior to developing a theoretically based, self-administered intervention to promote safe sexual practices during deployment?	131; 131	Eleven commands were approached to participate; 2 commands participated. Questionnaire packets were sent for distribution among women within selected units. A post-paid envelope was included to return the surveys.	Women had an average of 9.2 lifetime sexual partners and low condom/contraceptive use rates; 25.6% had a prior sexually transmitted infection and the majority would desire a kit or self-administered intervention. Forced-choice responses yielded little desire for information regarding safer sexual practices. Women identified different sexual health and safer sexual information needs based upon whether they were at a normal duty station or during deployment. Participants did not identify many information needs; however, their sexual behaviors indicated the need for interventions.
von Sadovszky 2008[134] Rating: VI Quality: B	What is the level of condom use among military women and what are their reasons for use or disuse of condoms? What were the relationships between demographic variables and regular condom use? What do they like about using condoms? What problems have they had with using condoms in the past? What are the reasons by the demographic variables of age, ethnicity, and relationship status?	131; 131	Four questions specific to this study (about condom use) were embedded in the questionnaire used in a larger study. One question was a forced choice; the other 3 questions were open-ended. General demographic information, history related to Army service, and sexual demographics were also collected. Questionnaires were sent to a contact person at 4 Army bases on site who oversaw distribution to potential participants. Participants completed the questionnaire at their convenience and returned the instrument directly to the principal investigator.	There was no relationship between regular condom use and age, ethnicity, number of sexual partners, or history of sexually transmitted infections. Single/divorced women were more likely than married women and those in an ongoing relationship to use condoms regularly. Regular condom users most often cited contraception and protection from sexually transmitted diseases as reasons for use, and reported lower rates of problems with condoms. Non-regular users most often cited monogamous relationships and other forms of contraception as reasons for non-regular use. Women in the regular use group liked that they were user friendly and were clean. Women who used condoms had problems with irritation or inflammation and breaking during use. Women who did not regularly use condoms reported breakage during use, irritation or inflammation, and slippage during intercourse.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
von Sadovszky 2009[155] Rating: VI Quality: B	What are Army women's evaluations of a sexual awareness kit to promote safer sexual behaviors during deployment or when away from home base on extended travel?	20; 20	Demographics were collected, women examined the sexual awareness kit, then the investigators conducted 2 focus groups (n=10); participants provided written responses to 8 open-ended questions, followed by discussion of those questions guided by an interview schedule about the sexual awareness kit and its potential for use during deployment. Field notes were taken during discussions for subsequent coding and analysis.	Participants provided overall positive evaluations of the sexual awareness kit and would use or recommend the use of the kit to promote safer sex or sexual health. Women cited that the sexual awareness kit was a good idea, informative, and centered on women's unique needs.
Wallace 2006[123] Rating: VI Quality: B	Does body mass index (BMI), physical fitness test run times, and cardiovascular fitness have an effect on exertional health illness (EHI) among recruits? What are the effects by sex and training period phase?	2478; 172	Retrospective data analysis of US Marine Corps Automated Recruit Management System (ARMS), a database that tracked every Marine Corps recruit through basic training at the Marine Corps Recruit Depot, Parris Island, SC, from 1988 to 1996.	A 9% increase in risk for EHI was associated with higher BMI in male recruits; BMI was not associated with increased risk among female recruits.
Wardell 2001[169] Rating: VI Quality: B	What are the personal hygiene practices of women experiencing hygiene issues in a combat or deployed situation?	33; 33	Interviews were conducted in private settings, audiotaped, and transcribed. A structured set of questions focused on women's experiences with cleansing the body, collecting menses waste, and protecting against genitourinary infections in a hostile environment. Additionally, they were asked what they would do in the same way or differently if faced with a combat situation and what recommendations they would make regarding hygiene practices for women in combat situations. Participants were also asked what information was given to them about personal hygiene, what items they brought with them, and how those decisions were made. Other data collected included age, place of deployment, unit, rank, menstrual history, and changes noted in menstrual cycles.	Content analysis revealed 5 highlights of experiences: facilities, menses management, infections, spirit, medical services, and suggestions. Influencing factors included location, length of stay, arrival time in combat arena, and facilities provided.
