Active Duty Women's Health Care Services

President's Memo

OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE
HEALTH AFFAIRS
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DEFENSE
HEALTH
BOARD

MEMORANDUM FOR ASSISTANT SECRETARY OF DEFENSE FOR HEALTH AFFAIRS

SUBJECT: Active Duty Women's Health Care Services

The Defense Health Board (DHB) is pleased to submit its report on Active Duty Women's Health Care Services. This review summarizes the DHB's findings and presents recommendations to improve the health and readiness of Active Duty women.

On July 29, 2019, the Assistant Secretary of Defense for Health Affairs (ASD(HA)) directed the DHB, through its Health Care Delivery Subcommittee, to provide recommendations to the Department on Active Duty women's health to improve accessibility and quality of health services, and to optimize medical readiness. Specifically, the ASD(HA) requested the DHB to:

- Determine how the DoD should improve research, quality of care, and access to health services for Active Duty women, while maintaining a focus on readiness;
- Address psychological and mental health conditions with gender-specific epidemiologies;
- Evaluate access to reproductive health services, including preventive care, for Active Duty women throughout the deployment cycle; and
- Identify best musculoskeletal injury prevention practices for Active Duty women.

The Health Care Delivery Subcommittee reviewed current women's health services in the Military Health System, relevant policies and practices within the Department of Defense (DoD) and other foreign militaries, and peer-reviewed scientific literature. The Subcommittee received briefings from, and consulted with, experts from both government and civilian institutions.

The Subcommittee presented its report to the DHB on November 5, 2020. Many of the DHB's findings and recommendations echo those in previous reports issued over the last few decades – decades in which many of these recommendations to improve the health of active-duty women remained unfulfilled. The DHB's recommendations aim to solidify the DoD's commitment to prioritizing women's health and achieving sustained improvement building on best practices already present within the Department. Following public deliberation of the findings and recommendations, the DHB unanimously approved the report.

On behalf of the Board, I appreciate the opportunity to provide this independent review to the Department. I hope that it drives lasting positive change for Active Duty women's health.

Jeremy Lazarus, M.D.
President, Defense Health Board

Attachment:
As stated

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Executive Summary

This report provides findings and recommendations for the Secretary of Defense's consideration on matters and policies related to active duty women's (ADW's) health care, needs, and services. The Office of the Under Secretary of Defense for Personnel and Readiness (OUSD(P&R)) charged the Defense Health Board (DHB) to recommend strategies to improve accessibility and quality of health services that would enhance ADW's medical readiness. Specifically, the OUSD(P&R) requested the DHB review and make recommendations to improve ADW's health and care to include a special focus on musculoskeletal, reproductive, and psychological health. Over the course of a year, the DHB reviewed the Department of Defense's (DoD) current women's health services, relevant health policies, subject matter expert interviews, and civilian and foreign militaries' models to inform its findings and recommendations.

Women's integration into the military began to accelerate in the 1970s, with ADW now at 17% of the active duty force, though with considerable variation across the Services. More than 30 reports and legislative actions addressing ADW's health, medical care, and operational readiness accompanied this growth. The DHB drew upon decades of scientific evidence, prior findings, and previous recommendations to define 10 *Guiding Principles* for preparing this report's findings and recommendations:

1. Decades of findings and *recommendations concerning ADW's health have not led to sustained improvements.* The shortfall has occurred because of limited dissemination of findings, inattention to implementation, and unassigned accountability.

2. The DoD's traditional male norms and attitudes contribute to the variability in the knowledge of ADW's health needs. DoD leaders should be aware of how these norms and attitudes affect active duty women's operational health needs.

3. Significant best practices to improve ADW's health already exist in isolated locations and commands. Substantial improvements in ADW's health can be realized by identifying, standardizing, and deploying these best practices throughout the military.

4. The Defense Health Agency's (DHA) new responsibilities give it both the *opportunity and the authority to identify, standardize, and improve how the Military Health System (MHS) delivers care to ADW.*

5. Initiatives to improve women's health should be implemented *proactively using a lifecycle perspective,* rather than reacting to isolated episodes or incidents. The perspective begins at recruitment and extends to retirement or separation. The lifecycle perspective should optimize health, fitness, and performance at the lowest total cost over the Soldier's, Sailor's, Airman's, and Marine's service life.

6. *The comprehensive fitness and readiness framework adopted by DoD and endorsed by the Joint Chiefs of Staff "Total Force Fitness"* should inform, measure, emphasize, and accelerate the efforts to improve ADW's health and performance.

7. The health of ADW is optimized when *women are enabled and empowered to perform self-care and be equal partners in their care.*

8. *Technology promises a scalable and low-cost means* of delivering health information and counseling to ADW wherever they are stationed and deployed.

9. Appropriate *gender-sensitive customization* is necessary and superior to a 'one-size fits all' approach for improving ADW's health and fitness.

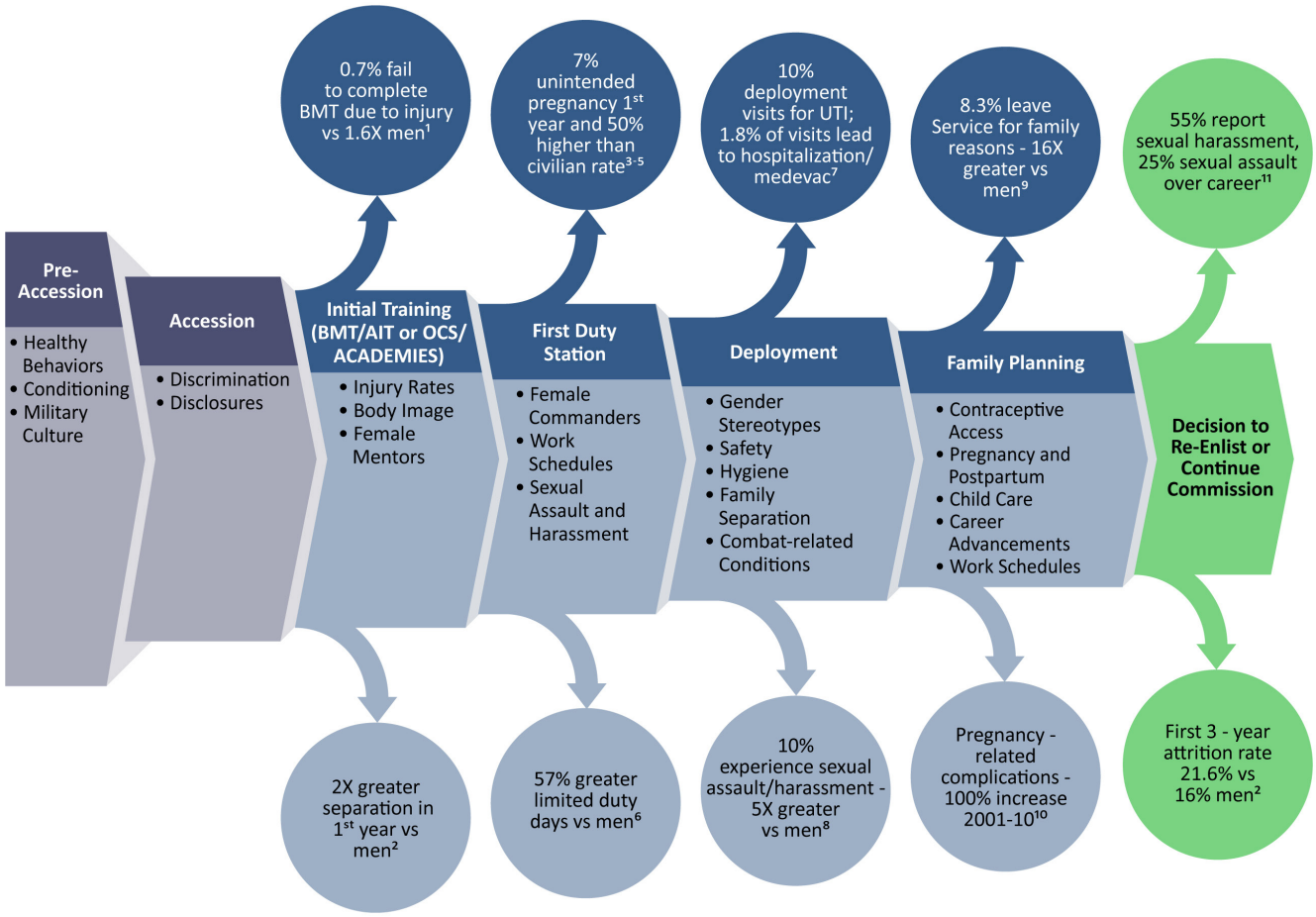
10. Organizational accountability, which includes dedicated resources, will improve and sustain ADW's health and fitness.

The DHB found that ADW have been incorporated into all military occupational specialties and have proven themselves critical to DoD mission success. Yet they continue to experience health care and operational challenges that reviews and reports over the past 25 years have identified, evaluated, and made recommendations for improvement. Attempts to address well-known and persistent deficiencies in health, medical care, and operational concerns have generally been isolated, uncoordinated, unstandardized, and unmeasured. Initiatives have too often been short-lived, underfunded, or advanced only by individual champions or advisory bodies without implementation authority. The DoD has not uniformly disseminated and implemented repeated and recurrent recommendations. Consequently, most ADW's health initiatives have fallen short of the need, lacking sustained leadership commitment, support, and accountability for strategy, tactics, and execution to ensure improved health, medical care, and operational effectiveness.

We were encouraged to learn that some components and capabilities for a world-class approach to women's health already exist in isolated parts of DoD and MHS. The DoD should identify, capture, integrate, standardize, and scale these best practices particularly now with the enhanced execution authority of the Defense Health Agency. The DHB's recommendations will require DoD's commitment to become a forward-leaning organization that appropriately prioritizes women's health, which will enhance DoD's capability to meet its mission. Finally, the DHB comments on several emerging scientific and medical developments, trends, and concerns that will likely impact ADW's health and care for DOD's future considerations.

The DHB identified common ADW's career lifecycle milestones and selected health- and mission-related attrition factors, depicted in Figure 1.

Figure 1. Active Duty Women Career Lifecycle Milestones and Selected Health- and Mission-Related Attrition Factors



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The DHB reports the following findings, regarding such existing capabilities and proposed new capabilities and activities, and makes their recommendations based on their findings throughout their investigation in response to the tasking:

Finding 1.1: Active duty women (ADW) continue to experience high rates of stress fractures and other musculoskeletal injuries, urogenital infections, unintended pregnancies, sexual and intimate partner violence, anxiety, depression, adjustment disorders, and eating disorders. These conditions adversely affect ADW's readiness and health. The differential incidence of these conditions among ADW have persisted despite 70 years of integration efforts and the creation of more than 10 advisory and decision-making groups, specifically created to improve ADW's health, fitness, safety, and performance. The groups capably identified best practices and recommended their adoption. But, lacking authority and accountability, few of their recommendations have been implemented.

> **Recommendation 1.1:** With urgency and commitment, the DoD should establish an overarching office with a clear charter to approve recommendations necessary to improve ADW's health, fitness, safety, and performance. This office should be both authoritative and accountable for outcomes and for minimizing undesirable gender-associated differences in:
>
> i. Health care delivery
> ii. Health care personnel
> iii. Research, dissemination, and implementation of best health care practices
> iv. Supply chains (e.g., clothing, equipment, medical products)
> v. Personnel policies (e.g., fitness standards, parental leave) and
> vi. Culture (i.e., traditional male-centric values).

Finding 1.2: All military personnel – not just health professionals – influence, support, or detract from the health and health care of ADW.

> **Recommendation 1.2:** Expand general awareness of the gender-specific health and health care issues affecting ADW particularly among line commanders and senior non-commissioned officers.

Finding 1.3: The availability and scope of women's health services vary significantly at their point-of-access (home station, field, deployment, or military treatment facility).

> **Recommendation 1.3:** Standardize availability and scope of ADW's health care services.

Finding 2: Both basic training programs and ongoing fitness-for-duty evaluations have two foundational fitness components: health fitness standards that are gender-specific, and occupationally-focused fitness standards that should be gender-neutral. A "one size fits all" approach for health fitness contributes to training injuries in a mixed-gender population. Women enter the military with lower fitness levels than men and are more susceptible to overuse and lower limb injuries. Their musculoskeletal injury risk is further increased when they attempt to meet gender-neutral health fitness standards during Basic Military Training (BMT) and without access to gender-customized equipment (see Finding 3). Research also suggests that a higher percentage of ADW can make the transition to meet occupationally specific, operationally-relevant (OSOR) standards by using more focused, structured, and monitored training approaches.

> **Recommendation 2.1:** The DoD and Recruiting commands should improve preparation of recruits by emphasizing healthy behaviors (stop smoking, reduce

excess alcohol consumption, and adopt healthy eating habits) and gender-specific aerobic and strength conditioning prior to accession to reduce the risks of injury and increase the likelihood of success in BMT and military service.

Recommendation 2.2: The DoD should implement two-level fitness assessments: (i) gender-specific fitness standards and (ii) gender-neutral occupational-specific, skill- and operationally-relevant standards.

Recommendation 2.3: Basic training programs should embed licensed sports medicine professionals within the unit. These professionals can promote and implement evidence-based practices for training and rapid injury recovery, which are particularly valuable for ADW. The VIPER program at Joint Base San Antonio – Lackland represents a best practice for embedding a sports medicine trainer in a unit during BMT.

Finding 3: ADW lack access to gender-customized equipment (e.g., properly fitting sports bras, backpacks, protective armor, footwear, and insoles) necessary for (i) achieving training standards, (ii) reducing musculoskeletal injuries, and (iii) decreasing attrition.

Recommendation 3: The DoD should define and ensure procurement and distribution of gender-customized equipment to reduce injuries and improve the health, performance, and readiness of ADW.

Finding 4: Studies of BMT injuries observed an association between increased risk of stress fractures and injury in women with iron and vitamin D deficiencies. Women who incurred injuries in BMT also were more likely to have poorer pre-accession health and fitness levels, higher rates of smoking, and amenorrhea. Blood donation is expected of all trainees at the end of BMT. Donations from female trainees contribute 6% of the Armed Forces Blood Program supply. Blood donation causes a significant decrease in iron stores, which take up to 10 months to replenish in women.

Recommendation 4: The DoD should conduct well-designed studies of ADW to determine the association between hematologic and nutritional deficiencies and the incidence of ADW injuries and sub-standard performance. Studies should also assess the efficacy of interventions or policies to remediate such deficiencies, including the benefits of calcium, vitamin D, iron supplementation, and restricting ADW blood donations.

Finding 5: ADW's limited access to and awareness of products and services for self-care of treatable and preventable urogenital conditions hinders their capability to actively manage symptoms and prevent disease progression, especially in the deployed or field environment.

Recommendation 5.1: The DoD should educate pre-deployment women about urogenital infection prevention, self-diagnosis, and treatment particularly when deployed.

Recommendation 5.2: The DoD should enable women to perform self-medical care by incorporating urogenital infection self-testing and self-treatment kits and hygiene devices (e.g., Female Urinary Diversion Device (FUDD)) into standard equipment kits and supply chains.

Finding 6: Unintended pregnancy is approximately 50% higher for ADW than for civilian women, and is approximately the same

as the incidence of planned pregnancy among ADW. The occurrence of unplanned pregnancies creates significant adverse health and major mission impacts. Studies show that long-acting reversible contraception (LARC) counseling and walk-in contraceptive clinics decrease unintended pregnancies.

Recommendation 6: The DoD should improve contraceptive education and services through the following actions:

1. Launch a sexual and relationship health education campaign for all Service members at all accession locations to include knowledge and access to contraception options
2. Provide the military-designed mobile contraceptive decision-support "Decide + Be Ready" counseling app
3. Promote the use of the most effective LARC method by establishing and expanding walk-in contraceptive clinics [best practice Navy PINC clinic], and
4. Provide convenient mobile women's health services where ADW work

Finding 7: The Services do not uniformly apply evidence-based standards and practices for postpartum fitness recovery and return-to-duty. The Air Force's post-pregnancy event return-to-duty sliding scale represents a best practice model for optimal postpartum fitness recovery and evaluation.

Recommendation 7: The DoD should standardize policies for post-pregnancy fitness evaluations and return-to-duty that are contingent on types of pregnancy outcomes (e.g., miscarriage, stillbirth, pre-term, full-term).

Finding 8: Breastfeeding has positive effects on the physical, emotional, and psychological health of ADW and their infants. ADW breastfeeding rates are below the Healthy People 2020 goal. The Services do not uniformly apply or execute policies to support breastfeeding.

Recommendation 8: The DoD should continue to improve and standardize policy, education, and infrastructure to encourage and facilitate breastfeeding.

Finding 9: Fertility services available to ADW show particularly high variation across military treatment facilities and locations.

Recommendation 9: The MHS should standardize the fertility benefit and access to services.

Finding 10.1: Despite efforts to reduce sexual harassment, assault, and intimate partner violence, ADW continue to experience elevated and unacceptable rates of gender-related, intentional trauma. Such actions against women are more likely to lead to post-traumatic stress disorder (PTSD) than exposure to combat. DoD efforts to raise awareness of the magnitude of the ongoing problem, and line commander and non-commissioned officer accountability for a zero-tolerance culture, need to be continually reinforced.

Recommendation 10.1: Continual reinforcement of zero-tolerance for workplace sexual harassment and assault and for intimate partner violence must be emphasized in Service member training, particularly for line commanders and non-commissioned officers.

Finding 10.2: Stigma and fear of reprisal for reporting sexual harassment and assault continue to exist.

Recommendation 10.2: Allegations of sexual assault should be reported and investigated promptly including medical forensic examinations resulting in a timely adjudication, delivery of judgment/ punishment, and whenever possible, communication to commanders, non-commissioned officers, and Service members to reinforce that the culture of zero-tolerance is, in fact, in place.

Finding 10.3: Women respond better to established PTSD treatments than men, especially when the diagnosis is made early. The full complement of health professionals and services for victims of sexual assault, however, does not exist at all locations where ADW serve.

Recommendation 10.3: The DoD should expand adequately trained and gender-responsive staffing for timely medical and psychological evaluation and counseling for sexual harassment, assault, and intimate partner violence. Evaluation and counseling can be provided at an MTF, private care, or telehealth.

Finding 10.4: DHA Connected Health has at least seven publicly available mobile apps to support Service members with behavioral health issues. The DoD has an app that specifically supports military victims of sexual harassment or assault.

Recommendation 10.4: The DoD and DHA Connected Health should re-evaluate and standardize existing digital health tools for ADW's mental health needs, especially regarding sexual harassment and assault. The DoD Safe Helpline app is a potential best practice resource for guiding military members to much needed care and support for sexual assault.

Finding 11: Anxiety, depression, and adjustment disorders are more prevalent in ADW than men. Women and men respond similarly to treatment and counseling for anxiety and depression. Gender- and military-specific identification, screening, and treatment modalities have not been comprehensively studied or deployed.

Recommendation 11: The DoD should validate the gender- and military-appropriateness of all currently used mental and behavioral health screening tools and treatment modalities.

Finding 12: Body appearance standards and Service-specific cultures may contribute to ADW's eating behavior disorders and body image issues. Eating disorder prevalence varies among Services.

Recommendation 12: The DoD should study whether the body appearance standards for women are appropriate to promote physical fitness and attainment of military occupational standards, without inadvertently motivating ADW into disordered eating.

Finding 13: The MHS Dashboard and the Women and Infant Clinical Community Dashboard, maintained by DHA, display different types of women's health measures but mainly measures of inputs, process, compliance, and complications. Few of the dashboards measure outcomes; patient-reported outcome measures are especially rare. The Dashboard data do not show performance at different times of ADW's lifecycle of military service.

Dashboard data are at least 3-6 months out of date, and often much longer. Beyond the lack of timeliness, the Dashboards have restricted access, and lack metrics on ADW's medical readiness (unplanned pregnancy, musculoskeletal injuries, sexual assault). These data deficiencies

limit the Dashboards' relevance for identifying and responding to differential rates of ADW health, readiness, and safety.

> **Recommendation 13:** Create an interactive and customizable ADW's MHS Dashboard that provides line and health personnel with access to up-to-date data on key drivers and outcome measures of ADW's readiness. The Dashboard should track both nationally-accepted and military-relevant women's health metrics, and feature customizable options to reflect the differential needs of the end-users (e.g., Commanders tracking musculoskeletal injury rates and outcomes by gender). The Dashboard should feature patient-reported outcome metrics (PROMs) specific to the needs and concerns of ADW over their lifecycle in the military.

Finding 14: The DoD electronic medical record (EMR) system does not systematically collect PROMs for conditions relevant to women's health and readiness. The EMRs have inadequate and inconsistent documentation of military-relevant medical issues and constrain personnel from documenting specific conditions, their treatment, and the outcomes produced. As a part of MHS' transformation efforts to streamline healthcare services, the DHA has adopted frameworks for measuring and entering PROMs into the EMR, which will allow identification of ADW's health-related drivers of quality and continuous improvement. Currently, however, no standardized ADW-specific readiness metrics are under development in the new set of PROMs.

> **Recommendation 14.1:** The DHA should establish a set of ADW metrics that are informed from review of the universe of women-specific metrics, including inputs like (i) health care personnel training, (ii) compliance with recommendations, (iii) complications, and (iv) PROMs of health and personnel outcomes (e.g., treatment success or failure, readiness return times, attrition rates, and retention rates). Ensure integration of these metrics into the EMR and dashboards.

> **Recommendation 14.2:** The DHA should provide ongoing support and resources to those who have a stake in developing, documenting/reporting, implementing, validating, and tracking of metrics relevant and specific to ADW's health and readiness.

Table of Contents

List of Appendices

List of Figures

List of Tables

Definitions

Please note that this document uses "Active Duty" to encompass all Active Component, including Reserve and National Guard Components of the U.S. Military. Additionally, the report follows recent Department of Defense (DoD) practice by using the terms "mental health," "psychological health," and "behavioral health" interchangeably.[1]

The following terms describe individuals at different points in the accession process:

- Recruit: An individual who has passed accession screening and will begin their career.
- Trainee: A Service member at the beginning of their career going through Basic Military Training (e.g., boot camp).