Warner 2007[46] Rating: VI Quality: B	What is the prevalence of and risk factors for eating disorders in an entry-level Army population?	1090; 135	US Army soldiers enrolled in advanced individual training (immediately following basic training) at Aberdeen Proving Ground, MD, were approached in formation and offered the opportunity to participate. Completed surveys were sealed and dropped into a box; non-participants turned in blank surveys. The survey consisted of basic demographic information (age, sex, ethnicity, educational level), height, weight, history of abuse, and history of previous mental health treatment, and the Eating Attitudes Test-26 (EAT-26).	Female sex was among the risk factors of disordered eating.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Warner 2007[225] Rating: VI Quality: B	What is the prevalence of depression in a sample of Army personnel enrolled in advanced individual training? What are the demographic and psychosocial predictors of depression for this sample?	1090; 135	Self-report questionnaires were anonymous, and included information about demographics, Patient Health Questionnaire-9 (PHQ-9) depression screener questions, history (yes/no) and timing of mental health treatment, and history (yes/no) of abuse (physical/verbal/sexual).	Sex was not associated with depression classification. Approximately 22% of females endorsed symptoms consistent with moderate-to-severe depression. Females were much more likely to have a history of verbal, physical, and sexual abuse, and a history of previous psychiatric treatment.
Warner 2008[246] Rating: VI Quality: B	What are soldiers' preferences regarding the timing and process of conducting postdeployment mental health screening? When and how would soldiers most honestly endorse their mental health issues and what factors influenced their responses on postdeployment mental health screening?	2678; 171	The survey was distributed to all Army soldiers of 1 deploying brigade combat team during predeployment briefings. Survey instrument consisted of demographic characteristics (age, sex, rank, number of deployments completed, and educational level), self-reported history of mental health treatment, and history of having completed a postdeployment Battlemind Training. Items also included postdeployment screening preferences, care-seeking attitudes, barriers to care, and care-seeking enhancement strategies. Completed surveys were dropped into a box that was sealed until data entry; non-participants turned in blank surveys (to prevent them from being identified).	Sex was not associated with attitude of seeking treatment, agreement to the questions on barriers to care, or with a positive attitude toward the use of strategies to encourage care-seeking. Soldiers who had previously deployed were less likely to seek assistance than were those who had not deployed.
Wasserman 2003[32] Rating: VI Quality: B	What adverse events resulted from routine anthrax immunization among Army medical personnel?	601; 185	Subjects were health care personnel stationed at Tripler Army Medical Center (TAMC) and at Schofield Barracks Health Clinic, HI, who started the anthrax vaccine series between September 12 and October 16, 1998. Individuals completed surveys of symptoms, severity, and duration after immunization. Vaccine Adverse Event Reporting System reports triggered further evaluation of medical records. The Health Enrollment Assessment Review Survey (HEARS), completed between May and August, 2000, data of soldiers beginning the anthrax vaccine series in September 1998 were compared with anthrax-unvaccinated soldiers. Medical records of soldiers stationed TAMC on October 1, 1998, were extracted and evaluated for the period October 1, 1998, through September 30, 2000; individuals were placed in one of 3 groups (the survey cohort, soldiers receiving the anthrax vaccine outside the enrollment period, and soldiers not immunized) for comparison.	Sex was significantly correlated with reported localized events. The rate ratio was higher for women compared with men. After each immunization, men and women reported inability to temporarily perform 1 or more of their normal duties.