Chapter 1: Introduction

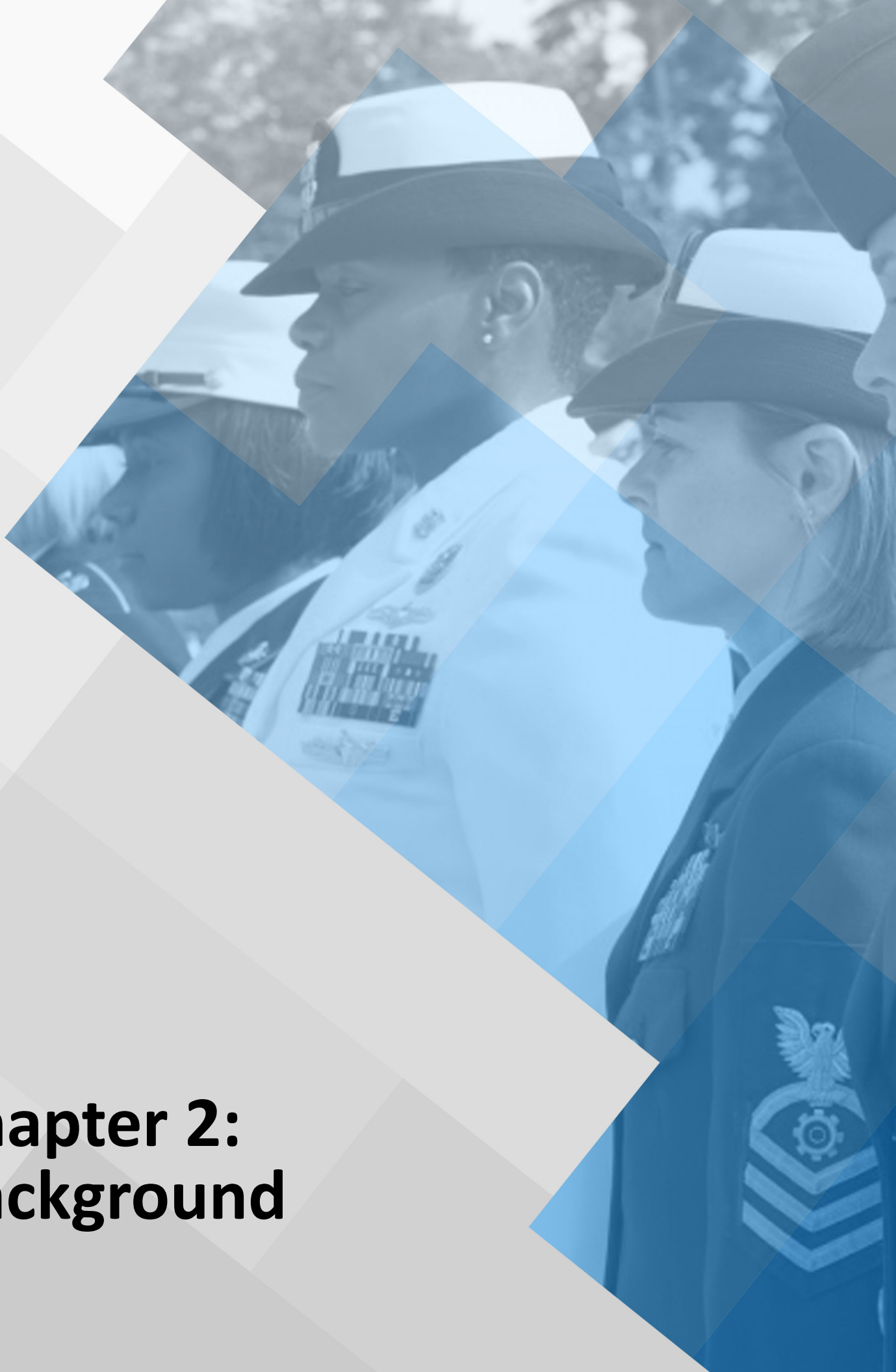
On July 29, 2019, the Assistant Secretary of Defense for Manpower and Reserve Affairs, performing the duties of the Under Secretary of Defense for Personnel and Readiness (USD (P&R)), requested that the Defense Health Board (DHB) provide recommendations to the Department of Defense (DoD) to identify Active Duty women's (ADW's) health care needs, improve accessibility and quality of health services, and optimize individual medical readiness (*Appendix B*). Specifically, the Assistant Secretary of Defense for Manpower and Reserve Affairs tasked the DHB to address and develop findings and recommendations on policies and practices in place to:

- Determine how the DoD should improve research, quality of care, and access to health services for ADW, while maintaining a focus on readiness;
- Address psychological and mental health conditions with gender-specific epidemiologies;
- Evaluate access to reproductive health care services, including preventive care, for ADW throughout the deployment lifecycle; and
- Identify best musculoskeletal injury prevention practices for ADW.

The DHB charged the Health Care Delivery (HCD) Subcommittee to review the provision of ADW health care and related services. The HCD Subcommittee task was specifically to:

- Determine what policies, practices, structure, and capabilities the DoD should implement to improve the quality of and access to women's health services, with a focus on maintaining readiness of ADW. Consult findings and experiences from the Veterans Health Administration (VHA) and the Department of Health and Human Services (DHHS) in making those determinations.
- Review available psychological and mental health services for ADW that address conditions with gender-specific epidemiology, prevention, diagnosis, or treatment considerations such as suicidal ideation, mood disorders, eating disorders, and adjustment disorders.
- Evaluate access to reproductive health services for ADW, including contraception, fertility treatments, genitourinary infections, and obstetric care. Specifically evaluate contraception access and availability in the pre-deployment period and deployed environment and access to and availability of female preventive services such as mammograms and cervical cancer screening in the deployed environment.
- Assess available and currently implemented musculoskeletal injury prevention practices for their effectiveness and applicability to ADW and recommend changes, as necessary.
- Provide recommendations on how the DoD can best identify, prioritize, and implement research on ADW's health issues.

The HCD Subcommittee met in-person on September 16, 2019 and January 24, 2020, and by video teleconference on November 22, 2019, March 30, 2020, April 28, 2020, May 20, 2020, June 17, 2020, July 8, 2020, July 30, 2020, August 27, 2020, September 10, 2020, September 24, 2020, October 8, 2020 and October 22, 2020. The HCD Subcommittee explored DoD policies, practices, structure, and capabilities that promote or inhibit women's health and access to services focused on musculoskeletal injury prevention, reproductive health, and psychological and mental health.



Chapter 2: Background

Women's Participation and Health Care in the U.S. Military

Women's participation in the military evolved slowly during the 20th century with key events or legislation providing the impetus for their expansion into new roles. Health services to meet women's specific needs in military roles and environments, however, have lagged behind their entry into military service.

Women have served in the United States' (U.S.) military since the American Revolution. Initially, women – with a few notable exceptions – served in non-combat roles, typically performing clerical or medical services, far from the front lines.[2] Those who chose to fight disguised themselves as men.[2] Women gained recognition for their contributions during the first half of the 20th century, as they temporarily filled manpower gaps during times of war through Service-specific corps units (Figure 2). During this period, women took traditional male jobs, such as mechanics, pilots, and ambulance drivers. After World War II, women began to hold permanent positions in the military. This status precipitated efforts toward gender-neutral opportunity and treatment in the Armed Forces. Women could attend the military academies, receive promotions through the ranks, and serve in deployment settings. Notably, DoD policy did not permit women to serve in direct ground combat settings until the past decade. The removal of restrictions on roles that women could occupy, and a general emphasis on parity in the U.S. military, significantly increased female enrollment, with women emerging as the fastest growing active duty population. Currently, the DoD estimates that women account for 17% of the active duty component (Table 1), totaling approximately 225,000 women.[3]

Figure 2. Timeline of Women's Formal Pathway to the U.S. Military Service

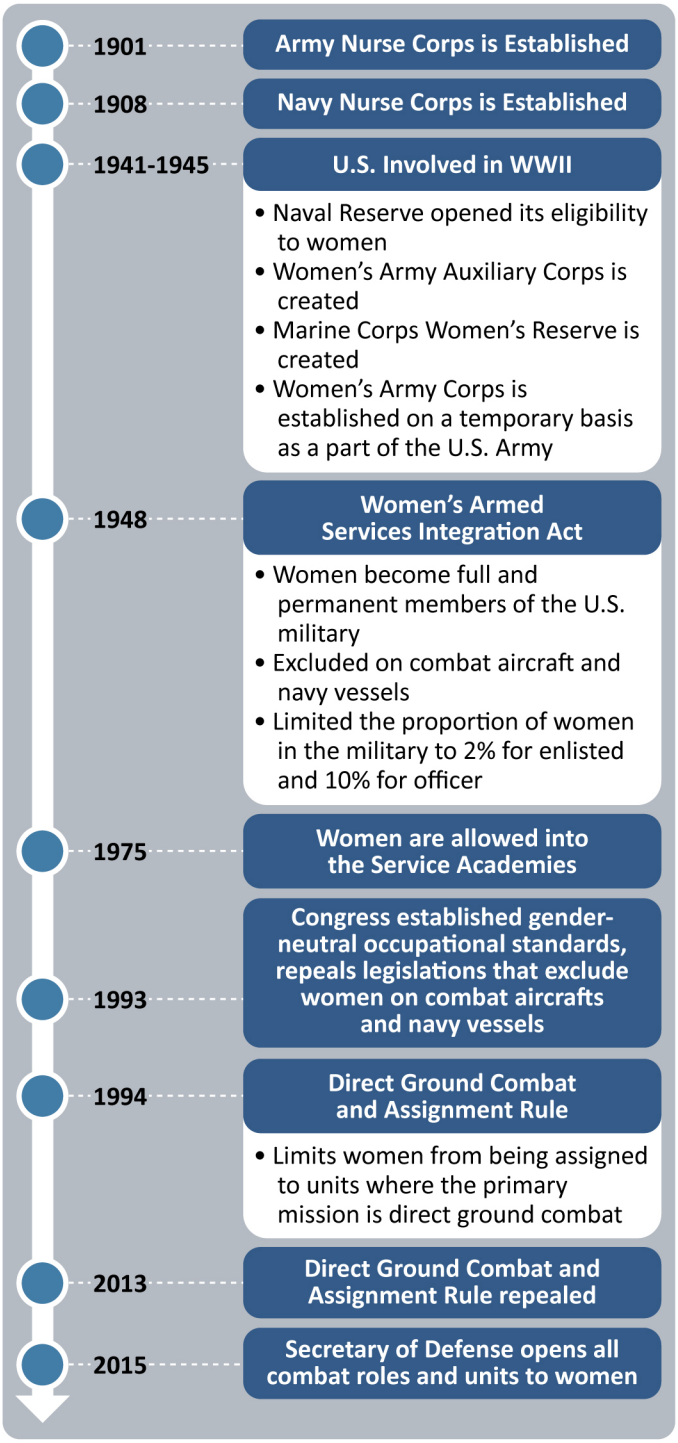


Table 1. Percentage of Women Among U.S. Active Duty and Reserve Component Population, by Service and Rank, 2020

Component	Officer	Enlisted	Cadet/ Midshipmen	Total
Active Duty Total*	19%	17%	26%	17%
Air Force	22%	21%	28%	21%
Army	18%	15%	23%	15%
Navy	20%	20%	28%	20%
Marine Corps	8%	9%	-	9%
Reserve Total**	20%	20%	-	20%
Air National Guard	20%	21%	-	21%
Air Force Reserve	27%	27%	-	27%
Army National Guard	14%	18%	-	18%
Army Reserve	25%	24%	-	24%
Navy Reserve	20%	25%	-	24%
Marine Corps Reserve	7%	4%	-	4%

**Total Active Duty Component calculated based on the 2020 Defense Manapower Data Center Reports[2,3]*
***Total Reserve Component calculated based on the 2018 Demographics Report[4]*

The Military Health System (MHS) began to care for women in the early 1940s to provide maternal and infant care for the spouses of young draftees.[6] Women, at the time, were not permitted to remain on active duty if pregnant. Maternal and infant health care remains the largest area of utilization in the military medical treatment facilities (MTF), with over 109,000 childbirths recorded in fiscal year 2019.[6,7] All military hospitals offer general gynecological care, and over 90% of them provide basic or specialized levels of maternity and neonatal care services.[8] In deployment settings, however, ADW have limited access to urologic/gynecologic care or for medical and mental health care after sexual assault due to limited transportation, communication, laboratory capabilities, and skillsets of personnel.[9,10] Enlisted medics, corpsmen, and physician assistants have limited exposure and knowledge, both didactic and clinical, about women's health topics.[11]

Legislative Milestones with Health Ramifications for ADW in the U.S. Military

Over the years, women's involvement and outstanding performance in conflict zones prompted ratification of statutes and policies that widened employment opportunities and transformed women's relationship to the MHS. Prior to World War I, insufficient medical providers for male Service members drove the recruitment of women as nurses and led to the establishment of the Army and Navy Nurse Corps. Subsequent legislation, including the Women's Armed Services Integration Act of 1948 and the repeal of the Direct Ground Combat and Assignment Rule in 2013, increased the roles available to women including direct combat. These legislative actions, along with multiple other statutes and policies enacted or issued in the intervening years and beyond, have shifted women in increasing numbers from providers to consumers of military health care (Appendix F).

After the Women's Armed Services Integration Act passed in 1948, women's health became a vital component of the Military Services' medical readiness. During the next seven decades (1948-2016), policymakers leveraged the Act to apply laws focused on the impact of women's health on unit readiness and the MHS, such as the provision of women-specific health services and research. Other legislative actions included the elimination of combat exclusion policies described above, the introduction of gender-neutral occupational performance standards, and the establishment of policies for maternity leave. Early in this period, Servicewomen observed policy changes that removed prejudice against their continued service or promotion based on their status as a mother or expectant mother. Legislation on women's rights enacted in the mid-1990s led to multiple initiatives raising awareness of women's primary and preventive care, family planning, and vulnerability to sexual assault and rape. Statutes and policies focused on women's integration and retention in military service drove the piecemeal development of a healthcare system for women in the military.

ADW's Health and Readiness – Research and Recommendations

Previous ADW's Health and Readiness Studies

The transition of women from providers to active consumers of military health care exposed the military's limited understanding of their specific health care needs and challenges.[2,12,13] Multiple congressionally-mandated studies, DoD programs, and external advisory bodies aimed to fill those gaps. In the National Defense Authorization Act for Fiscal Year 1994 (NDAA), Congress appropriated direct funds to the health of female Service members, ordering the creation of the Defense Women's Health Research Program (DWHRP).[12] The Institute of Medicine provided recommendations to guide the focus of the DWHRP studies, including longitudinal women's health studies; the development of gender-specific databases; and four specific lines of effort: the health and work performance of military women, psychological and physical health issues resulting from the integration of women, health promotion and disease prevention, and access to and delivery of health care.[14] The DWHRP supported 104 intramural and 30 extramural studies categorized within 10 health research issues.[12] A Research Priorities Report Card published in 2005 reported success in addressing three health issues, limited success in six, and no success in one of those identified issues (Appendix G).[12]

Women's Health Research Gaps

After the DWHRP studies concluded, other military health research groups arose to continue addressing women's health research gaps. The TriService Nursing Research Program (TSNRP) Military Women's Health Research Interest Group (MWHRIG) and the Naval Health Research Center's Consortium for the Health and Readiness of Servicewomen were two of the most prominent. In a collaborative effort, these groups identified eight major topic areas through systematic review of U.S. military women's health research from 2000 to 2010[15]:

- Readiness/health protection/illness prevention
- Gynecological health
- Psychological health
- Deployment health

- Environmental and occupational exposures
- Obstetrics/postpartum issues/fertility
- Chronic disease
- Interpersonal violence/sexual trauma

The MWHRIG successfully identified research gaps in each topic area; however, a lack of high-quality research and a predominance of descriptive studies limited advancement in women's health research.

Englert and Yablonsky expanded the MWHRIG's literature search through 2015 and updated the eight major topics of women's health and health outcomes in the military (Table 2).[16] The authors identified research gaps in seven of the eight topic areas, with the largest gaps noted in obstetric-gynecologic health and psychological health. The authors also graded the quality of ADW's health studies based on conceptual framing, appropriateness, transparency, validity, reliability, and cogency using a quality-assessment tool adapted from established frameworks.[16] Obstetric-gynecologic health topics had a disproportionate amount of low-quality studies compared with other major topic areas.

Table 2. Identified Gaps in Active Duty Women's Health Topic Areas

Major Topic Areas	Identified Gaps
Psychological Health	Stigma Adjustment disorders Personality disorders Eating disorders
Readiness	Sleep
Injury	None
Acute care and preventative medicine	Sexually transmitted infections
Deployment Health	Gynecological care
Social Relationships	Sexual assault Physical assault
Chronic illness	Cancer Multisystem illness
Obstetric-gynecologic health	Contraception Uterine wellness Menstruation Menstrual suppresion General obstetrics and pregnancy Birth outcomes/infant health Vaginal health Unplanned pregnancy Breast wellness Breastfeeding Fertility

The elimination of ground combat exclusionary rules for women renewed interest in readiness related health issues for ADW. In particular, the Women in Combat Symposium of 2014 brought together thought leaders to address gaps in the areas relevant to women's success in combat roles: leadership and peer behavior, operational performance, and health and well-being (physical health and well-being, psychological and social health). Tepe et al consolidated the Symposium's findings into 20 research gaps with 13 of the reported gaps having a direct impact on female Service members' health (Appendix H).[17]

Other notable groups and advisory bodies have offered findings and recommendations relevant to ADW's health. These include the Defense Advisory Committee on Women in the Services (DACOWITS), the Institute of Medicine subcommittees, the Office of the Assistant Secretary of Defense for Health Affairs, the 2011 Army Women's Health Task Force, and the U.S. Government Accountability Office (GAO). Appendix I lists the recommendations from these groups. The DoD has not yet fully realized many of these recommendations, and research gaps inhibiting discovery and adoption of best practices remain.

Operational Readiness in ADW

Operational Performance and Health in ADW

Service members are required to maintain operational readiness, or "the capability of a unit/formation, ship, weapon system, or equipment to perform the missions or functions for which it is organized or designed."[18] The achievement of operational readiness comes through training, equipping, organizing, and maintaining armed forces. Service member characteristics can influence readiness. Many who opposed eliminating the ban on women serving in ground combat roles argued that women would not be physically capable of enduring military operations due to female physiology. These opponents contended that physiological differences between men and women – including body composition, musculoskeletal, cardiorespiratory, metabolic, and thermoregulatory function – would weaken women's performance in combat and lower military readiness.[2] This argument rested on the implicit assumption that all-male units are uniformly high-performing in combat; in other words, the distribution of men's and women's performance would not overlap.[2]

History has demonstrated that women are capable, both physically and mentally, to perform in combat. A Marine Corps combat gender integration study indicated gender-integrated teams performed as well or better on decision-making tasks than all-male teams.[19] In the Iraq and Afghanistan wars, nearly 300,000 women deployed and competently served in support of Operation Enduring Freedom and Operation Iraqi Freedom.

Yet, biomechanical, musculoskeletal, and physiological characteristics do impact physical readiness. Female physiology renders women prone to a higher rate of injury compared to their male counterparts; their increased vulnerability to injury can translate into increased medical absences, which leaves units undermanned or under-skilled for military exercises, operations, and deployments.[2, 12, 20] Significantly, however, sex-specific interventions may improve women's physical capabilities, reduce their injury risk, and dramatically raise personal and overall unit readiness.[20]

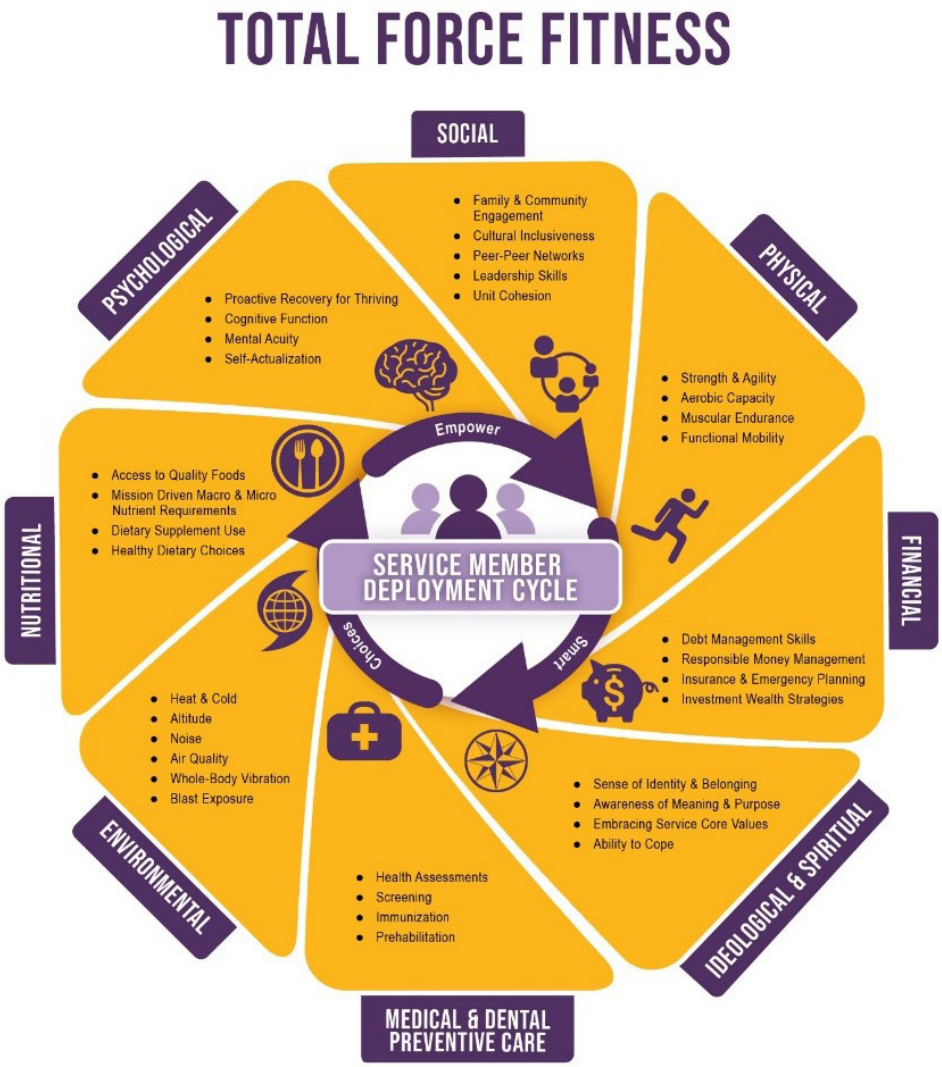
To date, growth in resources dedicated to the health of ADW has not kept pace with their exposure to health risks. As ADW's involvement has expanded to direct combat roles, women have incurred greater casualties and threats (e.g., kidnappings, higher rates of morbidity and mortality). Service officials have noted that the military could increase female readiness by addressing sex-specific health and medical issues, but the DoD has not fully acknowledged this recommendation and certainly not put it into practice.[13]

Framework for Operationalizing and Measuring Health and Readiness

The guiding principles of this report call for an integration of recommendations within an existing DoD framework. The DHB reviewed several existing health prevention frameworks, including Lifestyle Medicine, the Army's Performance Triad, and Total Force Fitness (TFF). DoD leadership can utilize these prevention frameworks to establish gender-neutral standards to systematically improve the health of ADW. The DHB chose to align its recommendations with the TFF framework due to existing metrics, endorsement by the Joint Chiefs of Staff, and well-developed health and wellness domains.

The TFF, first introduced in 2011, provides a holistic framework focused on prevention efforts across eight interrelated domains (Figure 3).[21] The overall aim for each military organization is to holistically examine and optimize the methods available to screen and assess the total fitness of its Service

Figure 3. Domains of the Total Force Fitness Framework (Provisional)



members.[21, 22] The framework allows leaders and Service members to understand, assess, optimize, and maintain the Military Services' capabilities to execute the full range of military operations.[21, 22] The TFF concept and domains are gender-neutral in nature, thus it is broad enough to capture ADW's health needs. TFF metrics will define and assess mission readiness, unit mission effectiveness, and individual total fitness. Individual domain metrics are currently under evaluation by several DoD-level working groups.[23] Below are brief overviews of the provisional TFF domains with corresponding illustrative or notional metrics.[23]

1. **Social Fitness:** the ability to engage in productive personal and professional relationships, positively interact with unit and command networks, leverage resources that promote overall well-being and optimal performance of mission essential tasks (METs).
   The metrics may include the Group Environment Questionnaire for task cohesion and social cohesion, and the Navy Bureau of Medicine and Surgery's "stress thermometer" to assess Service members' personal stress levels and their families.

2. **Physical Fitness:** the ability to physically accomplish all aspects of METs while remaining mission capable and avoiding injury.
   The metrics may include fitness evaluations and the rate of loss of duty days to injury.

3. **Financial Fitness:** the ability to make and exercise money management decisions that best support Service members' life circumstances and optimal performance of METs.
   The metrics may include the enrollment rate of Service members in government food and financial assistance programs.

4. **Ideological & Spiritual Fitness:** the ability to operationalize one's spirituality composed of beliefs, practices, principles, and values to optimize performance of METs and strengthen connectedness with sources of hope, meaning, and purpose.
   The metrics may include the rate of re-enlistment to assess morale.

5. **Medical and Dental Preventive Care Fitness:** the ability to sustain health and wellness and facilitate restoration to meet established medical and dental standards for fitness for duty, return to duty, and medical readiness.
   The metrics may include dental status, immunization status, hearing and vision ability, periodic health assessment measures, and other metrics tracked by Service-specific information management systems.

6. **Environmental Fitness:** the ability to optimally perform METs in any operational environment including, but not limited to, deployment, garrison, and training.
   The metrics may include the rates of electrolyte imbalance, heat-cold injuries, hydration, and community-level pollution exposure.

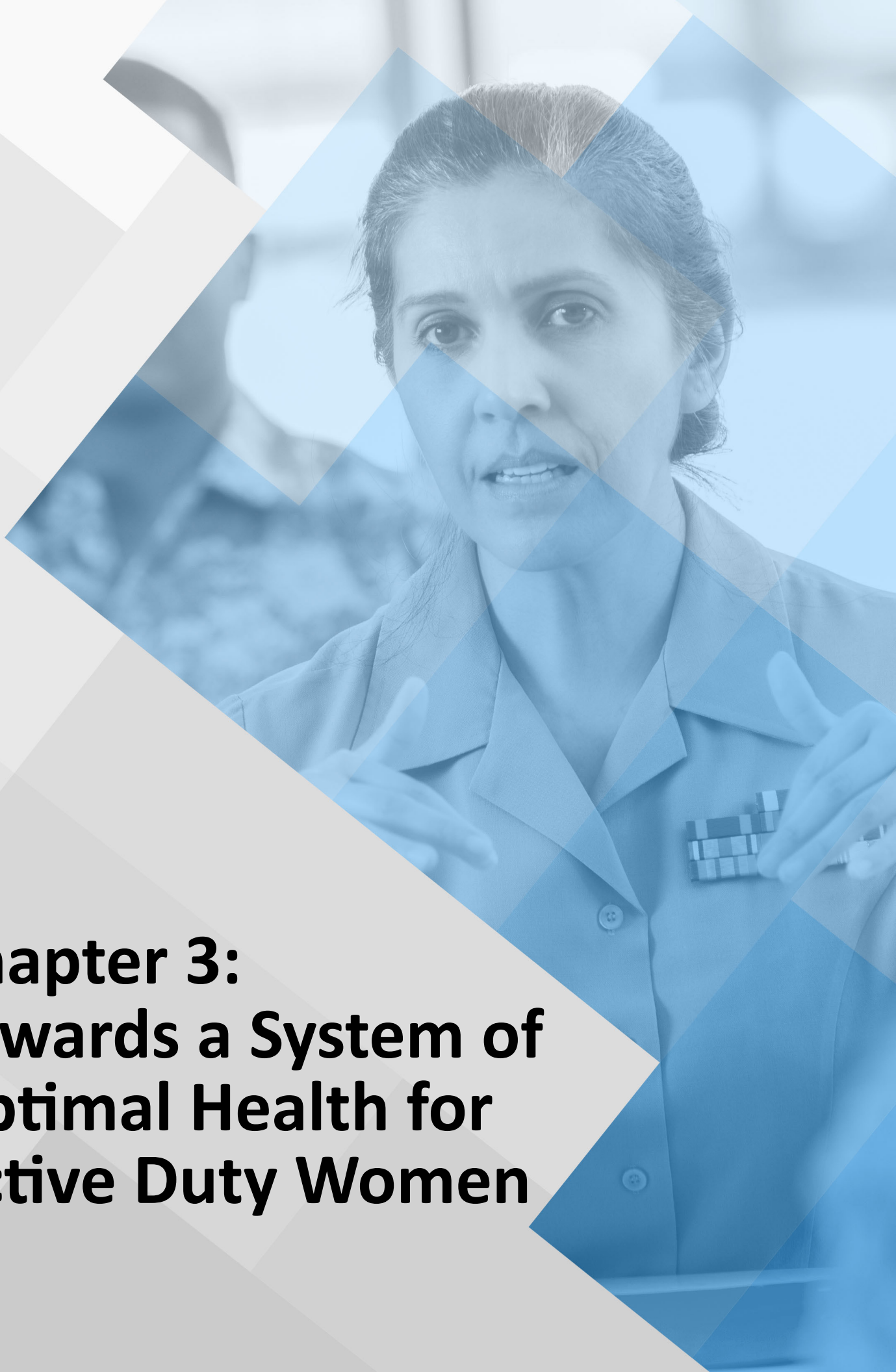
7. **Nutritional Fitness:** the ability to sustain an optimal level of MET performance through consumption of foods, dietary supplements, and beverages in adequate quantities, quality, nutrient content, and proportions.
   The metrics may include healthy eating rates (e.g. nutrition surveys, Healthy Eating Index), food nutrient adequacy, affordability, and availability within dining facilities, on-base, and in the surrounding community.

8. **Psychological Fitness:** the ability to integrate and improve cognitive, emotional, and behavioral capacities to optimize the performance of METs and ensure mission readiness.
   The metrics may include rates of perinatal and postpartum depression and anxiety, negative body image/dissatisfaction, and psychological abuse related to intimate partner violence (IPV).

Towards a System for Optimal Health for ADW

Women's increasing role in combat operations and peace engagements has opened new opportunities but uncovered deficiencies in their health status and the military's ability to competently deliver health care to them. Efforts to address these gaps through statutes, research, advisory committee reviews, and task force evaluations have yielded modest successes, but many ADW health care needs remain inadequately addressed leading to sub-optimal health and reduced operational readiness. Despite 25 years of studies and recommendations, the DoD still lacks a self-sustaining unitary organizational approach to ADW's health.

The subsequent chapters of this report will describe the governance and measurement of ADW's health, three major topic areas with morbidity in ADW, and DoD and Service-specific efforts and initiatives to address ADW's health concerns. Each chapter will identify current research, best practices, and recommendations to enhance the health and readiness of female Service members within the context of the TFF approach.



Chapter 3: Towards a System of Optimal Health for Active Duty Women

Impact of Institutional Culture and Governance on ADW's Health Services

Globally, well-functioning health systems strive for universal health coverage for all who seek care.[24] Universal health coverage removes the cost barrier to assure equitable access to health services, medications, vaccines, and technologies.[24] In theory, UHC is the fundamental goal of any health system, but, in practicality, universal health coverage does not guarantee parity in health services for men and women.[25] Gender-based differences in societal norms and expectations, health risk factors, disease incidence, and health service needs greatly influence women's access to care.[25] Such differences often leave women with their health needs unmet, especially when gender equity is not an explicit goal of a health system's set priority.

Box 1. Selected Best Practices Related to Women's Health Governance, Health Service Accessibility, and Culture

Centralized Women's Health Services Offices
Centralized Women's Health Services Office Supports medical readiness of Active Duty Women of the Navy by implementing a Female Force Readiness Strategy
Best Practice: Navy Office of Women's Health
Owner: Navy Bureau of Medicine and Surgery

Grassroots Organization with Direct Communication to Policymakers and Service Leaders
Promotes female-specific health care programs, and policies in support for individualized health care
Best Practice: Air Force Women's Initiative Team
Owner: Air Force Barrier Analysis Working Group

The MHS prioritizes *Better Health, Better Health Care, Lower Cost,* and *Increased Readiness* for all Service members. Through this prioritization, ADW receive health coverage at little to no cost. Women represent over 40% of MHS active duty and active duty family member beneficiaries.[8] The expanding and evolving roles of ADW increases their exposure to varying health and safety risks, however, a significant percentage of available health care services for women only deliver maternity and neonatal care.[8] Similar to the civilian population, gender-based differences exist in the military. The MHS is engaged in efforts to better understand and support the unique health needs of ADW.

Restrictive gender norms, such as traditional male-centric values, can weaken a health system's functioning compromising access and quality health care.[26] For ADW, the impact of restrictive gendered norms concerning the perception of women being physically or mentally inferior can take the form of health care providers or leadership trivializing or overemphasizing their health concerns. Infusing a gender-responsive, transformative approach into the MHS's grounded priorities will create a health system that actively considers and addresses gendered norms and attitudes at all forms and levels of health care.[24, 27]

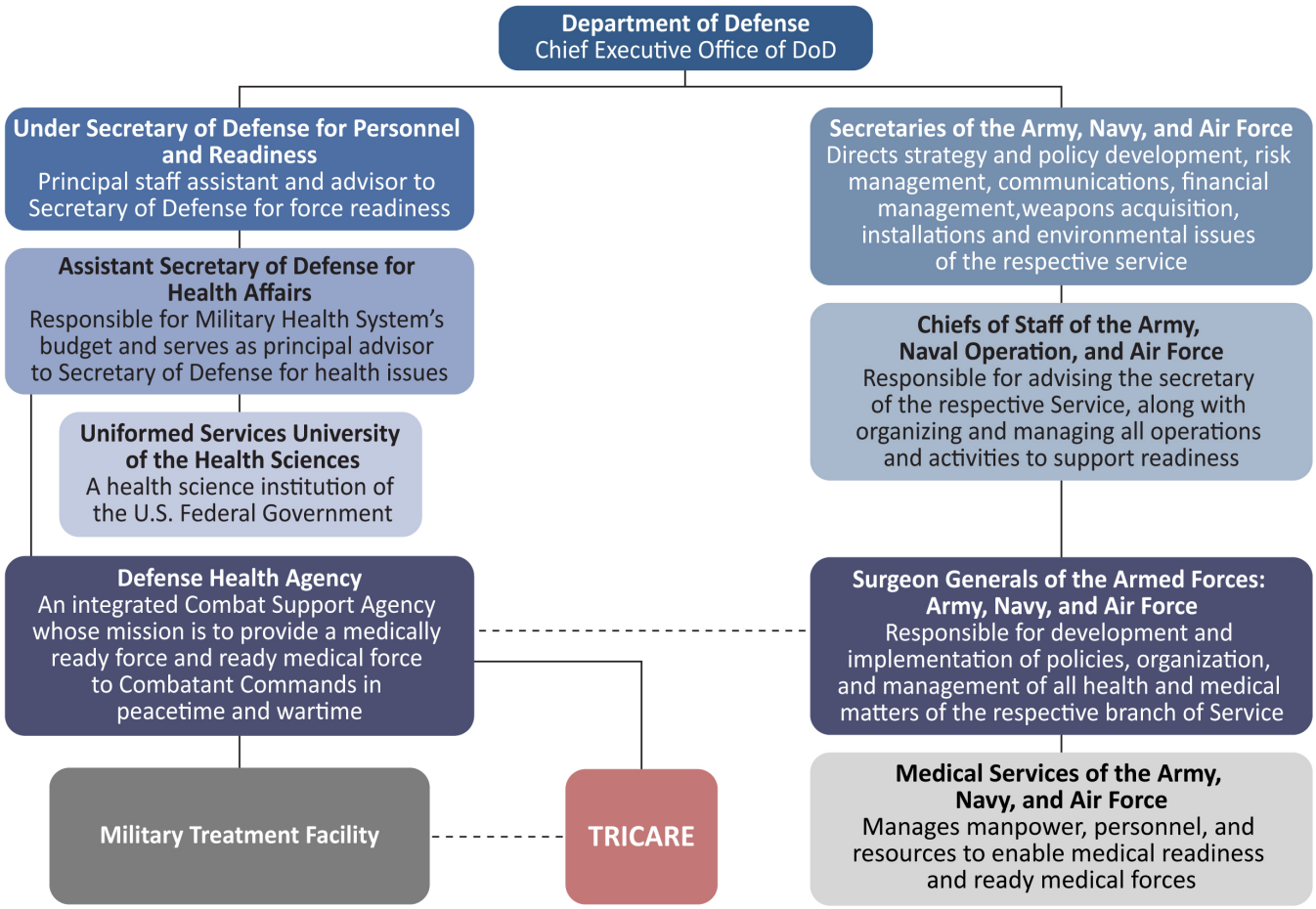
Current shifts in military medicine, including a cultural shift towards a High Reliability Organization (HRO) model and an organizational shift to one health care system from three, can facilitate needed developments in ADW's healthcare. An HRO embraces a culture of safety and learning that enables continuous improvement to clinical quality, safety, and reliability.[28] Shifting the culture in this direction promotes an environment conducive to driving the gender-responsive approach needed to achieve gender parity. The following section will discuss the ongoing organizational evolution and its relevance

to improved care for military women.

MHS Transformation and the Evolution of Women's Health Care in the DoD

The DoD's MHS is one of the largest and most complex U.S. health care system. Organizationally, the MHS falls under the Secretary of Defense and the USD(P&R), who are also responsible for non-healthcare related issues. The MHS is comprised of the Office of the Assistant Secretary of Defense for Health Affairs (OASD HA), the Defense Health Agency (DHA), the Joint Staff Surgeon, the Uniformed Services University of the Health Sciences, TRICARE, and the military branches' medical services (Figure 4). Each has its primary responsibilities and oversight but works collaboratively to ensure the MHS accomplishes its mission. For example, OASD HA leads policy formulation and program oversight of MHS clinical policies and programs. Specifically, the OASD HA's Office of Health Services Policy and Oversight (HSP&O) develops health policies for women, children, and families. Policies for women's health include ADW and non-active duty female beneficiaries (spouses, adolescents, and retirees). The DHA supports the delivery of integrated health services to MHS beneficiaries and is responsible for driving greater integration of clinical and business practices across the MHS.[29] Together, HSP&O assists the DHA and Services with the development of procedural guidance for health care services directed to ADW.

Figure 4. Organizational Structure of the Department of Defense



Leveraging DHA for ADW's Health

The NDAA 2017 codified the reformation of the DHA and MTFs, entitling responsibility of the MTFs to the DHA. This reform centralized governance of budgetary matters, information technology, health care administration and management, administrative policy and procedure, and military medical construction. Through this reformation, the DHA adopted the MHS's charge to ensure the Service members' health-related readiness, provide for military personnel and their dependents' health care needs, and maintain a ready medical force.[5] Ensuring health readiness requires the DHA to adopt best and evidence-based practices for disease and injury prevention, health communication, and disease monitoring and tracking. Reformation of DHA also led to other health system modernization efforts, such as consolidation of TRICARE medical benefit packages, expansion of health care systems partnerships, implementation of an integrated electronic health record system, and advancements in technology (e.g., expansion of telehealth options).[6, 30]

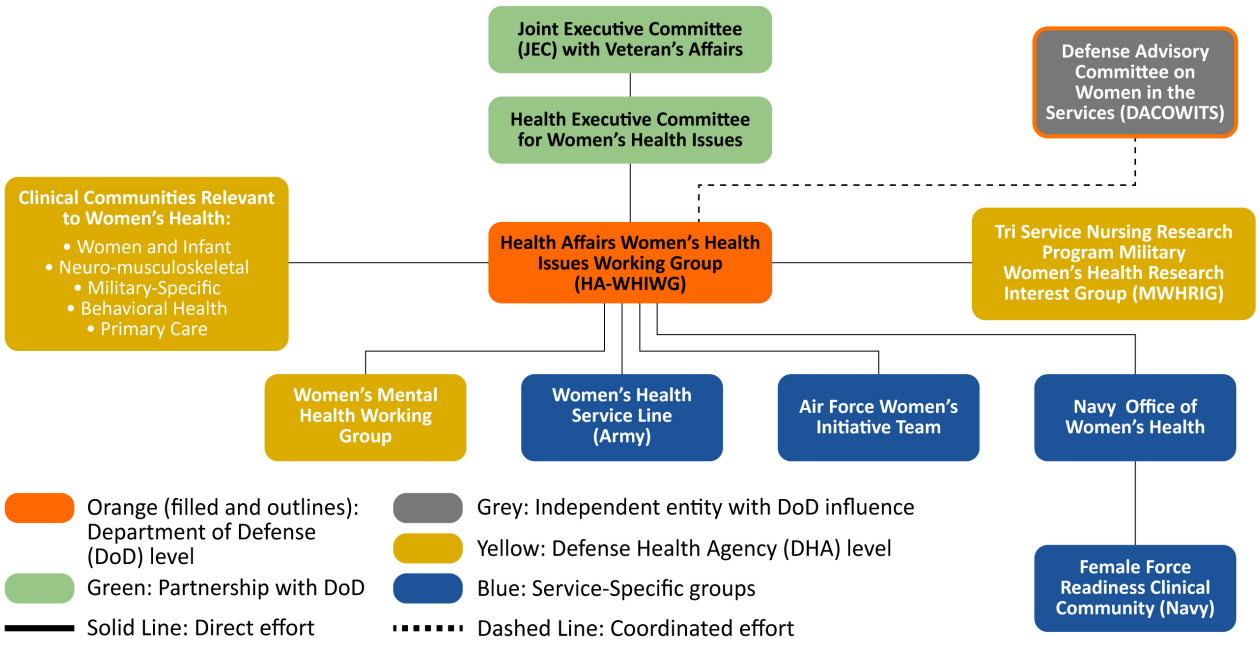
Before establishing the DHA in 2013, the MHS consisted of three parallel Service-specific health care systems, each with its health information and technology system. The DHA is transitioning many elements of the Services' health systems – at first, common functions like pharmacy, logistics, and health records, and more recently facilities, personnel, and policies – into a single system. Health care for ADW is not yet an integrated function.

Leveraging the DHA infrastructure is necessary to integrate both the health protection and performance optimization of ADW, and ensure parity in health services for male and female Service members.[31] Equitable access to effective health care services for ADW, delivered by providers at all points-of-care, calls for a health system with strong leadership and governance that develops firm policies. Integration of all levels of the health information system infrastructure should facilitate timely dissemination of information. Best practices – of which there are many in the DoD (*Appendix D*) – need to be shared so that all ADW receive the same level of care no matter their Service affiliation or location. The work and findings of expert groups in women's health, detailed below, must inform the way forward in this transformative effort.

DoD Women's Health Working Groups and Programs

Congressional, DoD, or Service-specific mandated assessments of women's health in the military led to the establishment of various women's health groups or programs. Many of these women's health bodies continue to exist, beyond fulfillment of mandated missions (including the Tri-Service Nursing Research Program's (TSNRP's) Military Women's Health Research Interest Group (MWHRIG)), to explore and address the health needs of women through community engagement, policy examination, and research. Across the MHS, the DoD has at least 10 currently active women's health advisory or decision-making bodies (Figure 5). These bodies, described below, are disparate and function within various levels of the MHS, often overlapping in their mission.

Figure 5. Department of Defense Committee or Working Groups with Interest in Women's Health



DoD Advisory Committee

The Defense Advisory Committee on Women in the Services (DACOWITS), founded in 1951, is an independent body of advisors to the Department of Defense.[32] The Committee provides advice and recommendations on matters and policies relating to the recruitment, retention, employment, integration, well-being, and treatment of Servicewomen. DACOWITS addresses ADW's health as it relates to the aforementioned topic areas. The Committee has published multiple recommendations regarding ADW's health (*Appendix I*). DACOWITS is the only federal advisory committee in the DoD devoted solely to matters on women.

Multi-Service Women's Health Groups

The DoD has multiple internal, inter-Service, and inter-governmental women's health committees and working groups. The DoD-level women's health working groups collaborate and share resources with entities internal and external to the DoD to drive solutions for ADW's health issues. The Joint Executive Committee (JEC) provides a forum for Veteran's Affairs (VA) and DoD senior leadership to communicate on joint interest topics.[33] The VA/DoD Women's Health Working Group and JEC Sexual Trauma Working Group are working groups under the JEC. The VA/DoD Women's Health Working Group reports directly to the Health Executive Committee and addresses current and emerging health care needs of transitioning ADW and women Veterans. This Working Group's notable achievements include:

- A webinar on Genetic Testing for Breast Cancer Referral Screening
- Women's Health Transition Training (described below)
- Women's health questions for the baseline Separation Health Assessment
- Musculoskeletal and Mental Health mini-residencies for providers

The Sexual Trauma Working Group, established in August 2020, directly reports to the JEC. By order of the Veterans Access, Choice, and Accountability Act, the Working Group implemented section 402 to ensure smooth transferral of benefits and care for Service members transitioning to the VA who experienced sexual assault and sexual harassment during their service.[33, 34]

The VA/DoD Health Executive Committee Women's Health Working Group charter contains the DoD's women's mental health agenda. The charter's requirement to "address the delivery of treatment, services, programs, policy, and research related to the mental health needs of transitioning ADW and women Veterans" formally established the Women's Mental Health Workgroup in 2011.[35] The DHA's Psychological Health Center of Excellence (PHCoE), in collaboration with the Health Affairs Women's Health Issues Working Group (HA-WHIWG), the Services, VA, and other stakeholders, led the Women's Mental Health Workgroup's efforts in the development of a VA/DoD women's mental health online training course, a literature review, and the VA/DoD Women's Mental Health Mini-Residency.[35]

The OASD HA's HSP&O collaborates with the Services, the DHA, and across the DoD, through participation in working groups, to ensure that the MHS accomplishes its women's health mission. The HA-WHIWG, comprised of DoD, DHA, and Service representatives, convenes to discuss emerging women's health issues and assist with the development of DHA procedural guidance for ADW health care services. Additionally, the OASD HA leveraged working groups, such as the Medical Management of Patients Disclosing a Sexual Assault Working Group and Sexual Assault Forensic Examination Sub-Working Group, to improve measures, optimize sexual assault prevention, and develop health care management tools.[36] These working groups, now defunct, developed DoD Instruction 6310.09, Medical Management of Patients Associated with Sexual Assault and the associated DHA Procedural Instruction. In early 2020, DHA stood up the Forensic Healthcare Advisory Group to disseminate related policy and continue improvements to medical forensic clinical practices. In support of the Advisory Group, PHCoE's Sexual Assault Advisory Group provides technical guidance at the collaborative forums.[37]

The DHA's primary responsibility as a joint integrated Combat Support Agency is to drive more effective and efficient clinical and business processes across the MHS. A key driver for integrating the Services' clinical processes for women's health and other disciplines is the formation of the DHA Clinical Communities. Clinical communities promote integration through tri-Service coordination, clinician engagement, the establishment of value and outcome metrics, clinical performance improvement, coordination with clinical support services, development of standardized patient-focused care pathways, and knowledge maintenance.[28] The DHA has 11 Clinical Communities. ADW's health readiness falls within the purview of five of the Clinical Communities: Women and Infant, Behavioral Health, Neuro-musculoskeletal, Primary Care, and Military-Specific Care Clinical Communities. The Women and Infant Clinical Community (WICC) and the Primary Care Clinical Community (PCCC) are the primary subject matter expertise repositories for women's health care. The WICC focuses on women's Gynecologic Surgery and Obstetrics and perinatal care, and the PCCC focuses on well-woman topics such as breast and cervical cancer screening. The goal for all Clinical Communities, the WICC and PCCC in particular, is to align and standardize policies and procedures impacting health care delivery for Active Duty Service Members (ADSMs) and their beneficiaries. These Clinical Communities promote initiatives to support health care, readiness, and overall Service member well-being/mental health,

including the gender-specific needs of female warriors.[38]

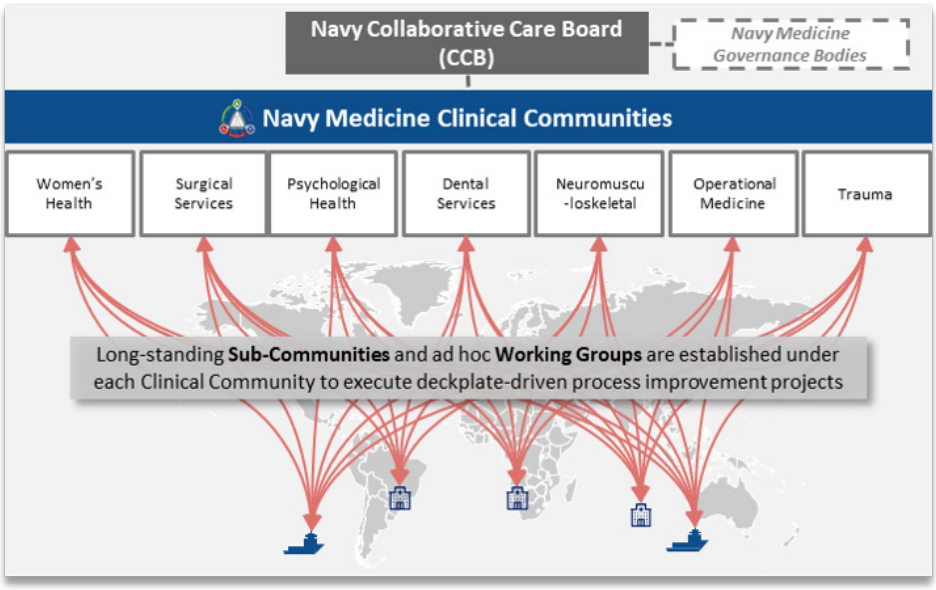
The Tri-Service Nursing Research Program (TSNRP) established the Military Women's Health Research Interest Group (MWHRIG) to address the lack of consolidated research on women in combat.[39] The group expanded their research agenda and fostered a mission to build scientific evidence, strengthen interagency collaborations, mentor research scientists, and advance the translation of evidence into clinical practice application.[39] Research topics of interest for the MWHRIG include gender specific and reproductive care, general health, mental health, substance abuse, and trauma. As discussed in Chapter 2, the MWHRIG published several gap analyses of the deficits in ADW's health research. However, recent budget cuts affecting a number of programs, including the MWHRIG, resulted in a nearly $4 million reduction to the TSNRP program for fiscal year (FY) 2020.[40] In October 2020, TSNRP received FY21 temporary Bridge Funding from the Uniformed Services University in which $2.3 million is allocated to military nursing science research and evidence-based practice awards. Historically, the TSNRP received $6 million annually for research and awards, however future funding of TSNRP is uncertain.[41] This cut in funding to TSNRP perpetuates the long existing or inadequately addressed gaps in ADW's health research.