Weber 2010[224] Rating: IV Quality: B	What is the incidence of Bipolar I disorder (BP1) among hospitalized military personnel?	3317; 805	First hospitalizations occurring from 1997 to 2006 with a primary diagnosis for Bipolar Affective Disorder (BAP), Manic (ICD9 296.4); BAP, Depressed (ICD9 296.5); BAP, Mixed (ICD9 296.6); or BAP, NOS (ICD9 296.7) and select demographic characteristics (age, sex, and age) were extracted from the Defense Medical Epidemiological Database.	The overall incidence rates were higher for women than men, with differences between whites and blacks.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Weina 2006[13] Rating: VI Quality: C	What amount of time is needed for postpartum soldiers to return to prepregnancy fitness conditions as evidenced by the Army Physical Fitness Test (APFT)?	52; 52	Army women with at least 1 pregnancy while on active duty and at least 1 postpartum for-the-record APFT at Dewitt Army Community Hospital and Kimbrough Ambulatory Care Center completed a self-administered investigator-developed survey (content validity and reliability verified). Maternal demographics, complications of pregnancy, exercise during pregnancy and in the postpartum period, weight gain, and type of delivery were collected. The pre- and 6-month and 1-year post-pregnancy APFTs were recorded. Soldiers' subjective opinion about how long it takes to return to prepregnancy fitness and reasons that delayed active-duty soldier returning to fitness were also recorded.	Complications, weight gain, and postpartum exercise practices had statistically significant effects on postpartum APFT scores. There were statistically significant differences between the prepregnancy and first postpregnancy APFT scores. These data suggested that the current pregnancy profile of 6 months is not enough time for women to recover and perform as they previously did.
Weld 2009[118] Rating: VI Quality: C	What is the health literacy rate among active-duty military personnel universal access to health care? What are the literacy and health literacy skills among a sample of active-duty military personnel compared with the national population? What is the reliability and validity of the shortened version of the Test of Functional Health Literacy in Adults (S-TOFHLA) in a military health care setting?	155; 82	Active-duty military personnel at a major military medical center able to read and understand English and answer a questionnaire, and willing to participate completed data collection instruments that included sociodemographic characteristics (sex, age, pay grade/ service rank, educational level, race/ethnicity, marital status), the S-TOFHLA, and the Rapid Estimate of Adult Literacy in Medicine (REALM) between January and May 2008. Participants also reported whether they had received health professional training (i.e., combat medic) and if they were employed in a health care role.	Ninety-five percent (94.6 %) of active-duty personnel had a ninth grade-level or above reading level, and 99.4% had adequate heath literacy skills. There was no effect of sex on S-TOFHLA scores.
Wiesen 2002[34] Rating: IV Quality: C	Does receipt of anthrax vaccine result in a measurable decrease in pregnancy rates among Army women of reproductive age? What are the effects on fetal loss and adverse birth outcomes?	4092; 4092	Anthrax immunization status of having had at least one dose between January 1999 and March 2000, pregnancy diagnosis, birth, and adverse birth outcomes of those who were immunized, as well as those who were not immunized during that time period were collected from administrative and clinical databases.	There were no significant differences in pregnancy rate, birth rate, or adverse birth outcomes between the women who received anthrax vaccination and those who did not. Compared with national rates, the sample's rates were comparable or lower than expected.
Wiesen 2004[135] Rating: IV Quality: B	What are the pregnancy rates, characteristics, and predictors of pregnancy in women who become pregnant?	5578; 5578	Study population included Army active-duty women assigned to Fort Lewis, WA, at some time from January 1995 through June 1997. A local personnel database provided demographics (age, marital status, race, grade, unit type, and educational level) and period of assignment; a database at Madigan Army Medical Center provided medical information.	Standardized pregnancy rates in the study population were statistically indistinguishable from national estimates. Health care services use was an important independent determinant of pregnancy occurrence. Factors that affected pregnancy likelihood included age, marital status, race, Pap smear during study period, educational level and at least 1 prescription for oral contraceptives during the study period.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Williams 2010[238] Rating: VI Quality: B	What is the feasibility of deploying a web-enhanced behavioral self-management program for stress in a military setting?	142; 78	All active-duty members at Naval Medical Center, Portsmouth, VA, were invited to participate. Data were collected using the Stress Gym Feasibility Questionnaire and the Stress Gym Open-ended evaluation. Both instruments were provided to the participants as they were completing Stress Gym Modules online.	None of the program evaluation questions demonstrated significant differences based on characteristics such as sex, race/ethnicity or military rank. Use of the screening assessment within the Stress Gym resulted in the following modules being most frequently recommended: stress and emotion, sleeping, balance, and reacting to stress. The teamwork module was the least frequently recommended module. Significant reductions in stress were seen among both officers and enlisted personnel after use of the Stress Gym.
Williamson 2002[51] Rating: VI Quality: B	What are the changes in food selections, food intake, and body weight during 8 weeks of basic combat training (BCT)?	92; 44% of total	Subjects included soldiers over age 17 from 2 companies from 2 different brigades stationed at Fort Jackson, SC, for BCT. Data were collected at breakfast, lunch, and dinner during 2 days in the first week of BCT and again during the eighth week. To anonymously track an individual soldier over time, unique barcodes were printed on the back of the soldier's military ID card; hand-held computers with barcode readers were used prior to collecting any data. To determine the soldiers' time in the dining facilities (DFACs), scanning was done when the soldier entered the DFAC, at the beginning of the serving line, when the soldier completed food selection, and after the meal had been consumed. Digital video cameras, placed above the tray at the point that soldiers exited the food line and before entering tray disposal station were used to capture photographs of the food after it was selected and of the food uneaten after the soldier ate. Using the photographs of the trays, trained research associated classified food selections, amount of food selected, and amount of food consumed. Demographic data, height, and weight were collected in a 1-hour assessment session with each of the 2 companies.	Between weeks 1 and 8 of BCT, female soldiers increased intake of fruit and decreased intake of vegetables. Male soldiers consumed more grains, meats, and fats than female soldiers. Women consumed fewer calories than men. Black females lost the most weight of all sex and race groups.
Williamson 2009[6] Rating: VI Quality: C	Can a computerized weight and fitness database track individuals and units over time for cross-sectional, longitudinal analysis of trends? Can it identify useful trends, provide actionable data, and/or improve unit compliance with fitness regulations?	684; 261	Body weight, height, and Army Physical Fitness Test (APFT) scores for 3 medical companies at Womack Army Medical Center (WAMC), Fort Bragg, NC, were entered into the Military Services Fitness Database (MSFD) from July 2003 to December 2005, for a total of 5 measurement periods. To be included in the longitudinal analysis, a minimum of 3 measurements was required. Demographic data were collected.	Men and women gained weight and body mass index increased over time. Women were over their weight allowance for height, and moved further over their allowance with time. APFT failure rate was similar among men and women.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Wilmoth 2003[179] Rating: VI Quality: B	How do enlisted military women manage breast cancer diagnosis and treatment within the context of their military careers?	16; 16	The Grounded Theory qualitative method was used in the study. Informants between 3 and 12 months post diagnosis of breast cancer were solicited from oncology and surgical clinics in 4 military medical installations on the east coast. Data collected included a demographic data form, 3 audiotaped interviews (the first in person; the remaining 2 through telephone interviews), post-interview notes, and analytic discussions. Interviews followed a published format on demands of illness.	The substantive theory identified was that of balancing demands and expectations with the core psychosocial process experienced by participants. Negotiating compromises was the primary technique used to meet treatment demands and the expectations of the workplace. Participants were satisfied with the quality of the medical care they received, and they desired greater institutionalized support to assist them in balancing demands and expectations placed on them by the disease and its treatment.