Service-Specific Women's Health Groups

Navy

Among the Services and DHA, the Navy has the most well defined ADW's health organization. The Navy's Office of Women's Health (OWH), established in 2010, provides oversight, coordination, and prioritizes initiatives to advance ADW health services.[42] Their mission is to support medical readiness by ensuring ADW's health is an integral component of the total Fleet's and Marine Corps' health. The OWH develops and executes a Female Force Readiness Strategy. The Strategy is comprised of three tenets (health and wellness, culture, and education) encircled around six goals targeted to improve operational readiness, develop an educated patient and provider population, and deliver integrated care to female Sailors and Marines.[42]

Figure 6. Navy Medicine Clinical Communities[43]



The Navy has its Clinical Communities, similar to those at the DHA-level. The DHA adopted the Navy's model and nomenclature of Clinical Communities

for consolidation of subject-matter expertise for process and quality improvement in a High-Reliability Organization. The Navy's Women's Health Clinical Community created a sub-community in 2018, the Female Force Readiness Clinical Community, to focus on the female force's medical readiness and provision of ADW's healthcare in the operational setting (Figure 6).[43]

Similar to the role that the MWHRIG serves for the MHS, the Consortium on the Health and Readiness of Service women, developed by the Naval Health Research Center, served to elevate ADW's health in the Navy research portfolio. The Consortium, disbanded in 2017, was a loose network of more than 30 research scientists across public and private institutions.

Air Force

The Air Force has an ADW's group, Air Force's Women's Initiative Team (AFWIT), unique in its focus on policy and its composition and placement outside of traditional DoD health organization and leadership. AFWIT is a policy group comprised of over 400 volunteers and one permanent government civilian lawyer.[44] The AFWIT has female-specific health care programs, policies, and entitlements lines of effort that prioritize issues related to providing high quality, individualized healthcare for ADW in the Air Force. Individual champions with personal motivation help drive the success of the AFWIT. At the time of this report, a Medical Service Corps Officer leads the current initiatives in the AFWIT's health care line of effort; other champions include an active duty aircraft mechanic and a planning and programming officer.

The AFWIT focuses on policies that affect a woman's ability to serve the Air Force's mission. It operates under the Air Force Barrier Analysis Working Group, a group that reports directly to the Secretary of the Air Force's Office. The AFWIT provides a direct line to escalate women's health priorities from the tactical level up through senior leadership and policy makers.[44] Accomplishments, to date, include incorporating a sliding scale protocol for return to physical fitness assessments after a pregnancy event; repealing an exemption policy prohibiting pregnant and postpartum women from attending professional military education; and facilitating the action behind updating the DoD equal opportunity policy to prohibit pregnancy-based discrimination.[45-47] Women's health groups partnered with entities outside of the MHS structure are at an advantage in promoting the medical readiness of ADW. These groups positively impact military women's health by facilitating changes to policies, including administration, personnel, and logistics, that indirectly affect women's health and wellness.

Army

In December 2011, then-Army Surgeon General Major General (MG) Horoho directed the establishment of the Army's Women's Health Task Force (WHTF) to address the health concerns of ADW in combat.[48] The WHTF counts among its successes improved female health education, better body armor for females, the creation of women's health clinical practice guidelines for use by medics and providers, and promotion of the Female Urinary Diversion Device (FUDD).[48] Other areas of work included addressing the psychological needs of families when Service members deploy, addressing military sexual trauma through the Sexual Harassment and Assault Response Prevention (SHARP)

program, addressing the psychological effects of women in combat, and examining the feasibility of a 12-month postpartum deployment deferment.[48] The Women's Health Service Line replaced the WHTF after MG Horoho's tenure and adopted its remaining tasks. The Women's Health Service Line's mission is to shape enterprise services and policies that foster collaboration and emphasize standardization to optimize women's health services across Army Medicine. MHS's transformation is reshaping the future mission of the WHTF to one primarily focused on women's readiness.[49] The DHA will absorb the WHTF's medical mission.[49]

DoD and Service-level Women's Health Working Groups and Programs Network

The DoD, with its numerous women's health working groups and organizational units, demonstrates a strong commitment to the health of ADW. The decentralized and fragmented groups, however, have had limited effectiveness in improving the health and safety of ADW. Even with many *ex officio* members representing the various groups within the other groups, each working group operates under a different authority, limiting the reach and impact of its ADW's health initiatives. A participant in several DoD women's health groups noted the number of these bodies to the DHB and requested for the DHB to "*Please do NOT recommend yet another Women's Health group*!"[38] Some groups, such as the HA-WHIWG and the DHA Clinical Communities, attempt to eliminate the stovepipes by embedding collaboration into their mission. Representatives from the HA-WHIWG, DHA Clinical Communities, and Service-level working groups briefed the Subcommittee on the successes of their collaborative efforts to mitigate gaps and redundancies in health policy initiatives and health care services. However, these collaborative bodies have no authority or influence on operations, procurement, logistics, and other functional areas in the military that strongly impact ADW's health outcomes. DoD must empower one group with the authority, resources, influence, expertise, and accountability to implement the spectrum of coordinated policy, research, and clinical services needed by ADW.

Federal Women's Health Committees and Programs External to the DoD

The DoD can draw on other federal agencies' experiences in its approach to ADW's health care. The need for increased attention to women's health care began, among the American public, during the 1960s and 1970s.[50] By the 1980s, federal lawmakers passed bills placing women's health care at the forefront of the American agenda.[50] In the 1980s and 1990s, federal statutes established and escalated the emergence of a multitude of committees, councils, programs, and working groups focused on improving U.S. women's health care.[50] The women's health care focus expanded to include clinical and public health research, health promotion, and education. The DHB reviewed the various active bodies across federal agencies to examine their structural capabilities in implementing their women's health care focus and facilitating response efforts.

Department of Health and Human Services

The DHHS has several advisory bodies spread across some of its agencies. The DHHS advisory bodies mentioned in this report are in the National Institutes of Health (NIH), Substance Abuse and Mental Health Services Administration (SAMHSA), and the Centers for Disease Control and Prevention (CDC).

DHHS oversees the national research agenda and the inclusion of women's health priorities through the NIH. Under the NIH Revitalization Act of 1993, the NIH formed two advisory committees: The Advisory Committee on Research on Women's Health (ACRWH) and the NIH Coordinating Committee on Research on Women's Health (CCRWH).[51] ACRWH advises and makes recommendations on priority issues affecting women's health and sex differences research.[51] CCRWH members serve as direct liaisons between each NIH Institute and Center and the NIH Office of Research on Women's Health (ORWH).[51] The CCRWH also serves as a resource for women's health activities across the NIH. The CCRWH's counterpart, the ACRWH is an independent body of multidisciplinary experts who advise the ORWH director on appropriate NIH research activities in women's health. ACRWH's other responsibilities include reviewing the NIH's women's health research portfolio, surveying goals for women researchers' scientific career development, and assessing the inclusion of women and minorities in NIH clinical research.[52] CCRWH members also support the ACRWH efforts by gathering data by age and ethnic/racial groups of women's participation in clinical trials, the development and expansion of clinical trials necessary to the health of women, and women's health research.

Among the many advisory committees existing under the SAMHSA's umbrella, the Advisory Committee for Women's Services is their only federal advisory committee committed to addressing women's substance abuse and mental health services issues. The Public Health Service Act, which grants the DHHS the authority to respond to public health emergencies, also legislatively mandates the Advisory Committee for Women's Services through Section 501.[53, 54] The Advisory Committee's primary responsibility is to advise the Associate Administrator for Women's Services and the SAMHSA Administrator on appropriate activities in respect to women's substance abuse and mental health services.[53]

CDC's Advisory Committee on Breast Cancer in Young Women advises and guides the Secretary of Health and Human Services, the Assistant Secretary for Health, and the Director of CDC on formative research, development, implementation and evaluation of evidence-based activities designed to prevent and promote the early detection and support of young women who develop breast cancer.[51] The Education and Awareness Requires Learning Young Act, section 10413 of the Patient Protection and Affordable Care Act (Public Law 111-148) authorized CDC to develop initiatives to increase knowledge of breast health and breast cancer among women under the age of 40 and heightened risk of developing the disease.[55] The Advisory Committee on Breast Cancer in Young Women develops evidence-based approaches to advance understanding and awareness of breast cancer among young women through prevention research, public and health professional education and awareness activities, and emerging prevention strategies.[55]

From 1990 to 2000, the DHHS established at least five offices and agencies dedicated to women's health. In 1990, the NIH established the Office of Research on Women's Health to promote women's health and sex differences research.[56] DHHS established the first Office on Women's Health in 1991 to lead and oversee the DHHS's Coordinating Committee on Women's Health.[57] From 1994 to 2000, the Food and Drug Administration, Centers for Disease Control and Prevention, Agency for Health Research and Quality, and Health Resources and Services Administration stood up Offices of Women's Health.[58, 59] These offices coordinate their efforts through DHHS's Coordinating Committee of Women's

Health.[59] The combined efforts of DHHS's women's health offices and agencies contributed to significant achievements in women's health ranging from an increase in breastfeeding to addressing sex differences underlying women's health issues for better prevention, management, and treatment of health conditions. DHHS is working to improve the standardization of data collection to continue the progress toward a more proactive response to women's health issues.[54]

These DHHS offices and programs dedicated to women's health resulted from numerous Congressional actions over the decade. However, the 2010 Affordable Care Act codified the establishment of the Offices of Women's Health and gave the offices, as mentioned earlier, new authority, agency, and protection from termination or reorganization without Congress's approval.[59]

Department of Veterans Affairs

The Department of Veterans Affairs (VA), with its health system (the Veterans Health Administration [VHA]), has an internal Women's Health Services Office separate from advisory committees. In 1988, during a rise in the female veteran population, the VHA created the Women Veterans Health Program to streamline women's health services to provide cost-effective medical and psychosocial care.[60] With the demand from women veterans for more services, the VHA escalated the Program to Office status by establishing the Women's Health Services office.[60] This escalation and reorganization within the VA allowed for more collaboration of the Women's Health Services office with other VA offices, like primary care and mental health.[60] The Women's Health Services office provides programmatic and strategic support across six women's health priority areas: comprehensive primary care, women's health education, reproductive health, communication and partnership, women's health research, and special populations.[60] The Women's Health Services office provides a Women Veterans Program Manager at each VA Medical Center to coordinate primary care, pregnancy care, psychiatric care, sexual abuse counseling, inpatient medical/surgical care, homeless programs, and assistance for quality of care issues for women Veterans.[61]

As the VHA is independent of the MHS, many ADW who separate from the Services may lose continuity of care. Recognizing a gap in health care during Servicemembers' transition period could lead to poor health outcomes, the Women's Health Transition Assistance Program Pilot aims to increase ADW's understanding of the VHA's health system, available women's healthcare services, and resources available for transition support.[62] Soon after the program's conception, the VA partnered with the Air Force Women's Initiative Team to develop the transition training for the pilot program.[62] The program increased awareness of the VA's women's health services by over 230% since DoD enterprise-wide expansion in 2019.[62]

Public Law 98-160 established the Advisory Committee on Women Veterans (ACWV) in November 1983.[63] ACWV broadly addresses women Veterans' needs through assessments of VA programs such as compensation, rehabilitation, outreach, and health care.[63] Based on these assessments, the ACWV makes recommendations to the Secretary of Veteran Affairs on ways to improve and modify programs and services for women Veterans.[63]

An important coordinating body for the VA's women's health offices, advisory committees, and programs is the Center for Women Veterans, established in November 1994 by Public Law 103-446.[64] The Center monitors and coordinates VA's administration of health care, benefits, and programs for women Veterans. The Center also coordinates the ACWV's meetings.[64] The Center acts as a liaison to other federal, state, local agencies and organizations, and non-governmental partners. The Center's Director serves as the primary advisor to the Secretary of the VA on the VA's policies, programs, and legislation that affect women Veterans.[64] For women Veterans, the Center connects the women to resources and publicly recognizes their contributions and military service.

Comparison of DoD and Other Federal Agencies Women's Health Programs and Capabilities

Of the three women's health enterprise systems previously described, the DHHS and VHA have a central women's health authoritative body. The VHA leveraged timely reorganizations to streamline their women's health efforts, while DHHS was legally bound to establish various women's health offices. Along with the central bodies for women's health, the DHHS established committees to manage coordination, ensure partnership, and streamline communication. Unlike the DoD, the VA and DHHS have a parent women's health entity that can enact enterprise-wide change. The parent entities are permanent fixtures with the authority, agency, and legal protection to carry out women's health initiatives to completion and follow up. However, through its committees and working groups, the DoD has the flexibility to approach each legally mandated women's health mission in the manner it sees appropriate.

Women's Health Programs and Initiatives in Foreign Militaries

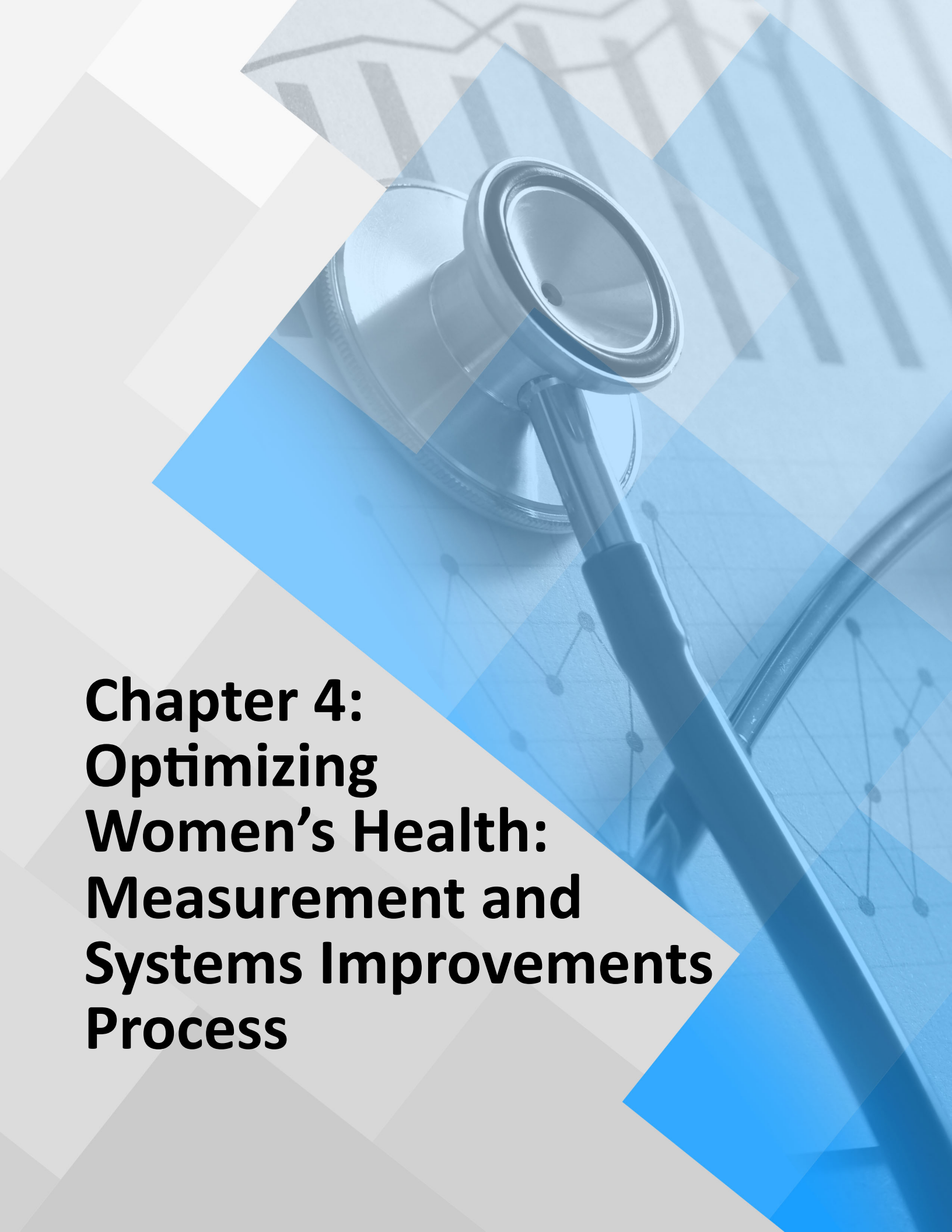
Women serve in the armed forces of at least 74 countries, with approximately 13 countries permitting women to serve in combat roles.[65] The DHB examined six countries' military health systems with women serving in combat (United Kingdom, France, Canada, Germany, Japan, and Israel). Within these countries' militaries, the representation of women ranges from 7-33%.[65-71] These countries, except for Israel, rely on voluntary recruitment of Service members. In April 2019, the IDF prohibited women from serving in combat roles.[72]

The six countries all offer some variation of a universal health care system and provide a primary health care model. The countries leverage the health care system to support military and civilian hospital partnership or cooperation. Germany, Canada, United Kingdom, and France do not offer women's health services nor have obstetrics and gynecology services in their military health system. Women must seek reproductive care at the civilian partner health facility.[65-69] In these countries, maternity leave ranges from three and a half to six months of paid leave, and up to an additional 12 months of partial or unpaid leave.[65-69]

The primary health care model for mental health services in these countries provides community-level health care services and often provides embedded mental health professionals in military units. Israel's and France's military offers specialized military-specific mental health care services based on the severity of the condition through a network of mental health clinics for military personnel only.[69, 71]

Forward Progression of Military Health Care for ADW

The MHS transformation has a significant impact on the health and medical readiness of ADW. Impediments persisting from traditional military structure and standards limit the effects of the transformation and slow the advancement of care for military women. Health system transformations centered on patients, especially women, improves the quality of care for all. The MHS's goals of *Increased Readiness, Better Health, Better Health Care,* and *Lower Cost* put the attainment of high-quality care for ADW within sight. Successful transformation of the MHS integrates the existing military health care structures into one and places greater emphasis on women within the MHS's goals. Setting women as a priority within the goals will minimize gender-associated differences in health care delivery, health care personnel, research, dissemination and implementation of best health care practices, supply chains, personnel policies, and culture. Additionally, strategically positioning a military women's health office among decision-makers and with a clear centralized authority places ADW in a sustained position at the forefront of the military health agenda.



Chapter 4: Optimizing Women's Health: Measurement and Systems Improvements Process

Women's Health Care Quality Measures and Their Link to Readiness

Governmental, accrediting, and professional organizations have developed and benchmarked multiple metrics of women's health. ADW, however, have military-specific health concerns that require military-specific metrics. A combination of existing general and military-specific women's health metrics provides the accountability and motivation for the DoD and the MHS to assess and continuously improve ADW's readiness. These metrics require a responsible agency with a systematic performance improvement process to collect, report, and disseminate the relevant data, interpret them for decision-making, and implement actions necessary to improve the health and readiness of ADW. This chapter starts with a general introduction and framework for the roles of measurement for civilian and military health care systems. It then describes existing and planned measurement programs in DoD. Subsequent chapters will suggest additional military-specific metrics of ADW's health.

Box 2. Selected Best Practices Related to Women's Health Metrics

Customized Women's Health Metrics Dashboard
Transparent, up-to-date visual of 14 women's health metrics
Best Practice: Military Health System (MHS) Dashboard and Woman and Infant Clinical Community (WICC) Dashboard
Owner: Defense Health Agency (DHA) J-5 Strategy, Plans and Functional Integration, and WICC

Service-level Gender Stratification of Health Measures
Health index measures stratified by gender that provide overview of ADSMs' health
Best Practice: DoD Health of the Force Index
Owner: Armed Forces Health Surveillance Branch

High Reliability Organization Status to Support ADW's Health
Subject-matter expertise to support and establish quality improvement methods to measure and improve health outcomes of ADW
Best Practice: Clinical Communities and Quadruple Aim Performance Plans
Owner: DHA J-3 Operational, Clinical Support Division

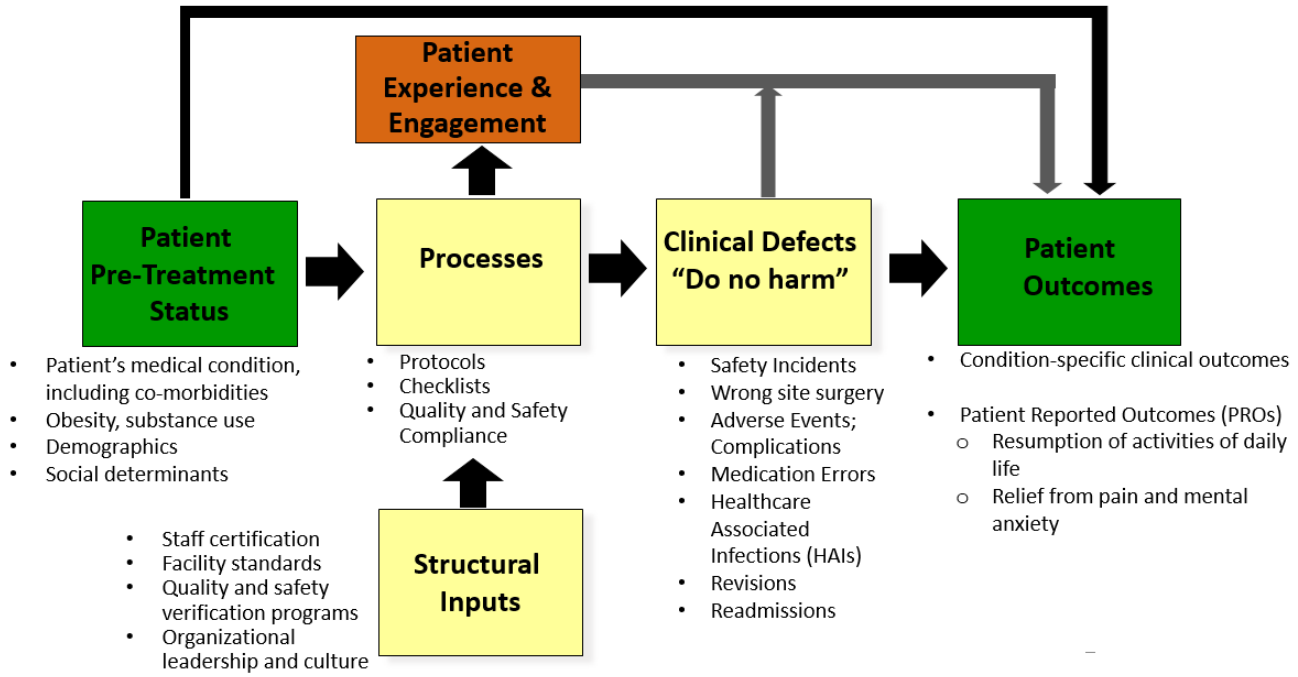
Patient-Supported Health Decision-Making for Better Outcomes
DHA Survey portal that provides expert-selected or developed patient reported outcomes with the potential to be stratified by gender and active duty status
Best Practice: Clinical Community-Driven Patient Reported Outcomes
Owner: DHA Value Metrics Team

Health Care Management Measurement and the Importance of Patient Reported Outcomes: Introduction and a Framework for Analysis

> *"We typically have a bunch of metrics to measure how effectively we deliver a particular kind of health care, and we have all kinds of different metrics that judge the quality of the care we deliver. But those are physician- or medicine-generated requirements. We should have patient-generated requirements, too. What does it feel like to go through the system? How well do they think they're being treated? If we're doing some sort of therapy and the therapy ends up as bad or as worse than a particular disease, then our metrics may look good, but from the patient's perspective, it feels terrible."*
>
> LTG Ronald Place, Director, Defense Health Agency (2020)[73]

Health care generates many measurements but as noted by Lieutenant General (LTG) Place, few capture health care from the patient's perspective. For example, most of the metrics endorsed by the National Quality Forum measure compliance, processes, and complications.[74] Health care measurement can occur at all stages of a patient's participation in the health care system, as shown in Figure 7. A faithful assessment of ADW's health requires measurements at each stage of this cycle, with four corresponding types of metrics: inputs, process and compliance, clinical defects, and outcomes. This assessment should emphasize patient reported outcomes.

Figure 7. Measuring Performance over a Patient's Treatment Care Cycle[75]



The cycle starts with input metrics, measurements about the patients themselves, and the health care facilities that treat them. Patient-specific input metrics, such as gender, health status and behaviors, medical conditions, demographic and socio-economic conditions, are essential since these factors lead to variability in health outcomes. If gender and active duty indicators are not among those inputs, other health metrics will not distinguish ADW from other beneficiaries of the MHS. Input metrics also include measurements about a health care facility's clinical and management personnel and its equipment, facilities, and infrastructure. Patients experience better outcomes when treated at a facility with appropriately-qualified personnel and capabilities.[76, 77] Measuring military health system and treatment facility characteristics are particularly important for assessing whether DHA actions to improve coordination and collaboration of the DoD and MHS with local civilian resources are improving medical readiness capabilities.

The total quality management movement led to health care adopting many process metrics to ensure compliance and conformance to evidence-based treatments. The goal was to reduce variations that do not lead to improved patient outcomes. Hospitals, such as Intermountain Health, formed committees of doctors, nurses, and administrators to identify treatment variations for high-volume conditions. The committees used quality metrics to detect which variations did not lead to better outcomes, eliminated them, and introduced metrics on compliance to the evidence-based pathways.

Clinical defect or complication metrics typically include the incidence of things gone wrong, such as wound infections during medical or surgical treatment. Aggregate measures of a facility's defects and complications include the incidence of readmissions, retreatments, and revision surgeries. Occasionally, medical treatment causes harm to patients while undergoing medical treatment, as measured by the frequency of safety incidents, wrong-site surgery, adverse event complications, medication errors, and healthcare-associated infections. The American College of Surgeons' National Surgical Quality Improvement Program (NSQIP) has introduced systematic measurement and benchmarking of the risk-adjusted incidence of defects in surgical care.[78] The metrics are collected for thousands of operative procedures across most surgical specialties, including obstetrics and gynecology, and are more useful for clinical staff than for patients.

All these metrics – Input, Process & Compliance, and Clinical Defects – are useful and necessary but not sufficient. Patients, including ADW, seek care to have their condition cured or, at least, alleviated, using a well-informed and convenient treatment process. Patient reported outcome measures (PROMs), which track patients' quality of life both before and after encounters with the health system, provide this information. Since only patients are aware of their outcomes, such as post-treatment physical function, relief from pain, and improved mental health, only they can report on them. Health systems, however, have been slow to adopt PROMs because they considered the metrics insufficiently reliable. Recent major advancements in the development and measurement of psychological constructs such as an individual's satisfaction and quality of life enable reliable measurement of patient-reported outcomes and used to evaluate and monitor physical, mental, and social health.[75]

Clinical and patient-reported outcomes help a health care system *learn* and *improve*. Valid, condition-specific outcomes data also promote *shared decision making* as patients become more familiar with the likely treatment outcomes on quality-of-life issues that matter to them. PROMs have improved communication between patients and providers, leading to improved clinical outcomes, self-management (e.g., symptom monitoring), patient engagement, resource utilization, and referrals to supportive care services. Outcome metrics are also vital for *accountability*.

With this taxonomy and definition of the metrics available at various parts of an ADW's participation in the MHS, the remainder of this chapter will survey health metrics available to the DoD. This chapter will also review the current state of ADW's health, as informed by health metrics currently in use.

Mirroring the quote at the opening of this section, DHA Director LTG Place also said, "Great outcomes reflect the first mission in the Military Health System." This means taking into account patient-related

or patient-reported outcome measures.[73] The DHB, while explicitly tasked to measure and improve the health and medical care for ADW, echoes LTG Place's words as it views the benefits from widespread adoption of ADW PROMs as only the first of many opportunities for the MHS to implement PROMs for all its beneficiaries.

Established Women's Health Metrics

Clinical Preventive Services

The Women's Preventive Services Initiative is a collaboration among the American College of Obstetricians and Gynecologists, the Department of Health and Human Services (DHHS), and the Health Resources and Services Association (HRSA).[79] This initiative focuses on women's health care needs across the lifespan by reviewing and updating evidence-based recommendations. As part of the resources provided by the Women's Preventive Services Initiative, a complete list of healthy-women preventive care services, including non-gender-specific preventive services, is available for professional and public use.[80] These services and their periodicity are shown in Table 3. Note that the measures for most of the items in the Health Service column would be process and compliance metrics, not outcomes.

Table 3. Women's Recommendated Preventive Services and their Periodicity

Health Service	Timing and Periodcity
Anxiety Screening*	Unspecified
Breast Cancer Screening	Every 1-2 years (for average risk women) starting no earlier than 40 years and no later than 50 years old until age 74 years
Breastfeeding Services and Supplies	Antepartum, peripartum, and postpartum
Cervical Cancer Screening	Women age 21-65 years (for average risk women); Pap test every 3 years for women 21-29 years old and Pap and HPV testing every 5 years (or Pap test alone every 3 years) for women 30-65 years
Contraception**	Reproductive years
Screening for Gestational Diabetes Mellitus	After 24 and before 28 weeks gestation
Screening for Diabetes Mellitus after Pregnancy	No earlier than 1 month and no later than 12 months postpartum
HIV Screening	Annually with laboratory testing at least once per lifetime
Interpersonal Violence Screening	At least annually
Counseling for Sexually Transmitted Infections***	Unspecified
Well-Women Preventative Visits	Annually starting in adolescences
Urinary Incontinence Screening	Annually
Chlamydia and Gonorrhea Screening	Annually

**Screening tool is currently in progress for publication. The target population is all adolescent and adult women.*
***Includes all FDA-approved female controlled-methods, effective family planning practices, and surgical sterilization procedures.*
****Dependent on risk factors.*

Clinical Care Quality Measures

National organizations, including national and government accrediting bodies, have developed process metrics for measuring the quality of care. The metrics drive continual process and quality improvements and serve as benchmarks to compare and assess the consistency and reliability of care across institutions, health plans, and countries.

The National Committee for Quality Assurance (NCQA) developed a set of performance measures called the Healthcare Effectiveness Data and Information Set (HEDIS®) that are aligned with the Institute of Medicine's (now the National Academy of Medicine) six Aims for Improvement of health care quality: safe, effective, patient-centered, timely, efficient, and equitable.[81] Note again the focus on process metrics, but not on patient outcomes. The Joint Commission developed the ORYX performance measures for evaluating health systems used within inpatient facilities. HEDIS® and ORYX measures are widely used across the field of health care for assessing inpatient and outpatient care, by health care plans for establishing long-term goals, and by consumers for comparing plans and facilities.[82, 83] The uniqueness of the National Academy of Medicine quality of healthcare metrics extends into frameworks that focus on "complex care" needs of individuals such as cervical and breast cancer care. Most of the measures are about safe and efficient care processes, while other measures address complex clinical and social needs of individuals such as functional status, cost/utilization, behavioral health, and maternal and neonatal care as well as PROMs of community engagement, self-reported well-being, and unmet care.[84]

The DHHS developed a joint-collaboration program with Title V Maternal and Child Health Services Block Grant program and Title XIX Medicaid program of the Social Security Act to improve health care services by making healthcare systems and health coverage more affordable for federal and state agencies.[85, 86] The development of Title V, specific to this collaboration, focuses on a three-tiered performance measure framework that highlights the impact of the following programs: National Outcome Measures (NOM) [population measures of maternal and child health], National Performance Measures (NPM) [consisting of 15 performance measures across five domains that align with Maternal and Children Services], and Evidence-based Strategy Measures [developed to measure how Title V evaluates investments used for NPM]. The latter two provide compliance metrics such as the rates of well-woman visits, breastfeeding, and safe sleep. In summary, numerous agencies have successfully introduced many women's healthcare quality measures, but only a few metrics track the improvement of patient outcomes and the effectiveness of complex care programs.

Quadruple Aim Performance Process: An Initiative that Would Improve Measurement of Women's Health Outcomes

In 2009, the DHA identified its Quadruple Aim as Better Health, Better Health Care, Lower Cost, and Increased Readiness. Three of the four aims extend the Healthcare Triple Aim – Experience of Care, Population Health, and Low Per Capita Cost – developed by the Institute for Healthcare Improvement.[87] Better health aims to reduce poor population health drivers by encouraging healthy behaviors and focusing on prevention. Better care aims to improve the patient's experience and, more importantly,

improve the patient's outcomes while minimizing complications and incidences of medical harm. Lower cost focuses on eliminating waste, reducing variation, and reducing the lifetime cost of achieving health and readiness.

The DHA Quadruple Aim adds Readiness as a fourth, military-specific aim. Service members must be medically ready to deploy, and the medical forces must be ready to provide care to those Service members wherever they may be. With women forming 17% of the Military Services, their readiness needs, and the medical personnel's requirements are key drivers to improve Readiness.

The DHA introduced two tools for improving Quadruple Aim performance: (i) the Quadruple Aim Performance Process (QPP) to standardize the performance improvement process across the Military Health System, and (ii) Clinical Communities to own, track, and improve treatment processes and clinical outcomes.[88]

The QPP framework uses the A3 planning sheet*, a pictorial representation of Total Quality Management and Lean Six Sigma process and quality improvement and measurement methods. Manufacturing, healthcare, and other service sectors have adopted these methods. The DHA launched QPP functional capability in October 2018 to align priorities, set improvement targets, and standardize and disseminate best practices for medical and non-medical processes.

Clinical Communities are condition- or population-based multi-disciplinary teams with responsibility for comprehensive and integrated care, including outpatient, inpatient, and rehabilitative care, as well as supporting services, such as nutrition, social work, therapy, and behavioral health. The Navy introduced the Clinical Communities structure after studying the practices of Intermountain Healthcare during a tri-service DHA High-Reliability Coordinating Board, which convened after a Secretary of Defense-directed MHS Review.[26]

Currently, the DHA has established 11 Clinical Communities, five of which are relevant for ADW health:

- Women & Infants (WICC)
- Neuromusculoskeletal Care
- Behavioral Health
- Primary Care
- Military-Specific (which focuses on Service member readiness)

Each Clinical Community uses the QPP to identify clinical problems, develop evidence-based clinical pathways to solve them, reduce treatment variations that do not lead to improved patient outcomes, lower costs, aim for zero harm, and improve beneficiary well-being.

As of July 2020, Clinical Communities have established only four QPP plans, with only one – the reduction of postpartum hemorrhage managed by the WICC – directly related to women's health. The postpartum hemorrhage QPP initiative standardized obstetric delivery practices in MTFs, developed process and complication metrics to track, via a dashboard, postpartum hemorrhage rates and the need for blood transfusion.

A3 refers to the International Standard Organization of the pieces of paper on which the performance plan is written

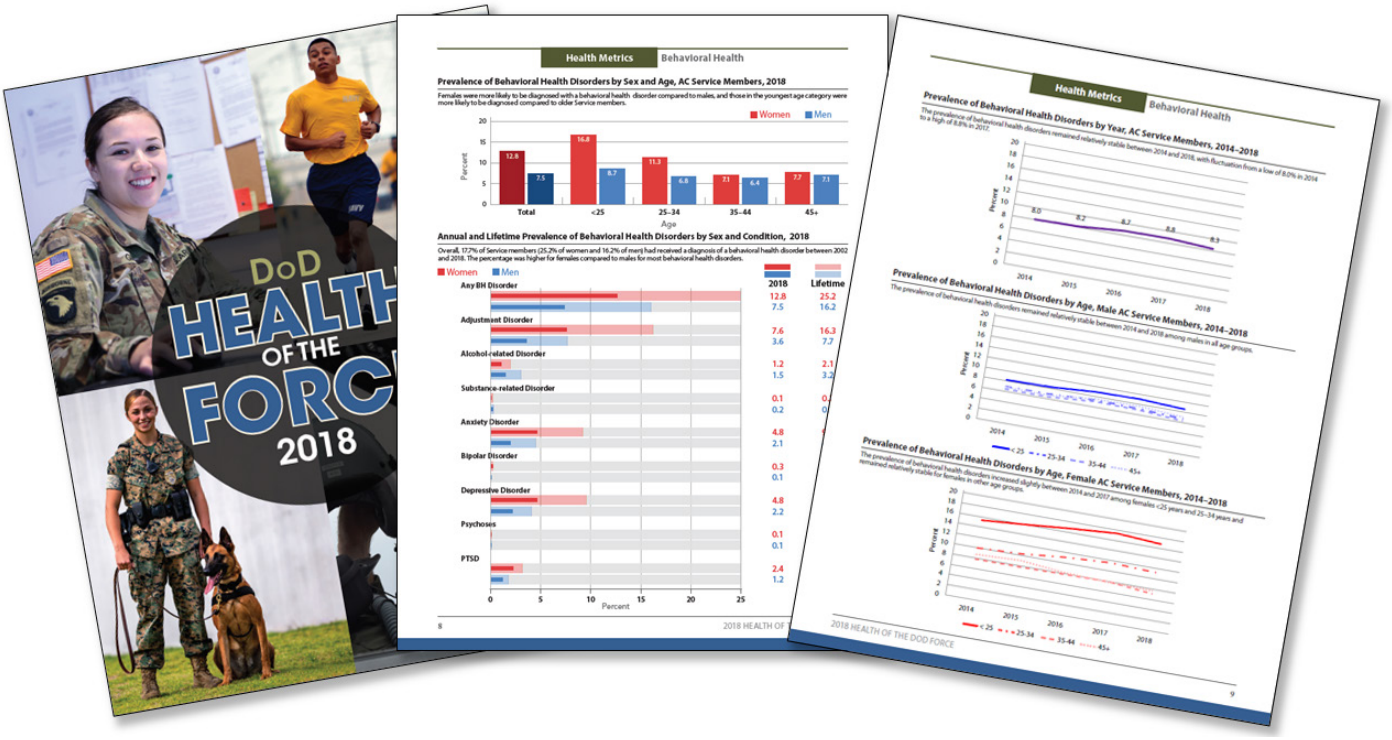
The DHA Clinical Communities have yet to define, deploy, and track patient-reported outcomes for their conditions, although the Neuromusculoskeletal Clinical Community and the Behavioral Health Clinical Community have developed PROMs. For other Clinical Communities, the DHA Survey Portal contains the functionality to deploy a wide variety of standard PROM sets for general and women-specific health. The Portal also includes the ability to innovate, create, and validate new women's health PROMs, including military-specific ones. The initiative to develop and implement PROMs, especially those relevant for ADW, needs to come from the individual Clinical Communities.

DHA Women's Health Metric Measurement and Achievement

DHA Women's Health General Quality Measure

The DoD and Army publish an annual Health of the Force (HOF) report that provides a snapshot of active duty Service members' health.[89, 90] The key distinction between the HOF reports and other DoD health measures is its focus on active component Service members and stratification by gender. The 2018 DoD HOF report details six measures, called 'health index measures' by the report, in four areas: injuries, behavioral health, sleep disorders, and obesity.[89] The 2019 Army HOF report expands the measures to 10 with the addition of substance use, tobacco use, heat illness, hearing issues, sexually-transmitted infections, and chronic disease.[90] The definition of these measures and the tools to access them were defined either by the Armed Forces Health Surveillance Branch or the Centers for Disease Control and Prevention.[89, 90] In the 2018 DoD HOF, primary tables and graphs report the health measures by gender and age. For behavioral health and sleep disorders, the 2018 DoD HOF report provides additional analyses by specific diagnoses. Figure 8 is a snapshot from the 2018 DoD HOF.[89] Both reports offer comparisons to measures reported in previous years' HOF reports, and gender-specific comparisons over time are offered for all of the measures except for acute and chronic injuries. Subsequent chapters highlight these comparisons and discuss HOF data on sub-categories of injuries and behavioral health. The 2019 Army HOF report also includes gender-stratified statistics on nutrition, activity, and sleep collected in 2018.[90] While the HOF reports excel in showing the cross-sectional state of several general aspects of ADW's health, its health measures lack the specificity, patient-centeredness, and frequency of reporting to serve as a viable tool for improving the DoD's women's health services.

Figure 8. Snapshot of the 2018 Department of Defense Health of the Force Report



In fiscal year 2015, the U.S. GAO reviewed the quality of women's health care services after determining that women accounted for more than half of the 7 million adults eligible for care in the MHS in the prior fiscal year.[8] The findings from that review focused on 90 quality measures for gynecological care, maternity care, and the neonatal period.[87] The DHA used data from the review to develop frameworks that addressed the needs for improvement within those areas. For example, the MHS developed the 2015 Perinatal Quality Initiative after identifying high rates of postpartum hemorrhage in military hospitals.[87] The DHA now tracks the industry-standard input, process, compliance, complication, and outcome measures highlighted in Table 4. These measures include HEDIS® measures set by the NCQA, Safety and Quality Indicators set by the Agency for Healthcare Research and Quality, Joint Commission National Quality Measures, and standards set by the National Perinatal Information Center. The MHS monitors and publishes these measures on multiple platforms: a public website and on internal tools such as the MHS Dashboard, Clinical Community Dashboards, the MHS Population Health Portal, and a Patient Survey Portal to collect Patient-Reported Outcomes.[91] Moreover, each Military Service has its own system for tracking health services related to prevention and readiness.

Accessibility, frequency of updates, ability to view facility variation, and data lags vary across these reporting platforms and individual measures. Standardization of processes and tools to measure and improve performance and establish the Clinical Communities has improved visibility, provided transparency, and accelerated MHS-wide quality gains.

Table 4. Selected Women's Health National Performance Measures

Measure	Benchmarking Organization	Metric-Type	MHS Tracking Mechanism
Well-Woman			
Breast cancer screening	HEDIS®	Compliance	Health.mil; MHS Dashboard
Cervical Cancer Screening	HEDIS®	Compliance	Health.mil; MHS Dashboard; MHSPHP Registry
Non-Recommended Cervical Cancer Screening in Adolescent Females	HEDIS®	Compliance	
Chlamydia screening (Women 16-24 years old)	HEDIS®	Compliance	Health.mil
HPV Vaccination	NOM 22.3	Compliance	MHSPHP Registry
Well-Woman Visit	NPM 1	Compliance	
Prenatal and Postnatal			
Antenatal Steroids	TJC PC-03 (Retired 2020)	Process	Health.mil
Cesarean Section rates*	IQI 33, NPM 2; TJC PC-02	Process	Health.mil; MHS Dashboard; WICC Dashboard
Drinking and Smoking during Pregnancy	NOM 10, NPM 14.1	Input	
Early Elective Delivery	NOM 7	Outcome	
Exclusive Breastmilk Feeding	NPIC, NPM 4, TJC PC-05	Patient-reported	Health.mil; WICC Dashboard
Maternal Mortality	NOM 3	Clinical Defect	
Postpartum Depression	NOM 24	Patient-reported	
Postpartum Readmission	NPIC	Clinical Defect	WICC Dashboard
Prenatal and Postpartum Care	HEDIS®; NOM 1, NPM 3, ORYX®-PC**	Compliance	
Preterm and Early Term Birth	NOM 5/6	Clinical Defect	
Preventive Dental Visit during Pregnancy	NPM 13.1	Compliance	
Severe Maternal Morbidity	NOM 2	Clinical Defect	WICC Dashboard
SMM - Overall and Excluding Transfusion	NPIC	Clinical Defect	WICC Dashboard
SMM Hemorrhage - Overall and Excluding Transfusion	NPIC	Clinical Defect	MHS Dashboard; WICC Dashboard
Elective Delivery	TJC PC-01	Outcome	WICC Dashboard
Obstetric Vaginal Delivery Trauma	PSI-18/19	Clinical Defect	
Urogenital Health			
Urinary Tract Infection Admission Rate	PQI-12	Clinical Defect	Carepoint
General Health & Readiness			
Health-Related Quality of Life (HRQoL)	CDC Healthy Days core questions	Patient-reported	
Individual Medical Readiness		Compliance	
Deployment-limiting Medical/Dental Condition		Clinical Defect	

HPV Human Papillomavirus Vaccine; NOM National Outcomes Measures; NPIC National Perinatal Information Center; IQI Inpatient Quality Indicators; NPM National Performance Measure; ORYX® Not an acronym – based on Oryx Technology which helped create metrics; ORYX® PC ORYX® Perinatal Care; PQI Patient Quality Indicator; PSI Patient Safety Indicator; SMM Severe Maternal Morbidity; TJC The Joint Commission; WICC Women & Infants Clinical Community

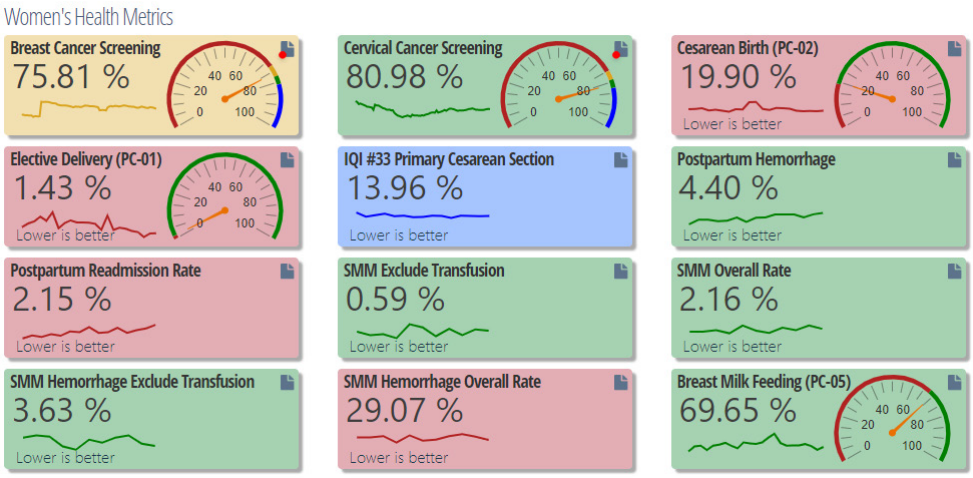
**There are 4 measures related to cesarean section rates, including total rate, primary rates, vaginal birth after cesarean (VBAC) rates, and uncomplicated VBAC rates. The MHS Dashboard and public facing website report primary cesarean rates only. The WICC Data Display tracks primary and other measures.*

*** ORYX® PC measures include 3 chart and electronic medical record abstracted measures as of January 1, 2020. The Joint Commission retired two measures (PC-03 and 04) in 2019*

Military Health System (MHS) Dashboard

A professionally designed MHS Dashboard tracks multiple metrics related to the DHA's Quadruple Aim of *Better Health*, *Better Health Care*, *Lower Cost*, and *Increased Readiness*. This dashboard tracks several women's health metrics, and users can customize views with additional metrics (Figure 9). The 12 women's health metrics in the primary display include six complication/clinical defect measures (postpartum readmission, two severe maternal morbidity measures, two postpartum hemorrhage measures), three compliance measures (breast cancer screening, cervical cancer screening, breastmilk feeding), and three clinical outcome measures (primary and any cesarean section rates, elective delivery). The dashboard details and pairs metric definitions and methodology documents with each metric's visualization. Color-coding indicates metric attainment relative to MHS goals or national benchmarks. For example, the Postpartum Hemorrhage metric is blue if the measure is greater than two standard deviations above the NPIC benchmark, red if greater than two standard deviations below the benchmark, and green if between two standard deviations from the benchmark. Cervical cancer screening uses color-coding relative to national percentiles published by HEDIS® (blue > 90th percentile, green between the 75th-90th, yellow between the 50th- 90th, and red < 50th). The dashboard displays updated breast cancer and cervical cancer screening metrics monthly and quarterly for cesarean section and postpartum hemorrhage rates. Considerable delay in data reporting (no updates since 2019, as of July 2020), makes them less useful to act upon or learn from. Some metrics may not capture what matters most to ADW. For example, the breast milk feeding metric considers only nursing during the birth hospitalization but not for the first 6-months recommended by the American Academy of Pediatrics and cited by ADW as important.[44, 92, 93] Policy-makers and clinicians can view metric performance by MTF, market, and service, but they cannot see performance specifically for ADW versus other female beneficiaries.