Wilson 2009[244] Rating: VI Quality: B	Across military mental health clinics during the year of 2000, what were the mental health care utilization rates?	1350000 ambulatory care in MTF (156099 behavioral health clinic); 34656 behavioral health clinic	Outpatient military health clinic visits for all active-duty US military personnel with primary diagnosis ICD-9 codes 290-319 (excluding ICD-9 305.1) and codes outside the selected range but used primarily by behavioral health providers (all V-codes recognized by DSM-IV and ICD-9 995.8) for the year 2000 were extracted from the Defense Medical Surveillance System. Mental health-related codes used more often in primary care clinics were excluded (e.g., counseling for HIV/STDs/injury prevention).	Individuals who received a mental health diagnosis or V Code diagnosis were more likely to attrite from military service. Sex differences were found for ICD-9 coded mental disorders, V-coded mental health problems, and other medical illnesses.
Wojcik 2008[250] Rating: VI Quality: A	How well does a refined disease and nonbattle injury (DNBI) model predict medical requirements of Army soldiers injured during Operation Iraqi Freedom (OIF)/Operation Enduring Freedom (OEF)? How do OIF/OEF DNBI admission rates compare to those for Operation Desert Shield/ Operation Desert Storm?	509711; 54606	Military personnel data of all deployed Army soldiers in OIF/ OEF between September 2001 and December 2004 were obtained from Defense Manpower Data Center; data included dates of arrival/ departure in theater, demographic, and unit data. Inpatient health care data for the soldiers' period of deployment were pulled from Patient Administration Systems and Biostatistics Activity standard inpatient data record database. NATO Standardization Agreement 2050 trauma indicator codes and cause-of-injury codes and ICD-9-CM codes were used to classify nonbattle injuries. Inpatient healthcare data indicating admission for DNBI were used to determine hospital admission rates for DNBI.	The risk for admission for DNBI was higher for female soldiers than males; compared with men, women were at increased risk for being hospitalized for disease. The risk for admission for nonbattle injury was lower for female soldiers than males; compared with men, women were at lower risk for being hospitalized for injury. This held true for both OIF and OEF data.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Wojcik 2009[183] Rating: IV Quality: A	What are the hospital admission patterns related to Army soldiers' mental health disorders that had deployed to Iraq and Afghanistan?	473964; 54606	Subjects included all US Army soldiers deployed from September 2001 (Operation Iraqi Freedom) and September 2002 (Operation Enduring Freedom) through December 2004. Deployed population data were obtained from the Defense Manpower Data Center (DMDC) and then combined with inpatient healthcare data from the Patient Administration Systems and Biostatistics Activity standard inpatient data record database. Admissions for mental disorders were based on episodes of care; an episode of care included all admissions within 10 days of each other, such as when a patient was transferred from 1 facility to another for a different level of care. Mental disorders were identified using ICD-9 codes 290-319 from any of the first 8 SIDR diagnosis fields.	Female soldiers were at increased risk for all mental health disorders, including posttraumatic stress disorder, as well as suicide and self-injury.
Wolf 2009[88] Rating: VI Quality: B	What are the incidence and demographic risk factors for de Quervain's tenosynovitis in a young, active military population?	11332; 4956	Retrospective population data from the Defense Medical Epidemiology Database (DMED) for all service members with an ICD code of 727.04. Inpatient data were excluded and repetitions of the same ICD-9-CM code for the same person were discarded.	Women had a significantly higher rate of de Quervain's tenosynovitis at 2.8 cases per 1000 person-years, compared with men at 0.6 per 1000 person-years. Risk factors for de Quervain's included female sex.
Wolf 2010[87] Rating: VI Quality: B	What is the epidemiology of lateral and medial epicondylitis in a military population? How does the military's incidence rate compare to that of the general civilian population?	X	Using the ICD-9-CM codes for lateral epicondylitis (726.32) and medial epicondylitis (726.33) for the period 1998-2006, the Defense Medical Epidemiology Database (DMED) was queried for race, sex, military service, rank, and age. Only first occurrence ambulatory encounters were included. The total number of service members on active duty during the study period (by race, sex, service, rank, and age) was also extracted from the DMED.	Military women had a higher incidence rate of lateral epicondylitis than males. There was no difference in the occurrence of medial epicondylitis between males and females.