Figure 9. MHS Dashboard with Available Women's Health Metrics and Attainment Reported as of July 2020

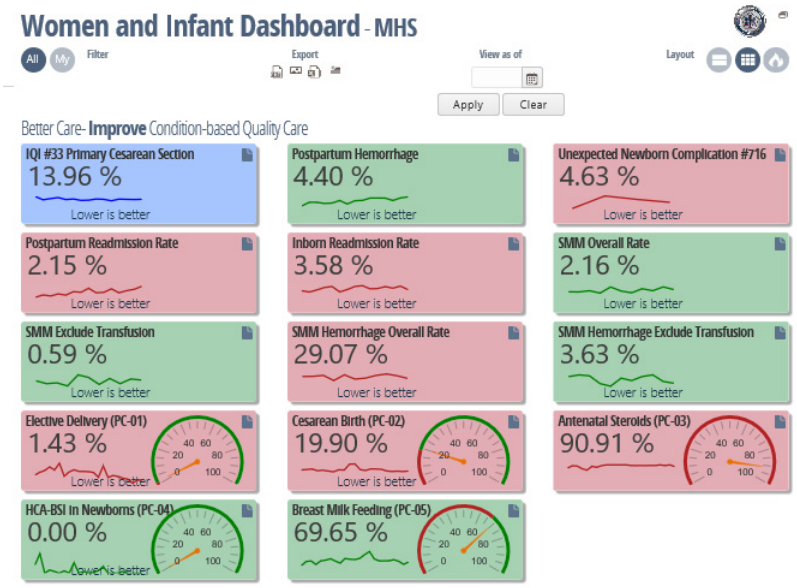


Clinical Community Dashboards

The Woman and Infant Clinical Community (WICC) displays its customized view of the MHS Dashboard with 14 women's health metrics (Figure 10). These exclusively focus on maternal and perinatal outcomes, and include several additional metrics not included on the default MHS Dashboard. The new metrics include two complication measures related to newborn infections and one compliance

measure (antenatal steroid administration). Quarterly data displayed on the WICC Dashboard lag. The DHA last updated the majority of the dashboard metrics in September 2019 with some recent updates dating back to September 2018. All metrics have well-defined and accessible measure definitions and methodology documents attached, and the data visualization is modern with several display options (tiles, trends, heat maps). Similar to the MHS Dashboard, users cannot distinguish ADW's performance from other female beneficiaries.

Figure 10. Women's Health Metrics on WICC Dashboard - and Attainment Reported as of July 2020



Other Clinical Communities relevant to ADW's health have limited or no gender-specific metrics or initiatives as of August 2020. All have charters, guiding principles, and analytic support similar to the WICC.

MHS Population Health Portal

The Military Health System Population Health Portal (MHSPHP) transforms Direct Care and Private Care administrative data into registry information. Individual providers, clinics, and MTFs use the registries within the portal to identify enrollees needing general and condition-specific clinical preventive services. The MHSPHP also tracks HEDIS® and other quality metrics described previously at the individual patient and at various group levels using this application.

Dedicated women's health-specific registries in the MHSPHP include breast cancer screening and cervical cancer screening registries. The end-user can filter all registries to look at women only or ADW only. Limitations include the need for hand calculation of aggregate and subgroup analysis, inability to look at past performance, and a data lag in populating the registry fields.

The MHSPHP also provides insight into several other quality indicators for women's health. These include Agency for Healthcare Research and Quality Patient Safety Indicator 18 and 19, two complication-metrics related to obstetric vaginal delivery trauma with and without instruments. The MHSPHP documents individual patients who contribute to the numerator or denominator of these indicators but does not provide aggregate statistics.

CarePoint Applications

Additional dashboards and applications for women's health quality indicators are available within the CarePoint website where the MHSPHP and the MHS Dashboard reside. A Quality Indicator Spreadsheet, designed with the software application Tableau™, reports quarterly rates of hospital admission rates for urinary tract infections (UTI), a complication-metric, which corresponds to the Agency for Healthcare Research and Quality PQI-12 quality indicator. Stratification by active duty and non-active duty populations is the default view. The UTI admission rate has ranged between 7.8 and 9.4 admissions per 10,000 Service members from early 2018 through the 3rd quarter of 2019. The application provides no reference to national benchmarks. This tool cannot determine gender specific rates, although the 26-times higher incidence of UTI in women than men suggests that most of these admissions are for active duty women.[94] Similar to other MHS Dashboards, these rates have a data lag of up to six months.

Public Website

The DHA provides access to MHS performance on 58 metrics, eight of which are women's health related, on its public-facing website (http://health.mil). Women's health metrics on the public website include the process and compliance metrics of rates of antenatal steroids, breast cancer screening, cervical cancer screening, cesarean section, chlamydia screening, and exclusive breastmilk feeding, and numbers of babies delivered (total and electively). The DHA website provides metrics only for individual or groups of MTFs only; a national civilian health system rate provides an additional comparison. As of August 2020, third quarter data from 2019 is the most recent available – a more than six-month lag. The user interface requires eight mouse-clicks and entry of a zip code before the metrics are visible. Data visualization includes tables and line graphs.

DHA Survey Portal and Patient-Reported Outcome Measures

The DHA collects several PROMs for musculoskeletal care, behavioral health, pain management, and overall quality of life.[95] The DHA Survey Portal integrates a collection of PROMs with reporting and tracking tools such as dashboards. Patients directly enter the information into their device. Neither the legacy Armed Forces Health Longitudinal Technology Application (AHLTA) nor the new MHS GENESIS electronic medical record has achieved the DHA Survey Portal's intent – to integrate PROMs into a patient's chart.

The Patient Reported Outcomes and Clinical Record (PROCR) team, a centralized group, works with the Clinical Communities to develop and implement PROM collection and analysis. There are four DHA PROs in use: Health-Related Quality of Life (HRQoL) via the Joint Outpatient Experience Survey, the Behavioral Health Data Portal (BHDP), the Military Orthopedics Tracking Injuries and Outcomes Network (MOTION), and the Pain Assessment Screening Tool & Outcomes Registry (PASTOR). The HRQoL metric, collected by DHA and the CDC's Behavioral Risk Factor Surveillance System's four core Healthy Days questions in the Joint Outpatient Experience Survey, is a population-level PROM.[96] PROCR staff intend to include the HRQoL questions into the DHA Survey Portal for a more frequent and

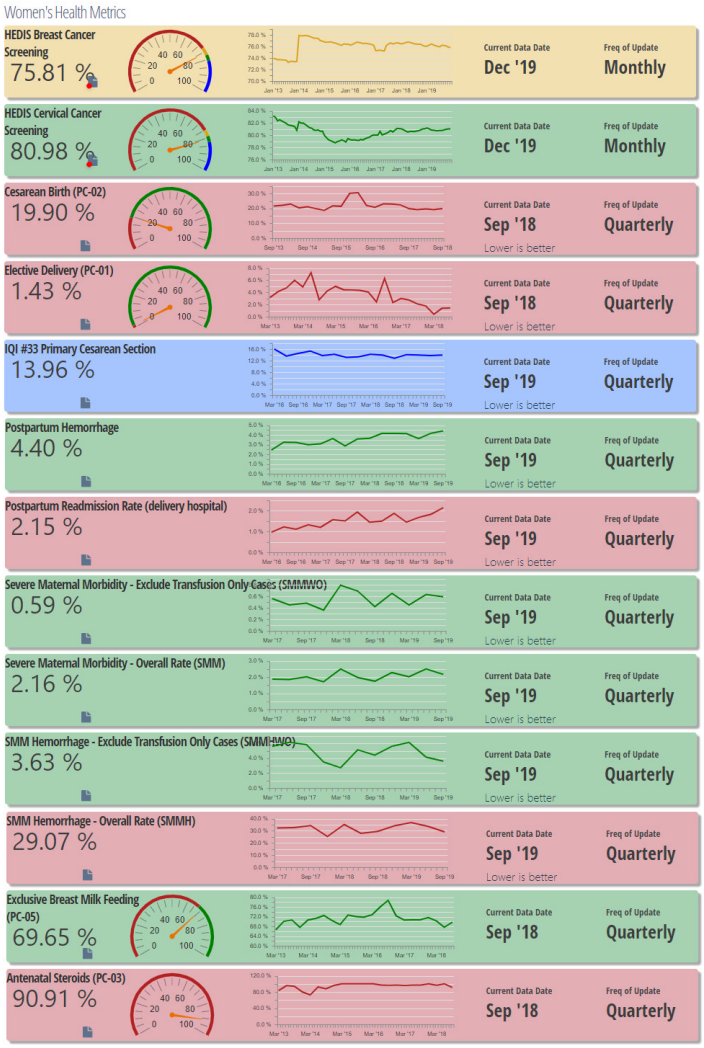
broader measurement.[95] Health care professionals use individual PROM data from BHDP, MOTION, and PASTOR that is integrated into clinical care workflow. High-level summary reports include aggregated PROMs from these tools, although they do not currently aggregate or stratify by gender or active duty status.

No female-specific PROM exists in the MHS, although DHA intends each Clinical Community to collect and monitor patient-reported data. If stratification by gender and active duty status is possible, the existing individual-level behavioral health and musculoskeletal injury PROMs directly relate to the ADW's health issues discussed elsewhere in this report.

Participation in Benchmarking Organizations

The MHS collects additional women's health data not reported on public or internal websites.[8] The MHS reports input, compliance, and complication/clinical defect metrics to the American College of Surgeons National Surgical Quality Improvement Program (NSQIP) for all hospitals. The GAO reported that the MHS used 17 NSQIP measures for outcomes after gynecologic surgery, specifically after hysterectomies and myomectomies.[8] This report details the collection of additional NPIC complication/clinical defect measures of obstetric trauma including the rate of perineal lacerations. The GAO report cites a DHA Clinical Quality Integration Board and three working groups (Perinatal Advisory Group, Clinical Measures Working Group, NSQIP Working Group) as those responsible for these quality measures for women's health.[8] Some of these group' functions have been absorbed into the Clinical Communities and other DHA value metrics groups.

Figure 11. Women's Health Metric Attainment on MHS Dashboard Reported as of July 2020



DoD Women's Health Attainment

The MHS exceeds the 50th percentile nationally in seven of the 14 women's health measures available for review and linked to benchmarks (Figure 11). The MHS' low primary cesarean section rate is in the top 10th percentile nationally.

The available reporting mechanisms lack an easy ability to track health outcomes for ADW among the entire female MHS population. Urinary tract infection hospital admission rates are displayed separately for active duty and non-ADSMs, but not by gender and without national benchmarks for comparison. The current state and trend of ADW's health, indicated by these metrics, is not readily available.

The readiness of ADW would benefit from commander and medical provider access to clear and timely health metrics. The DHA has provided a structure and process to improve women's health in domains where the MHS lags national performance, and to maintain and further improve where the MHS excels. Maximizing ADW's readiness requires expansion of the DoD's ability to measure health outcomes specifically for ADW. The effort also requires consideration of additional metrics for ADW that would be less relevant for the general civilian female population.

Military Specific Women's Health Care Metrics

ADW have military-specific health issues that affect their readiness and retention, including lower extremity fractures, unintended pregnancy, and PTSD due to sexual assault. Measuring and managing these health issues is vital to recruiting, training, deploying, and retaining ADW. This report details readiness-limiting women's health issues in three areas: musculoskeletal injuries, reproductive and urogenital care, and behavioral health. The MHS can readily obtain performance measures in all three areas and use this information for process-improvement efforts to "engineer-out" the root causes of poor readiness. The Pareto Principle – 80% of defects are due to 20% of the causes – suggests that the MHS focus on issues, such as unintended pregnancies and lower extremity stress fractures, that have high prevalence and high impact on ADW readiness and health.[97] Actively managing ADW's duty-limiting pain and their time to return to full-duty can guide individual and Service-wide interventions.

The Women's Health Databook, developed by OASD HA, and due to be published in 2021, consolidates metrics for a host of health conditions relevant to ADW's health into one readily accessible resource.[98] While the DoD has not specified the metrics and their types (input, process, compliance, complication, outcomes), the Databook does provide baseline measurements and methodologies from frameworks published and adopted by multiple international, governmental, and professional organizations. These measurements can serve as a foundation for future improvement initiatives. Successful and sustainable women's health initiatives, however, will require periodic and regular updates of the data in the Databook, rather than a one-time or infrequent publication such as the Health of the Force reports. The Databook metrics will also require an accountable and responsible group to own the data collection and interpretation, as well as the countermeasures and interventions designed to address ADW's health problems revealed by the metrics. This group will need Dissemination & Implementation resources to promote diffusion of the best practices it identifies to all military medicine branches, command structure, and management.

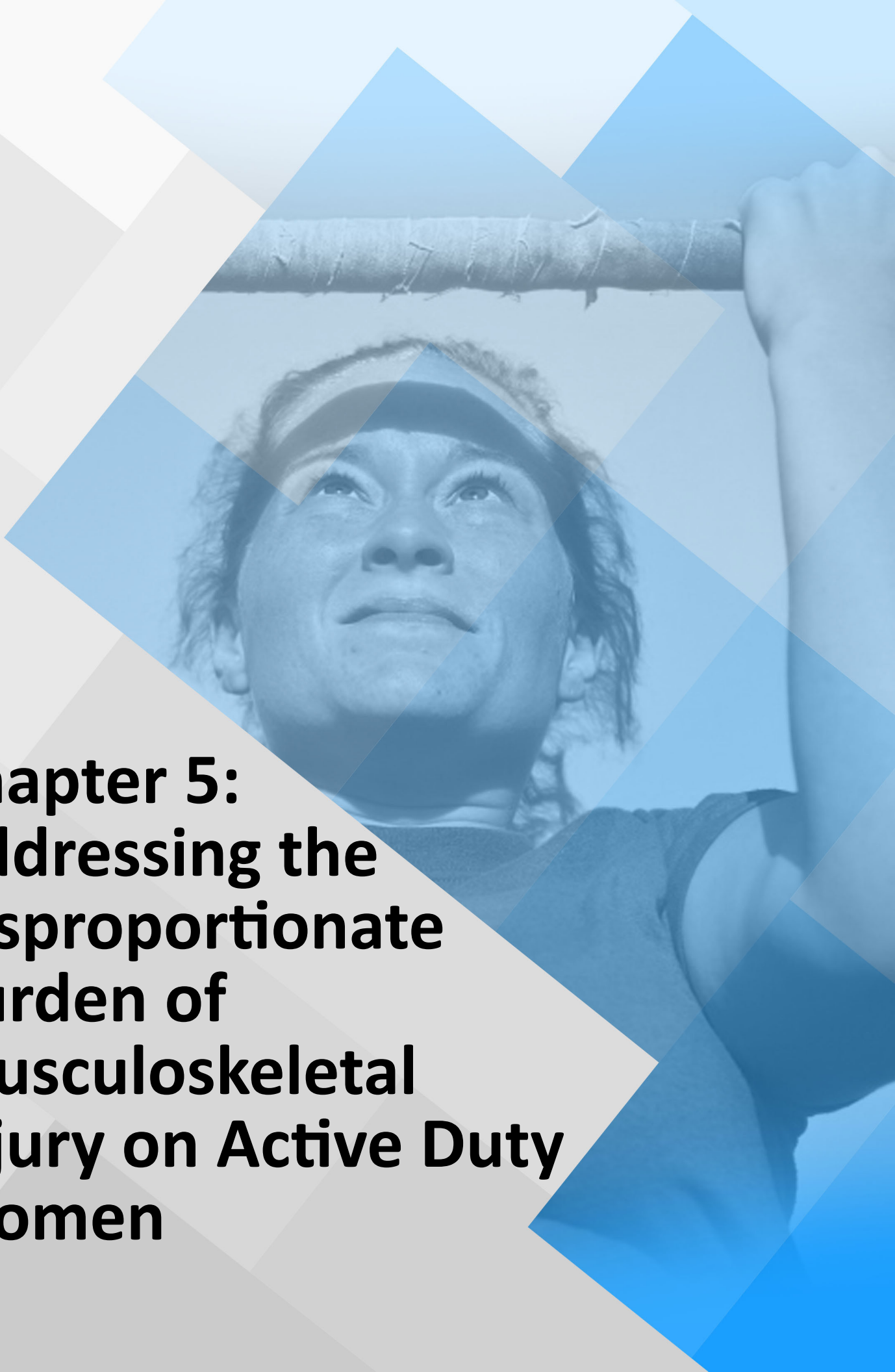
The DoD and MHS currently collect many assessments of individual healthy and unhealthy behaviors and, collectively, of military installations. However, these assessments do not collect data uniformly, consistently, or integrate them into a single accessible database. Standardization of such metrics through consolidation, integration, and display of data to key stakeholders is an important first step

to identifying and sharing best practices on lifestyle factors that reduce injury and disease incidence, and help treat them should they occur. The DHA Survey Portal and the emerging emphasis on Patient-Reported Outcomes holds promise to be that first step.

Retention, while not specifically a health-related metric, can serve as a deciding military-specific outcome measure. Differential retention rates between ADW and Active Duty Men (ADM) provide a potential signal of health-related causes that lead to women leaving the military. The Career History Archival Medical and Personnel System (CHAMPS) uses 16 codes to record the reasons for a Service member to remain or leave the service. Three codes – family, medical, and mental health issues – have particular relevance for women's health. The percentage of women who choose not to continue in service due to these reasons is a useful measure for how well DoD has managed ADW's health needs. Subcategories for sexual harassment or types of medical issues, like musculoskeletal injuries, are not available. Including more detail in CHAMPS would provide much more visibility into why women choose not to continue their service. Surveys of ADW, such as an anticipated RAND study (described in Chapter 6), provide a finer level of detail but do not provide recurring sources of data, are not universally collected, and are not as integrated into established personnel systems as CHAMPS. While retention rates may be the ideal outcome to track, it is difficult for the DoD to easily determine retention rates either because of the lack of specificity of CHAMPS codes or mixing of other transactions (e.g., name changes) in the accession and loss database.

Future Directions

The DHA and DoD possess a rapidly growing arsenal of high-quality processes, organizational structures, developed metrics, and data visualization tools to support the goal of improving ADW's health. Almost all the currently tracked metrics, however, measure compliance and conformance with specified clinical processes or defects and complications experienced by ADW. The DHA and DoD collect and store the data on dispersed legacy systems. Process standardization and expansion of metrics to track PROMs of ADW would support improving women's health. Using new, and often non-traditional data sources, such as female-specific patient-reported outcomes and ADW retention statistics, would also provide highly valuable data for learning and improvement, optimizing care, and clear accountability for ADW's health. Optimal execution of Clinical Community QPPs by DHA and the Markets requires timelier data, more frequent measurement of ADW's health metrics, and a single-site source and format for all metrics that commanders and medical personnel can use. Improvements to measurement will drive improvements to care and greater motivation and accountability for achieving improved care, particularly for those health conditions that disproportionately impact the lives – and readiness – of ADW. The following chapters detail three specific health conditions: musculoskeletal injury, reproductive health, and mental health.



Chapter 5: Addressing the Disproportionate Burden of Musculoskeletal Injury on Active Duty Women

The repeal of the Direct Ground Combat and Assignment Rule in 2013 permitted women to serve in combat roles. Each Service reevaluated its female fitness and body composition standards and decided to hold women to the same basic military training (BMT) standards as men. In BMT, and afterwards, throughout their careers, ADW sustain a higher prevalence of musculoskeletal injuries (MSKI) than their male counterparts [~50% versus ~25%].[20, 99, 100] The reasons for this disparity are multifactorial and include anatomic and physiologic gender differences. There is also a perceived stigma, perhaps more prominent in women, that being injured equates to a lack of toughness. Improving training, treatment, clothing, and equipment can reduce the incidence of MSKI and lessen the stigma associated with them.

Box 3. Selected Best Practices Related to Musculoskeletal Injury Prevention

Embedded Athletic Trainer
Reduced number of duty days cause from MSKI by providing on-the-spot care for injured Service members
Best Practice: Air Force Versatility Injury Prevention and Embedded Reconditioning (VIPER) Clinic
Owner: United States Air Force

Command Accountability for MSKI
Implementation of protocol for command to follow in or to decrease stress fractures during training
Best Practice: Injury Reduction Program
Owner: Israeli Defense Force

Customized Training Exercises
Step progression used during training to decrease the likelihood of sustaining MSKI
Best Practices: Air Force Tiered Physical Fitness Test; Israeli Defense Force Modified Gradated Exertion Table
Owners: Air Force Exercise Science Unit; Israeli Defense Force's Medical Corps

Pregnancy and Postpartum Reconditioning Training
A standardized training curricula to maintain adequate fitness levels in pregnant ADW and reduced the number of failed physical tests in postpartum ADW
Best Practice: Army's Physical Activity and Exercise during Pregnancy and the Postpartum Period
Owner: Army Public Health Center

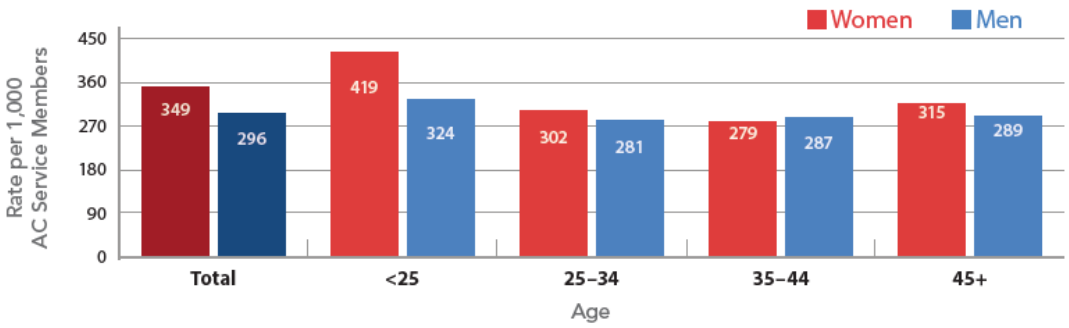
The prevalence of MSKI associated with military service and the difference between genders perpetuate disparities in women's readiness to deploy, attrition from training, rates of limited duty status, and separation from the Service.[20,101-105] With the cost to access and train a recruit estimated at $75,000, preventing the incidence of MSKI and reducing female recruit attrition will improve readiness and produce high financial savings.[106] Effective prevention strategies include optimizing nutrition, sleep, and other holistic factors embodied in the TFF framework to improve fitness, prevent injury, and promote rapid and effective rehabilitation and recovery.[21, 22] An examination of combat and non-combat related MSKIs show the DoD's concern on the incidence and burden of female MSKIs, mostly lower limb injuries and stress fractures, on individual and unit readiness.

The Burden of Female Injuries on Force Readiness

The TFF's physical fitness domain incorporates a holistic approach founded on six goals – injury prevention, muscular strength, endurance, aerobic capacity, flexibility, and agility – for Service

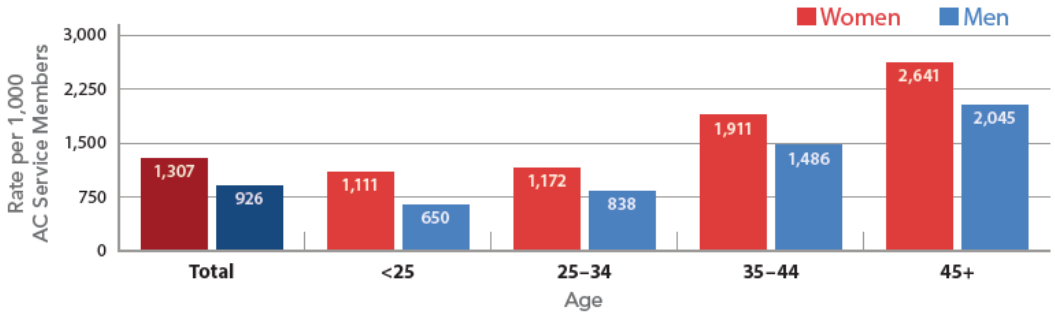
members to optimally achieve their mission essential duties.[21, 22] Five of these goals directly apply to the health-related fitness components of the DoD's physical fitness program: cardiovascular (or aerobic) endurance, muscular strength, muscular endurance, flexibility, and body composition.[107] The Services assess three out of the five components: aerobic endurance, muscular strength, and muscular endurance. Each health-related fitness component links to injury risks in both men and women. Common sources of MSKI originate from previous acute injuries (e.g., muscle tears, ruptures, or sprains) followed by repetitive activities that cause chronic micro-traumatic (overuse) damage over time. The 2018 DoD HOF Report calculated acute and overuse injury rates of 305 and 988 per 1,000 persons, respectively.[89] Overall, this amounted to 395,127 acute and 1,280,028 overuse injuries among ADSMs.[89] Compared to men, injury rates for women were higher in all Services for both categories (Figures 12, 13).