Wolfe 2005[308] Rating: VI Quality: B	Does a pre-military history of interpersonal trauma increase attrition rates during training? Does this differ for men and women?	1530; 698	Part of a larger longitudinal study of Marine Corps enlistees in their first 19 months of training. The questionnaire was administered between May and August 1997 in groups at Parris Island, SC. Participants were informed that the study was voluntary and confidential and administered by civilian staff members (no military personnel present during administration). Surveys included a demographic questionnaire (sex, age, ethnicity, marital status, and educational level), the 30-item version of the Childhood Trauma Questionnaire (assessing childhood trauma), the Finkelhor Sexual Abuse Screening Questions (history of childhood sexual abuse), 2 questions from the Sexual Experiences Survey (assessing attempted/completed rape), 5 items from the modified Diagnostics Interview Schedule (assessing other interpersonal traumatic stressors), and an open-ended question to capture other traumatic experiences. Attrition data was provided by the US Marine Corps and included discharge for any reason.	A history of at least 1 type of interpersonal trauma was reported by 47.5% of male recruits and 68.1% of female recruits. For women, the retention rates were significantly higher for those who did not report a history of trauma. Males had a higher probability than females of staying longer than 40 days. Female recruits were more likely to be discharged than were male recruits.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Woodruff 2000[217] Rating: IV Quality: B	What are the effects of a unique organizational smoking ban on female Navy recruits?	5503; 5503	Participants completed a self-report survey upon entry into basic training. They were next solicited to complete a follow-up survey at time of graduation. Finally, women who reported they were smokers at baseline were resurveyed 3 months after leaving basic training.	The percentage of self-identified smokers dropped significantly from baseline to graduation. Predictors of smoking cessation included white race versus black, as well as more extensive smoking history and greater intention to continue smoking at baseline. At final follow-up, 68% respondents had resumed smoking. Predictors of relapse included younger age, more extensive prior smoking history, and intention to smoke after graduation.
Woodruff 2000[216] Rating: IV Quality: B	Do additional, persistent strategies increase the long term survey response rate among female Navy recruits in a smoking cessation/ relapse prevention program during their first year of service?	1177; 1177	The Navy standard personnel Enlisted Master Record (EMR) was used to track the cohort (individuals who had participated in the smoking cessation/relapse prevention study 1 year prior). A stepped approach of using incentives, repeated mailings, alternative survey administration modes, and reminders was used to improve the 1-year follow-up survey response rate following initial study enrollment and intervention. The initial smoking survey was mailed directly to participants, and a postage-paid return envelope was enclosed. Respondents were categorized into on-time, reluctant, and nonrespondents.	Incentives and persistent efforts were effective at increasing the response rate to the follow-up survey in this study, including response rate by higher-risk individuals.
Woodruff 2010[212] Rating: IV Quality: B	Are there associations between cigarette smoking and medical outcomes over time among young, female Navy personnel?	5000; 5000	Subjects were female recruits entering recruit training (RT) at the Navy Recruit Training Command, Great Lakes, IL, between March 1996 and February 1997. Subjects completed a machine-scannable survey assessing their smoking behavior during their first week of in-processing. On June 23, 2005, the participants' survey information was linked with the Career History Archival Medical and Personnel System (CHAMPS) to extract sociodemographic, time in service, hospitalization data.	Daily smokers had higher rates of hospitalization for any reason, musculoskeletal reasons, non-pregnancy related, and mental disorders than never smokers and other smokers. Number of days hospitalized was significantly longer for daily smokers than for never smokers or other smokers.