Figure 12. Incidence of Acute Injury by Sex and Age, Active Component Service Members, 2018



Overall, acute injury rates were higher for female (349 per 1,000) compared to males (296 per 1,000). Among both males and female, acute injury rates were highest in the youngest age group.

Figure 13. Incidence of Cumulative Traumatic Injury by Sex and Age, Active Component Service Members, 2018



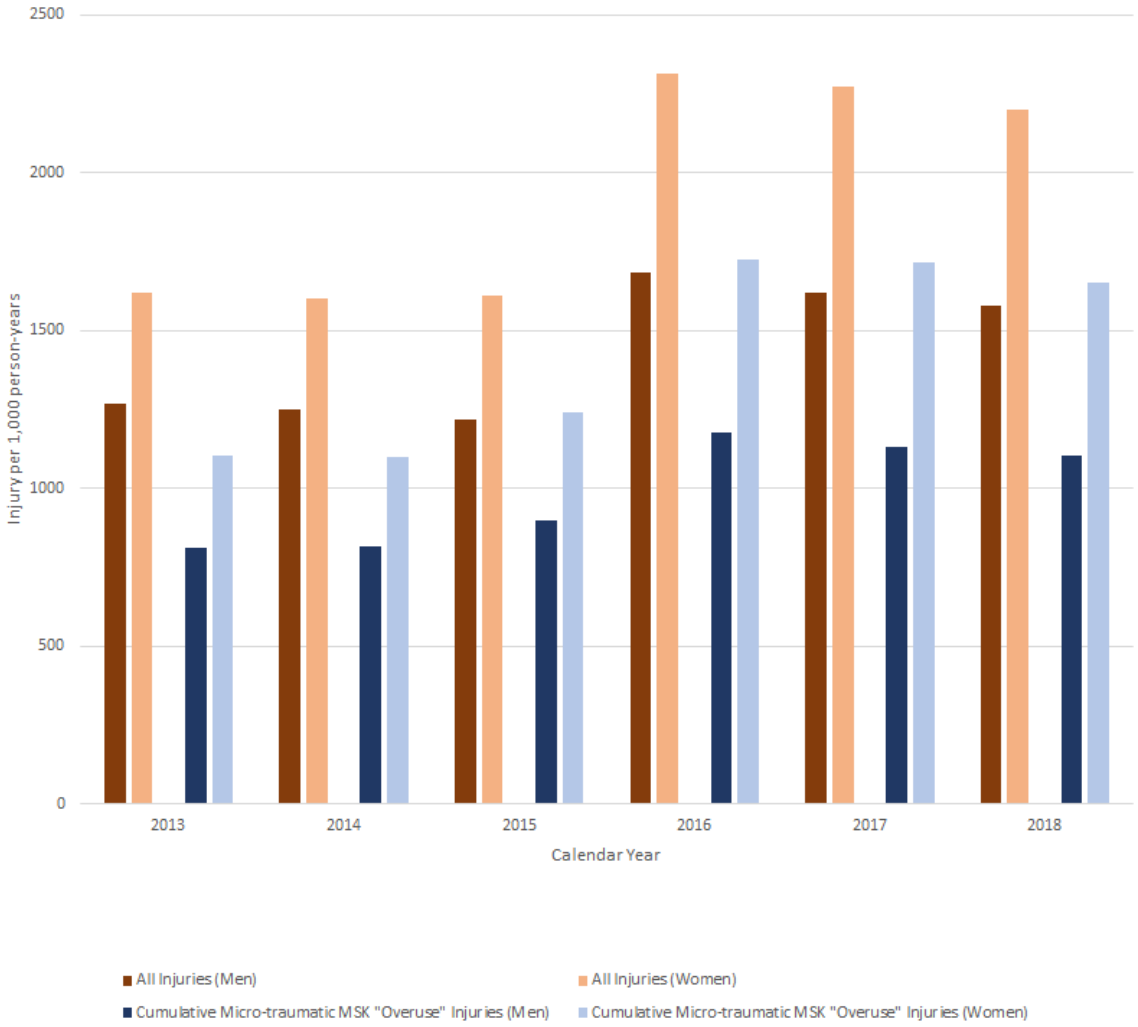
Cumulative traumatic injury rates were higher for older compared to younger Service members and higher for females (1,307 per 1,000) compared to males (926 per 1,000).

Low muscular endurance can increase the risk of injury. However, the frequency of injuries related to muscular endurance and physical training activities (e.g., sit-ups or push-ups) is slightly lower than long-distance running with full gear and other aerobic activities.[107] The U.S. Army reported that 80% of trainees at BMT are likely to experience an overuse injury.[99, 108] The majority of these injuries affected the lower extremities and back and calls to attention the need for a standard systemic

approach for injury prevention. Approaches for systematically designing and engineering out defects in manufacturing processes, such as Lean Six Sigma, may apply to the DoD's approach to reducing the high incidence and impact of MSKI.

While MSKIs are common in both ADW and ADM, the pattern of injuries differs. Women are more likely to sustain lower extremity injuries such as stress fractures and anterior cruciate ligament (ACL) tears.[109, 110] Such lower extremity injuries are the most common reason for decreased readiness of ADW, with more limited duty days for these injuries than men.[103, 111] Reported risk factors include decreased bone density, below normal body mass index (BMI), previous history of MSKIs, and anatomical features such as wider hips and smaller feet.[106, 107, 109] Figure 14 shows the increase in total and overuse injury rates and the disproportionate number of females with overuse injuries compared to males in the U.S. Army from 2013 to 2018.[112]

*Figure 14. U.S. Army Injury Rates by Gender, 2013-2018**



*Military Health System implementation of ICD-10CM began October 10, 2015. 2013-2015 rates calculated using ICD-9-CM codes; 2016-2018 using ICD-10CM.

Principal Causes of MSKI

Women's musculoskeletal function is physiologically different from men; some differences are risks for injury, while others promote protection. Women have lower average absolute muscular strength and short-term endurance, with higher average ratios of lower to upper body strength.[20] These physiologic differences translate to differential performance and injury risk for some common military tasks. Allison et al determined that female Service members exhibited greater flexibility, balance, and hip flexion than male Service members in the stop, drop, and landing evaluation.[20] These factors increase the likelihood of ADW experiencing knee valgus, the inward collapsing of the knee joint.[20, 113]

Female recruits' sub-optimal fitness levels prior to entering the military contribute to their increased rate of MSKIs.[114] Recruits who are aerobically fit, regardless of sex, have much lower incidence of training injuries.[108] This chapter will describe how rigorous and individualized training of high performance female athletes can eliminate gender differences in aerobic capacity.

Improper or ill-fitting equipment and clothing, such as combat boots, body armor, and sports bras, contribute to the high rate of MSKIs in ADW. Since 1978, DACOWITS, the Defense Women's Health Research Program, and the Army Women's Task Force have recommended that DoD procure gender-specific clothing, equipment, and gear (Appendix G). The DoD has not fully implemented these recommendations. Examples of the recommendations are:

- Footwear: The selection and use of running shoes without supportive insoles designed for the shape of women's feet and shock absorption increases the risk of ADW sustaining hip, knee, ankle, and foot injuries.[109] A simple preventive measure of choosing new running shoes or updating older running shoes with new insoles after reaching a certain mileage will reduce the risk of stress fractures among ADW.[109] In addition, placing insoles with shock absorption capability into combat boots reduces the incidence of ADW's injuries and podiatric visits.[109]

- Sports Bras: Excessive independent breast movement is linked to approximately 72% of breast pain in women and is associated with decreased physical activity and self-conscious feelings resulting in limited motivation and reduced capacity for physical activity.[115] DACOWITS previously noted this finding and provided policy recommendations to the DoD to address this issue.[115] The DHB heard from BMT staff, including a female training instructor, about the impact of poorly designed sports bras for ADW and the difficulty in addressing the issue through medical, training, and supply channels.[116] Lack of poorly designed sports bras for ADW remain an unaddressed issue despite previous recommendations by DACOWITS (Appendix G). The Army is currently surveying female Soldiers to select a commercially manufactured sports bra suitable as a standard issue item.[117] The rigors of basic training and other physical training highlight the importance of sports bras for mitigating preventable injuries caused by a lack of breast support.

- Clothing and Body Armor: DACOWITS' clothing and body armor recommendations focused on addressing concerns in areas such as availability of appropriately fitting clothing and

footwear for training and operational use: accessibility to the recommended clothing and footwear; assurance of quality uniform items; prompt distribution of equipment and available equipment; investment in research and development of equipment designed specifically for use by women; and properly fitting maternity uniforms. Service women's anecdotes on the ill-fitting garments bolster the need to implement DACOWITS' clothing and body armor recommendations.[118] As one female Army artillery officer recounted, women are forced to wear whatever protective gear happens to be available – often male armor – which in her circumstance inhibited proper lifting of a 100-pound artillery round to her chest for the fitness test, and putting her at risk for an MSKI.[119] Other equipment fitted to the torso such as backpacks, if not customized for women's bodies, will likely have the same issues.

DoD Physical Fitness Standards

DoD Policy Guidance on Physical Fitness Program Requirements

Upon entry into the military, individuals must meet medical and physical standards for successful admission. The Department of Defense Instruction (DoDI) 6130.03, *Medical Standards for Appointment, Enlistment, or Induction into the Military Services,* prohibits applicants' entry if they have a medical condition or physical defect that is duty limiting.[120] Such conditions include osteopenia, osteoporosis, or history of fragility fractures. The Department of Defense Directive (DoDD) 1308.1, *DoD Physical Fitness and Body Fat Program*, grants the Services the authority to establish a physical fitness and body fat program that supports and optimizes Service members' readiness and routinely assesses their physical fitness.[121] Service-wide generalized physical fitness tests are required to assess the basic components of the DoD Physical Fitness and Body Fat Program: aerobic capacity, muscular strength, muscular endurance, and desirable body fat composition.[121] Each DoDD 1308.1 requirement permits the Services to tailor programs to the particular needs of their ADW and men. DoDI 1308.3, *DoD Physical Fitness and Body Fat Programs Procedures,* elaborates by instructing the Services to adjust their programs appropriately by age and gender.[122] Physical fitness and body fat programs apply gender-appropriate adjustments toward timed runs, push-ups, sit-ups, and body fat standards (e.g., 18-26% body fat for men and 26-36% body fat for women). The DoD permits program flexibility in set standards; however, variability in the Services' gender-appropriate standards creates differential rates of ADW's physical readiness related to musculoskeletal fitness.

Service-Specific Physical Fitness Tests

The DoD requires female and male Service members to achieve a specified fitness level to maintain force readiness. Each Service has its performance endurance objectives for basic trainees and physical fitness curricula for instructors to use during physical fitness tests (PFTs). Although each Service incorporates different fitness activities within their respective PFT, each uses standard components including a cardiorespiratory (aerobic) endurance test, a muscular strength test, and a muscular endurance test.[123-126] Appendix J outlines each Service-specific fitness test requirement. Service members are required to complete the test annually or biannually, depending on the Service. Using

fitness tests based only on health-related fitness components provides inadequate information about the combat readiness of Service members.[127]

Pregnancy Fitness Programs

DoD directives and instructions authorize physical activity and convalescent leave for pregnant and postpartum ADW. ADW may take up to 12 weeks of convalescent leave after giving birth.[128] All Services exclude pregnant and postpartum women from taking the PFT and meeting fitness standards.[121] In ascending order of exemption length, the Army, the Navy, Marine Corps, and the Air Force grant exemption to the mother from physical fitness tests ranging from six to 12 months after giving birth.[123, 125, 126, 129, 130] Recent updates to Air Force policy exempts women from fitness assessments on a sliding scale dependent on the pregnancy duration (e.g., miscarriages, preterm births). Women with a pregnancy duration up to 12 weeks, between 12-20 weeks, or at least 20 weeks, are exempt from fitness assessments for at most 60, 180, and 365 days, respectively.[131] During the PT exemption period, ADW can maintain their pre-pregnancy fitness levels by participating in pregnancy and postpartum exercise programs.

The Air Force, Army, and Marine Corps based their pregnancy and postpartum fitness programs on the American College of Obstetrics and Gynecology clinical guidance "Physical Activity and Exercise during Pregnancy and the Postpartum Period."[132] Specifically, women with uncomplicated pregnancies should engage in aerobic and strength-conditioning exercises before, during, and after pregnancy.[132] The Army developed the Pregnancy Postpartum Physical Training (P3T) program, which provides senior commanders and local P3T program personnel the resources to counsel and encourage pregnant Soldiers to maintain fitness levels throughout gestation and the postpartum period.[133] The P3T program provides standardized physical training and education curricula taught by trained personnel; there is currently partial integration with Army Wellness Centers (AWC) and full integration is planned.[134] The Marine Corps' pregnancy and postpartum fitness program offers a self-guided program that outlines components, like nutrition and physical activity modification, taken from national and international professional public health associations for pregnant ADW to maintain health and readiness.[135] The Marine Corps has published a Pregnancy and Postpartum Physical Training Guidebook for commanders, fitness instructors, and Marines to assist in planning an exercise regimen throughout pregnancy and the postpartum period.[135, 136] At present, no such program exists for active duty Navy women.[130,137]

Body Composition Standards by Service Branch

The DoD recommends that Service members maintain adequate fitness and meet body fat standards for force readiness. Therefore, each Service developed standards for BMI, body fat percentage, circumference measurements, height, and weight. Table 5 outlines the components of each Service's assessment.

Table 5. Body Composition Standards Components by Service

Service	Body Mass Index (BMI)	Body Fat Percentage	Circumference	Height	Weight
Army	✓	✓*	N/A	✓	✓
Air Force	✓*	✓**	Abdominal	✓	✓
Navy		✓*	Abdominal and neck	✓	✓
Marine Corps	✓	✓	Men: neck and abdomen Women: abdomen, hip, and neck	✓	✓

**Only if height and weight standards not met*
***Only if above conditions and fails BMI*

Anthropometry is a battery of quantitative assessments that evaluates the physiological components of an individual's body. Each Service conducts an anthropometric assessment that differs slightly in components used. To date, three out of the four Services use BMI, body fat percentage, height, and weight. The Air Force, Navy, and Marine Corps also categorize Service members by neck or abdomen (or hip for ADW) circumference.

BMI, calculated as weight over squared height (kg/m^2), is the preferred choice as an anthropometric measure because of its feasibility and ease of use. Academic research and clinicians may use BMI to measure the total amount of fat within an individual.[138] However, BMI does not differentiate between fat distribution throughout the body, which increases Service members' risk of being misclassified into a weight group. In addition, BMI does not accurately assess true body composition and does not consider individual differences that affect body composition such as age, gender, and ethnicity.[138]

Research on body circumference measurements links chronic diseases to high abdominal circumference values.[139] Abdominal circumference can identify visceral body fat, which is highly correlated to developing conditions such as hypertension and diabetes mellitus.[140] The Air Force determined that abdominal circumference is more indicative of Airmen's fitness level than push-ups and sit-ups. It subsequently used this metric as a principal screening tool for body composition.[123, 140]

Abdominal circumference measurement fails to control for an individual's height. There is a chance for body composition results to be over or underestimated in short and tall Service members.[138] Tall individuals in healthy weight classifications have wider abdominal regions than short individuals, resulting in higher abdominal circumferences.[140] The benefits of this measurement outweigh the risks of cardiovascular and metabolic morbidity and mortality.[141] Airmen are required to take the abdominal circumference assessment.[123] Airmen that do not meet the allowable measurements (i.e., males measuring >39 inches, and females measuring >35.5 inches) but pass the rest of the fitness assessment with a composite score >75, are allowed to use the BMI screen as an alternative to abdominal circumference measurements.[123] Meeting BMI standards permits Airmen to pass the fitness assessment. Body fat percentage estimates (i.e., anthropometric taping at two or three sites) may substitute for the BMI screen, if BMI standards are not achieved. The abdominal circumference

component is exempted if Airmen pass either the BMI screen or the body fat assessment screen, along with achieving high marks on the fitness assessment.[123]

The Marine Corps changed its Body Composition program in 2018.[125] Female maximum weight based on a BMI of 25 to 26 altered the allowable maximum weight standard by a five to nine pounds increase relative to height. Marines are exempt from the Body Composition program requirements if they achieve a 285/285 physical fitness test (PFT)/combat fitness test (CFT) score. A 250/250 PFT/CFT score allows a Marine an extra 1% body fat. The updated Marine Corps Body Composition program policy imposed a positive correlation for body fat allowances as age increases. Female Marines within weight standard increased by 12% from 2015 to 2019 as a result of these policy changes.[136]

Emerging Perspectives and Potential Concerns

In sports medicine, trainers use a Step Progression approach to plan fitness training sessions.[142] This allows the trainers to customize an exercise program based on fitness level and fitness-related goals. Applying this approach to ADW allows them to complete the same activities as men, with some modifications. A Step Progression approach in ADW's exercise program may reduce injury by increasing strength in lifting, load carrying, and running activities.[143] This customized approach may benefit postpartum ADW with sufficient childbirth recovery time to recondition and avoid overloading their bodies.

Current DoD/Service Prevention Initiatives and Programs Related to MSKI

Most MSKIs are preventable with an appropriate intervention or initiative in place. Customizing initiatives requires understanding the cause and contributing factors of injury.[144] Military and civilian injury research has identified "modifiable" or "non-modifiable" risk factors that predispose Service members to experience MSKIs. MSKI risk-reducing initiatives focus on aerobic fitness, training intensity, flexibility, footwear, nutrition factors, and baseline fitness level.[145]

The DHB categorized existing DoD and Service-level risk-reducing initiatives into primary, secondary, and tertiary prevention. Several initiatives require a systems approach to guide and track ADW through an integrated array of prevention services across all levels of intensity.[146]

Primary Prevention Initiatives and Programs

Primary prevention initiatives, targeted for the early to mid-career Service member, are performed before an adverse health event. The initiatives attempt to improve baseline health and fitness levels by modifying nutrition and activity behaviors.[147]

Interventions at the Recruitment Phase

A rising number of potential military recruits are medically or physically unfit to serve.[107] A higher percentage of women are unfit due to low pre-military physical fitness levels, insufficient physical

activity, and poor dietary behaviors. Recruiters, under pressure to meet recruitment goals, often bring in recruits with suboptimal fitness levels.[148] Services can address this problem by pre-accession exercise and nutrition education on recruitment websites. For example, the Air Force developed the "Couch to BMT" videos to encourage exercise and healthy diets among recruits before joining the military and attending BMT.[149] While specific gender-appropriate training tips are not provided, these videos feature many female recruits, a female training instructor, and a discussion of vitamin D and iron deficiency.

Interventions in the Basic Training Environment

BMT is when most Service members experience intense physical, emotional, and mental stress. Stress fractures are the most frequent significant injury in the training environment. These fractures require lengthy rehabilitation before return to duty and delay or prevent trainees from participating in activities with their unit and graduating on time. All Services, guided by exercise science recommendations, reduced the number of running miles and the frequency of distance runs for BMT. Through this change, the risk of stress fractures and other overuse injuries decreased without compromising performance.[109]

Nutritional deficiencies can increase the risk of stress fractures or lead to the development of osteopenia and osteoporosis. Studies in military populations of the U.S., Greece, Israel, Finland, and the United Kingdom found an association between low 25-hydroxyvitamin D levels and stress fractures.[150-152] Services can mitigate nutritional deficiencies through interventions.[153] The Army developed a performance nutrition bar, with high calcium and iron concentrations, with limited effects due to poor utilization rates.[154] The Navy, based on a 2008 randomized placebo-controlled study, now provides calcium and vitamin D supplements for its female recruits.[155] The study documented that a calcium and vitamin D supplement produced a 20% decrease – although only a 1.3% absolute decrease - in stress fractures.[155]

Low iron and anemia contribute to overuse injuries.[156] Vegetarian diets, endurance exercise, and blood donation may compromise blood iron levels .[157] Females with low blood iron may experience decreased cardiovascular endurance, decreased cognitive performance, and depressed mood. Female blood donors with normal blood iron levels can completely exhaust iron stores from one donation and younger females with low blood iron will be iron deficient after one or two donations.[158] Blood iron levels can take 78 to 168 days to fully restore within the body, depending on baseline levels prior to donations.[158] Female trainees at all Services donate blood at the end of BMT, contributing to 6% of the Armed Forces Blood Program supply.[159]

Approximately 11% of male and 35% of female athletes experience iron deficiency.[157] Iron deficiency anemia affects 3-5% of females and <1% of male non-athletes.[157] In contrast, the Air Force reported 25% of female trainees and 9% of male trainees suffered from iron deficiency anemia.[160] This is consistent with NHANES iron-deficiency prevalence when adjusted for age, race, and ethnicity.[161] Iron supplementation may mitigate iron deficiency anemia by improving blood iron levels and total body iron stores.[157] Iron-deficient female athletes, with or without anemia, taking iron supplements improve their iron stores, though further research is needed to confirm the association of iron supplementation

with improved aerobic endurance.[157] The Army studied iron supplementation in female recruits in a randomized placebo-controlled trial.[155, 162] Iron-deficient women who received iron supplements had faster 2-mile run times compared to those who did not.[162] Among women with normal blood iron levels, supplementation did not show significant physical performance improvements.[162]

Programs Focused on General Health and Well-being

AWCs and the Air Force Health Promotion program help empower participants to achieve their health goals. The primary goal of the AWC is to streamline the delivery of Health Promotion and Wellness to a defined standard of operation for a consistent patient experience and provide measurable outcomes. The AWC comprehensively examined the Air Force's Health and Wellness Center model and industry and corporate wellness programs to derive their operating model, which allows objective data comparison across the Centers.[163] AWC services provide healthy behavior change through evidence-based health education, health coaching, and advanced fitness testing technology within a standardized model to enhance readiness and achieve optimal health. The fitness testing services include body composition assessments, cardiovascular function measurements with muscle oxygen uptake (VO_2Max), fitness evaluations, and an individualized plan for improved fitness, diet, sleep, and stress.[132] Assessments for fitness level, body composition, and metabolic rate at the AWCs, often combined with health coaching and group wellness classes, provide Soldiers the continuum of services between primary and secondary prevention.[163]

Secondary Prevention Initiatives and Programs

Secondary prevention initiatives and programs screen and assess individuals to identify diseases or conditions before the onset of signs and symptoms.[147] The Services currently provide remedial training for those who do not pass DoD physical fitness and body fat requirements.

Pre-enlistment Programs

Each Service establishes its physical fitness screening requirements with DoDI 1308.3 core pre-accession height and weight standards.[122] While no Service has pre-accession physical fitness standards, Army, Navy, and Marine Corps recruiters conduct pre-enlistment fitness assessments.[107,111,164,165] The Marine Corps Initial Strength Test consists of pull ups, crunches, a 1.5-mile run, and an ammunition lift test. The Army administers an Occupational Physical Assessment Test, which predicts a recruit's ability to successfully perform the physically demanding tasks of a standing long jump, seated power throw, strength deadlift, and interval aerobic run. Currently, the Army is piloting the Assessment of Recruit Motivation and Strength Program 2.0 for recruits who exceed body fat composition standards but meet all other Army standards.[166]

Screening Programs

The Service academies, as a training environment for officer accessions, have MSKI prevention practices in place. These practices vary by program and scope and are limited to intercollegiate sports

teams. The U.S. Naval Academy Brigade Surgeon reported increased collaboration – prompted by the COVID-19 pandemic - with counterparts at the U.S. Air Force Academy and the U.S. Military Academy. This collaboration, focused initially on return-to-campus pandemic preparations, now includes other shared issues including MSKIs and injury prevention.[167] The U.s. Naval Academy women's soccer and lacrosse teams and the U.S. Military Academy women's soccer team use an ACL-injury prevention protocol; even with this program, the teams experience several ACL injuries each season.