Wright 2006[262] Rating: VI Quality: B	What is the incidence of acute pelvic pain disorders in deployed female soldiers in support of Operation Iraqi Freedom and Operation Enduring Freedom?	1737; 1737	Computerized patient encounters were reviewed for all female soldiers presenting for gynecological care to the US Army Health Clinic, Camp Doha, Kuwait, between September 2003 and March 2004. Clinical, demographic, treatment, follow up, and disposition information were collected.	Pelvic disorders accounted for 14% of gynecological complaints
Wright 2006[148] Rating: VI Quality: C	What is the incidence of sexually transmitted diseases among female active-duty military personnel deployed in support of Operation Iraqi Freedom and Operation Enduring Freedom?	44; 44	All medical records of gynecological care encounters from September 2003 to March 2004 at the US Army Health Clinic, Camp Doha, Kuwait, were reviewed for demographic and clinical information: diagnosis, treatment, follow up, and disposition of soldiers with sexually transmitted diseases (STDs) were identified.	STD incidence in this population was 2.5%. The most commonly identified diagnoses were Herpes Simplex 2, *Condyloma acuminata*, and *Chlamydia trachomatis*.

Author	Study Question	Total Sample; Women Only	Data Collection Strategies	Gender-Specific Finding(s)
Wynd 2004[64] Rating: VI Quality: B	What factors predict health behaviors among Army Reserve, active-duty Army, and civilian hospital employees?	610; 375	The Health Promoting Lifestyle Profile II (HPLP II) measured the type and frequency of health-promoting behaviors practiced by the subjects. This self-report survey used a 52 item, four point Likert scale to assess health responsibility, physical activity, nutrition, spiritual growth, interpersonal relations, and stress management.	Female reservists had a higher smoking prevalence than males.
Yen 2003[156] Rating: VI Quality: B	What is the prevalence of bacterial vaginosis (BV) by Nugent Gram stain criteria in a healthy, nonpregnant, non-clinic sample of sexually experienced and unexperienced young women? What are the socio-demographic factors and clinical factors associated with a BV diagnosis? What is the performance of a rapid colorimetric pH test card and the Pap smear as screening methods compared with the Nugent gram stain criteria?	1938; 1938	All women who entered recruit training for the US Marine Corps between June 1999 and June 2000 and completed the required routine pelvic examination with sexually transmitted disease (STD) screening and a Papanicolaou smear within 2 weeks of arrival were eligible for participation. Three self-collected vaginal swabs and first-void urine were obtained following specific instructions from researchers. Endocervical samples were obtained during the required routine pelvic examination. Participants completed a self-report survey as well.	Bacterial vaginosis prevalence was 27%, with 28% in sexually experienced and 18% in nonsexually experienced women. Clinically, bacterial vaginosis was directly related to multiple sexual partners, self-report of vaginal discharge, self-report of vaginal odor, and concurrent *Chlamydia trachomatis* infection, and inversely related to hormonal contraceptive use. Vaginal discharge did not achieve statistical significance in multivariate analysis. Compared with the Nugent criteria, the sensitivities and specificities for bacterial vaginosis diagnosis were as follows: colorimetric pH test: 72% and 67%; Papanicolaou smear: 72% and 79%, respectively.
Zajdowicz 2003[11] Rating: VI Quality: B	What are the distributional differences of physical readiness testing (PRT) results for active-duty Navy personnel as specified by the May 2000 standards versus the previous standard? Under the new May 2000 standards, what are the body mass index (BMI) results and how do they compare with body composition assessment results? What are predictors of successful PRT results under the new standards?	1564; 547	Study subjects were active-duty service members at the Naval Medical Center Portsmouth, VA, with PRT data from April 2000 (old PRT standards) and October 2000 (new PRT standards). Height, weight, and time for a 1.5 walk/run were retrospectively collected from the paper or Microsoft Access file by which they were originally recorded. Demographic characteristics (age, sex, race/ethnicity) were also collected.	When stratified by sex, the BMI for females was normal whereas the mean BMI for males was overweight.


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