The Air Force Academy took a tactical approach to prevent the occurrence of bone stress injuries. They established and implemented a Bone Stress Protocol to screen against nine risk factors: poor baseline aerobic fitness; participation in an intensive training regimen within the last month; being female; past participation in a non-impact sport as a primary sport, including swimming; amenorrhea; known vitamin D deficiency; known caloric intake issue or eating disorder; running in minimalist shoes; and previous history of stress fractures.[168] Physical therapists assess the risk factors, including the wear pattern on cadets' running shoes. An integrated care team (e.g., behavioral health specialists and registered dietitians for disordered eating) or education (e.g., information and resources provided by behavioral health specialists and registered dietitians on amenorrhea and its relationship to iron level and vitamin D deficiency) mediates the promotion of positive behavior change to reduce risk factors.[168] Attention to these risk factors led to nearly eradicating bone stress injuries at the Air Force Academy. The Neuromusculoskeletal Clinical Community is currently developing a DHA-wide bone stress protocol.[169]

Bone density loss is often correlated to low vitamin D and calcium status.[170] Older females with low body weight and inadequate physical activity are at risk for bone density loss, which may progress to osteopenia or osteoporosis.[168] The DoD can help prevent disease progression by supplementing ADW with calcium and iron during early career and routine clinical assessments. ADW with signs and symptoms of bone disease, not yet developed to osteopenia or osteoporosis, are assessed and monitored with DEXA scans.[171] Despite inconclusive scientific evidence demonstrating vitamin D and calcium supplementation improves performance endurance, evidence associates supplementation to bone mineral density maintenance.[155] This supports injury prevention subject matter experts' recommendation of vitamin D and calcium supplementation during an ADW's early career to prevent bone density loss as they age.

Remedial Training Programs

DoDD 1308.1 requires the Services to provide remedial training to those who do not pass the PFT.[121] Each Service implements a different variant of a remedial training program in line with these requirements. The Air Force established two remedial training programs targeting two different populations: The Get Fit and Fitness Improvement programs. The Get Fit program targets trainees who failed their final physical training test at week seven of BMT.[172] Certified personal trainers assist these trainees in daily weight and cardiovascular training exercises. The Air Force's Fitness Improvement Program is mandatory for all Airmen with an unsatisfactory fitness assessment score. The program encompasses three initiatives: BE WELL – online training, the Healthy Weight program, and Military OneSource Health Coaching.[123] At a community level, the Air Force's Project Health and Readiness

Optimization program identifies squadrons from personal health assessment questionnaires showing high rates of negative health behaviors and engaging squadron leadership to motivate Airmen to alter their health behaviors.[173] The Navy has the Fitness Enhancement Program and the ShipShape weight management program for Sailors who fail the physical fitness assessment or body weight and composition standards.[174,175]

Tertiary Prevention Initiatives and Programs

Tertiary prevention initiatives and programs are used after diagnosis to slow or stop disease or condition progression through rehabilitation and screening for complications.[147] The USMC was an early advocate of embedding athletic trainers in units, with the inclusion of eight civilian athletic trainers in training units in 2003 as part of the Sports Medicine Injury Prevention (SMIP) program. Today, USMC training centers have 30 embedded athletic trainers, and the program expanded to operating forces in 2018 with a planned expansion to 66 trainers by FY 2023.[176] Similar programs exist in the Navy and Air Force. The Navy's Sports Medicine and Reconditioning Team (SMART) and the Air Force's Versatile Injury Prevention and Embedded Reconditioning (VIPER) program operate from clinics embedded in training centers.[177, 178] SMART uses a multidisciplinary healthcare team of sports medicine doctors, physical therapists, certified athletic trainers, podiatrists, and chiropractors. The Air Force's VIPER program uses athletic trainers with oversight from a board-certified sports medicine physician. The AF VIPER model also shows the benefit of the proximity of evaluation and rehabilitation resources to the injured Airman's or recruit's unit, decreasing time away from training caused by travel to a traditional clinic or hospital-based rehabilitation facility. Proximity also aims to improve the individual's psychological mood and promotes continued cohesion with their unit. All of these embedded athletic trainer programs complement existing assets in the prevention, treatment, and rehabilitation of athletic injuries, and enable injured trainees to return rapidly to training.

MSKI Prevention Continuum

Several DoD programs adopted a systems approach based on a continuum of care to prevent MSKIs. For example, the Air Force Operational Support Team coordinates its efforts through an integrated team of primary care clinicians, behavioral health specialists, chaplains, and exercise physiologists.[173] The Team rotates through squadrons within an Air Force wing command in coordination with the Health and Readiness Optimization program. The Army's Forward Musculoskeletal Care program and the Marine Corps Sports Medicine Injury Prevention program are other examples of a systems approach to MSKI prevention.[176, 179]

Research to Improve Prevention Approaches

Scientific studies have suggested that properly designed physical training programs will improve operational performance and reduce some of the previously described differences in injury rates between men and women.[180]

> *"The burden of MSK-I described above is a driving factor in physical training and has been identified as a top priority for program and policy interventions to reduce injury rates. However, knowing that physical training, during entry-level military training and deployment is a primary cause of MSK-I does not inform program designers and policy makers as to why Service members are being injured at such high rates. Identifying risk factors that predispose to these injuries is critical to successfully implement a strategy to reduce the burden of MSK-I."*
>
> Gribben et al[145]

Despite recommendations for evidence-based initiatives, only the Army has an injury prevention division, and no DoD-wide program addresses MSKI prevention. A tri-service MSKI prevention working group was formed in 2019, and the DHA stood up a Neuromusculoskeletal Clinical Community to help identify and standardize best practices.[100] Both initiatives are too new to demonstrate reductions in the incidence or severity of MSKIs.

Outcome Metrics: Measuring the Effectiveness of Initiatives

The DoD developed standardized injury metrics based on the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes. These metrics include injury-related musculoskeletal conditions, primarily overuse injuries. The DoD developed tools and methods to monitor these MSKI metrics. In 2002, the DoD Military Injury Metrics Working Group recommended implementation of five injury metrics: injury case rate, lost day injury case rate, limited duty injury case rate, limited day rate, and lost days rate. The working group recommended including cost estimation information with the metrics.[181]

In October 2015, the U.S. Army Public Health Center revised its metrics to reflect ICD-10-CM diagnostic codes and subsequently developed a comprehensive injury taxonomy to identify and categorize all injury types.[108,183] This taxonomy is the first classification system to differentiate between MSKI and non-MSKI, thus enabling further precision with injury reporting and monitoring.[108] The Army's Musculoskeletal Readiness metrics include:

- Percent of Soldiers on Musculoskeletal profile 31-90 days in the last 6 months
- Percent of Soldiers on Musculoskeletal profile >90 days in the last 6 months
- Number of temporary Musculoskeletal profile days per 100 Soldiers per month
- Percent of Soldiers in Medical Readiness Classification-3 (limited or non-deployable) on MSK profile >14 days

The Army uses these musculoskeletal readiness metrics in their annual HOF Report and provides stratification by gender and age.[90] Not all Services have adopted these standards or similar outcome metrics.

The metrics to evaluate the success of the Army P3T (Pregnancy, Postpartum Physical Training) program are Army Combat Fitness Test scores, AR 600-9 pass rate, and appropriate medical outcomes.[133] Currently, the DoD does not use a system for tracking injury rates by gender.[103] Holsteen et al

highlighted the issue of no systematic limited duty days recording in outpatient records.[103] Without systematic recording, recovery days are estimated, which potentially leads to a return to duty without full recovery. The Army Public Health Center developed a tracking tool that monitors female and male Service members injury rates.[104] In contrast, the Navy and Air Force rely on diagnostic codes for data on ADW injury rates, partially due to processes and limited personnel to perform surveillance and analyses.[100, 183] In depth analyses on the effects of MSKIs by gender is necessary for understanding trends and for developing best practices and surveillance systems.

Foreign Military, Civilian, and Other Governmental Approaches to Injury Prevention in Women

The DoD can gain insight into best practices for mitigating injury rates in ADW from civilian and other military organizations. For example, the American College of Obstetrics and Gynecology provided the Services' pregnancy and postpartum exercise recommendations template.[132] According to Rogers et al, a 2010 Navy Pregnancy and Parenthood survey reported approximately 23% of enlisted sailors and 14% of officers did not pass at least one component of the postpartum Physical Fitness Assessment as a result of work and child care barriers limiting the amount of time to focus on exercise.[130] Other professional and military organizations, such as the Israel Defense Forces (IDF), the American College of Sports Medicine (ACSM), the National Institute of Occupational Health and Safety of the CDC, and women's collegiate and professional sports teams offer insights to enhance fitness, reduce injury rates, and encourage healthy lifestyles – often to elite performance levels.[71, 184-187]

Foreign Military

With women serving for over 70 years, the IDF has addressed MSKIs and physical performance in both women and men. The IDF has a command accountability culture for preventable injuries and deploys a multimodal approach that it customizes to an individual's risk characteristics.

Stress fractures among IDF soldiers in the 1980s approached 25%, with similar rates among women warfighters in the early 2000s.[71] The IDF achieved reductions to 15% with the use of Gradated Exertion Tables, which guided gradual progressions in marching and running distances based on effort level and total distance. Stress fractures rates reduced more when the IDF modified the tables to account for the amount of gear carried relative to body weight, terrain, and time since the start of military training.[71] In 2010, the IDF started to use female-specific gradation exertion tables (Appendix K). Further reductions in stress fractures to <5% occurred when the IDF introduced guidelines that mandated a minimum number of hours of sleep and unit-specific calorie goals.[71] In 2013, the IDF opened an Overuse Injury Prevention Center that screens all recruits entering combat arms professions. Recruits who attended the Center have a <2% rate of stress fractures.[71]

Command accountability helps to sustain low stress fracture rates.[71] IDF commanders measure and track stress fractures. If the rate exceeds 5%, the commander must stop training, investigate whether the unit is following protocols, and explore other contributing factors before the unit can resume training.[71] If the stress fracture rate rises to 10%, training stops and the commander's higher-echelon

command investigates. If a unit has a 15% stress fracture rate, the unit no longer trains. Measurement and accountability keep commanders invested in avoiding training environments that lead to stress fractures and other MSKIs.[71]

Other organizational features promote attention to non-medical determinants of MSKI. The IDF co-locates its Medical Corps and Logistics Corps in the same branch with the same commanding general. This arrangement facilitates the modification of clothing and personal protective equipment modifications to improve health and reduce injury. Examples include footwear modifications and a change in the design of the flak jacket vest. The original design of the flak jacket vest's arm cutouts caused pain in women's upper chests. Unpublished data from 2015-2020 documented progressive modifications to the design to minimize the pressure exerted on the chest, with an 'S' shape ultimately identified as the design associated with the least pain.[71] The co-location and coordination between the medical and logistics branches allowed more rapid data sharing and changes than if the branches were physically distant and in separate chains of command.

The IDF takes a data-driven approach to nutrition. The IDF screens all female combatants for anemia and iron deficiency on induction day and prescribes iron and schedules re-testing for all those who screen positive. Over 18% of new IDF recruits have iron-deficiency anemia, and 60% have iron-deficiency, mostly caused by poorly implemented vegan diets.[188] The IDF continues to actively screen and treat iron-deficiency and iron-deficient anemia in female members at induction or if there is clinical suspicion. Vitamin D deficiency is not common in Israel, and it is unclear if the IDF checks vitamin D levels by screening blood samples.[71]

Civilian Models

American College of Sports Medicine (ACSM)

The ACSM and its certified professionals create exercise programs within a comprehensive framework to encourage the civilian population to adopt and maintain healthy physical activity.[183] ACSM's Guidelines for Exercise Testing and Prescription apply five-components – Frequency, Intensity, Time, Type, Volume, and Progression – to structure fitness programs (FITT-VP) to an individual's current level of fitness.[183] FITT-VP allows aerobic and strength training programs to progress at a customizable pace for individuals in healthy, elite, and vulnerable populations. While FITT-VP does not have any female-specific components, ADW may want to consider these components to customize an individual plan that fits their fitness levels and goals.

National Collegiate Athletic Association

The National Collegiate Athletic Association (NCAA) provides injury prevention, monitoring, rehabilitation, and performance enhancements for student-athletes at the organization and individual athletic department and team levels. The NCAA Sport Science Institute (SSI) monitors college athletes' wellness by providing safe and healthy environments through evidence-based research and practice.[189] The NCAA-SSI has a singular goal of protecting student-athletes through a comprehensive approach

that addresses a wide range of athletic health issues including cardiac health, concussion, doping and substance abuse, mental health, nutrition, sleep and performance, overuse injuries and periodization, sexual assault and interpersonal violence, athletics healthcare administration, and data-driven decisions.[189]

One of the NCAA-SSI's focus areas addresses overuse injuries and techniques for designing fitness programs tailored for student-athletes' optimized performance. The NCAA-SSI applies the American Development Model to fitness programs as a long-term development plan.[189] The principles of the American Development Model are divided into five stages, relative to an individual's age and developmental milestones that begin in childhood and progress into adulthood.[190] Through the SSI, the NCAA supports an Injury Statistics Clearinghouse, which has been available to researchers since 1982. The database can stratify by gender, sports activity, and detailed anatomic sites.[189] The DHB attempted to contact the NCAA-SSI to learn more about the program, gender-specific training activities, and research about injury prevention in elite female athletes; however, there was no response.

Several collegiate athletic departments promote MSKI injury prevention through customized training programs. Tulane University developed the Women's Sports Medicine Program as the primary method for providing comprehensive care to their female athletes. The program includes pre-season orthopedic and musculoskeletal assessments and partners with community resources for nutrition and rehabilitation services to support holistic health and wellness.[191] The University of Pennsylvania Athletic Department, different than the approach used by Tulane University, uses commercially available force plate technology for its female and male athletes to design injury prevention and strengthening regimens. They have reported a decrease in ACL injuries and decreased expenditures for physical therapy.[186]

Professional Women's Soccer

Professional women athletes perform at elite levels. Professional women's soccer teams, such as the Washington Spirit, use a highly-customized data-driven fitness monitoring system to prevent injuries, optimize performance, rehabilitate injuries, and return athletes to elite play after pregnancy.[186] Sensors in sports bras detect daily running distance, speed, and acceleration. Force-plate technology, similar to that used by the University of Pennsylvania, identifies anatomic asymmetries. The system uses individual-level data to adjust the athlete's daily regimen to minimize relative weaknesses and slightly exceed performance thresholds without overtaxing or providing too little training. The regimens include a weekly periodicity to provide rest periods that allow for peak performance on match days.

Such extreme customization is possible for the small number of elite female athletes on professional teams. Scaling this model today to a military-wide implementation is impractical, costly, and likely unfeasible. However, small elite units with women in them could utilize these techniques. For example, several elite military units are currently using force plate technology to identify musculoskeletal asymmetries and some AWCs place portable VO_2 max units in backpacks to monitor aerobic performance.[134, 192]

Government Models

Government organizations outside of the DoD provide models and guidelines for injury prevention through a public health approach to encourage healthy lifestyles and discourage occupationally-induced injuries. Most, but not all, provide achievable gender-neutral activities for individuals of all ages. Government models that address wellness practices are beneficial for encouraging a holistic approach to ADW's health and reducing MSKIs.

Centers for Disease Control and Prevention (CDC)

The CDC is the U.S. public health agency responsible for health and wellness on a national scale. The Division of Nutrition, Physical Activity and Obesity (DNPAO), located within the CDC, conducts surveillance on topics such as[193]:

- Physical activity
- Overweight and obesity
- Healthy weight
- Breastfeeding
- Micronutrient malnutrition

The National Institute for Occupational Safety and Health (NIOSH), another branch located in the CDC, is responsible for monitoring worker's health and promoting recommendations of techniques for preventing work-related injuries and accidents.[184] The NIOSH designed Total Worker Health (TWH), a holistic method addressing policies, practices, and programs that promote health and reduce injuries.[184] TWH approaches injury from an occupational health perspective rather than an athletic or fitness perspective. TWH uses a Hierarchy of Controls to enhance workers' health.[184]

- Physically remove unsafe work conditions
- Substitute work hazard for health-focused policies or programs
- Redesign the work environment to promote workers' safety and wellness
- Educate workers about safety and health
- Encourage workers' personal change

Both the DNPAO and NIOSH provide strategies to achieve these goals, decreasing the risk of work-related injuries and accidents.[184,193] ADW should already achieve physical activity standards encouraged by DNPAO; NIOSH information can provide DoD with strategies that reduce the risk of MSKI that result from military occupational work conditions and not necessarily physical training alone.

Office of Personnel Management

The Office of Personnel Management (OPM) is responsible for human resources management for the federal government's workforce. The OPM helps the workforce lead healthy lives by incorporating prevention activities, such as worksite health and wellness interventions.[194] It introduced worksite health and wellness interventions designed to increase work productivity and improve retention.[194] The interventions include health education, nutrition services, lactation support, physical activity

promotion, screenings, vaccinations, traditional occupational health and safety, disease management, and employee services connections.[194]

Title 5, U.S. Code, Section 7901, mandates health services for federal employees and provides guidelines for government agencies to follow while developing health service programs for employees.[194] OPM provides its resources based on the CDC's public health framework and the Department of Health and Human Services (HHS) Healthy People 2020 initiative.[195]

Applicability of Civilian, and Non-DoD Governmental Programs for DoD/Best Practices

Service-specific physical fitness assessments base standards on health-related fitness components, with some Services creating skill-related components to better assess combat readiness. The FITT-VP's components of exercise prescription may be useful in the development and fine-tuning Services' PFT and CFT programs. ACSM's components are gender-neutral and focus solely on the fitness level of an Active Duty member. The ACSM's Guidelines for Exercise Testing and Prescription use a customizable and gradual progression of fitness activities that allow civilians to transition into fitness programs safely. A gradual progression into PFT and CFT activities allow for ADW to work on techniques and increase physiological adaptability for movements, which reduces the risk of MSKI.

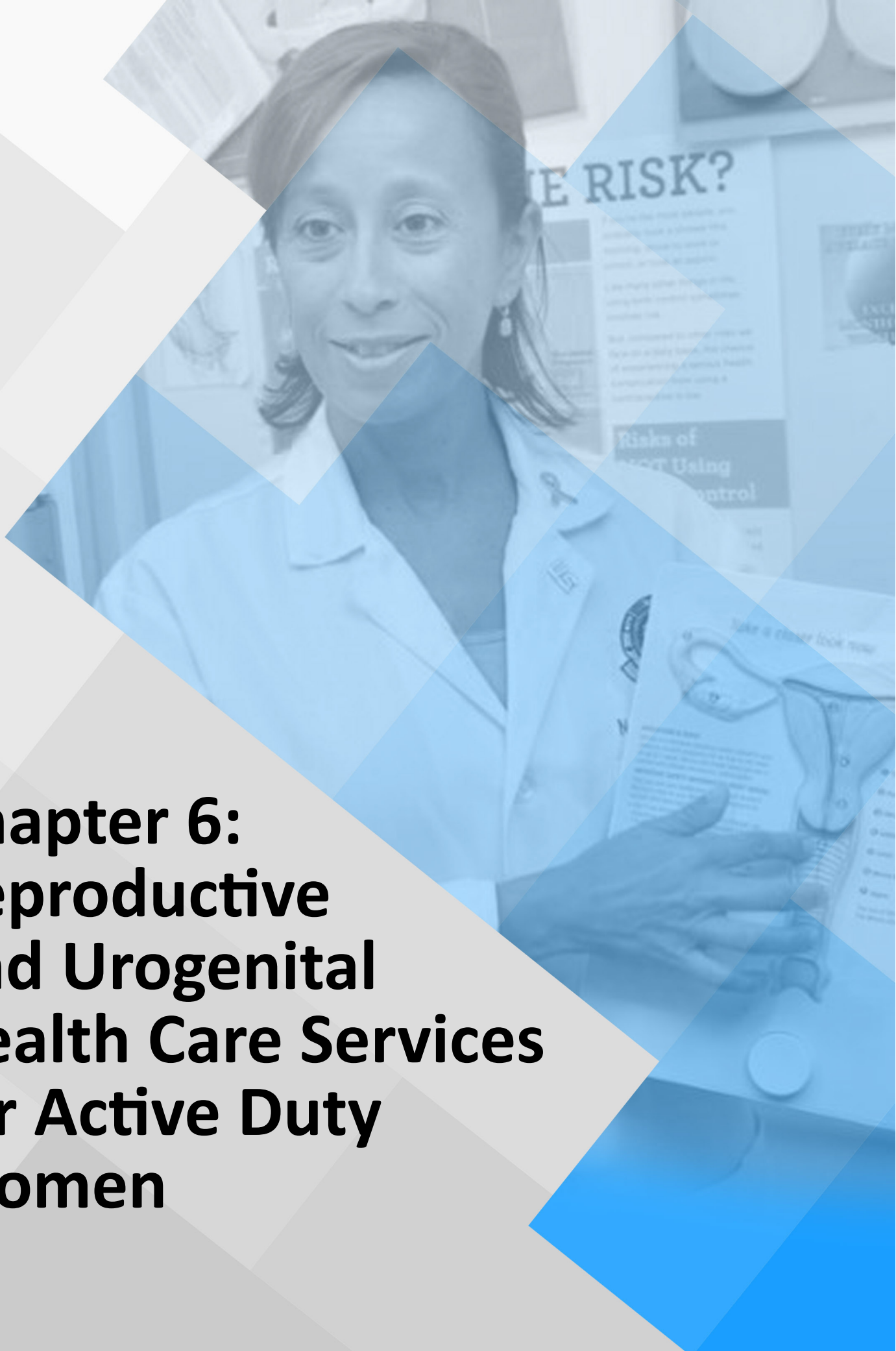
The government models listed above highlight useful strategies that may be beneficial for supporting ADW. The TWH provides a useful framework for minimizing the potential of work-related accidents and injuries for ADW.[184] However, the TWH is used primarily in office settings. While there is much evidence supporting the risks of MSKI from physical training, the correlation of repetitive motion injuries and poor ergonomics at workplace stations to active duty MSKI is less well known. As more military-occupational tasks become more reliant on operating technology and less on physical exertion, TWH, OPM, and occupational health experts may be useful in analyzing and improving the design of workstations and workflow for women's bodies.

MSKI in ADW is Preventable

ADW experience a high incidence of MSKI that inhibits successful entry, readiness, and retention in the Services. These issues are fixable problems. Knowledge already exists to reduce the incidence, mitigate the impact, and eliminate the sizable gender disparity of MSKIs. The remedies, however, require an integrated data-driven approach and accountability for reducing the incidence and consequence of MSKIs. Currently, the DoD does not have easily accessible data to track gender-specific injury rates. The data-driven approach to preventing MSKIs should be comprehensive and address extrinsic and intrinsic risk factors, training techniques, and accountability from Unit Commanders.[109] This approach should include generating hypotheses, answering research questions definitively, and sharing and scaling proven best practices.

Challenges still exist in changing the institutional and cultural traditions that are key drivers of ADW's MSKIs. Many root causes of injuries fall in the jurisdiction of DoD entities far removed from the medical field; DoD supply chain leaders for clothing, equipment, and gear, recruiting commands

preparing candidates for accession, and others need stronger liaison relationships with DoD medical professionals. The Air Force has notably led in this arena, with recent attention to female flight suits and cockpit design. However, the deep-seated tradition of working through pain and deferring care for MSKIs – more prominent in ADW who seek to avoid the stigma of injury – complicates even the most data-driven process-related improvements. For this most prevalent reason for limited duty, the economic argument alone – $75,000 to replace a recruit or Service member who separates or the equivalent time on limited duty – should drive the DoD to fix the problem of preventable MSKIs.



Chapter 6: Reproductive and Urogenital Health Care Services for Active Duty Women

Women's health refers to the branch of medicine that focuses on treating and diagnosing diseases and conditions that affect women's physical and emotional well-being. Women's health includes a wide range of specialties and focus areas, such as:

- Birth control and gynecology
- Breast, ovarian, and other female-related cancers
- Mammography
- Menopause and hormone therapy
- Osteoporosis
- Pregnancy and childbirth
- Sexual health and sexually transmitted infection (STI) screenings, diagnoses, and treatment
- Women and heart disease
- Benign conditions affecting the function of the female reproductive organs

How a health care system provides reproductive and maternal health is an indicator of the overall health of a population and the quality of care provided.[196] The DoD and the MHS must ensure and maintain optimal health of the ADW population to enhance individual and unit readiness.

The TFF framework links Service members', including ADW, overall health status (both intrinsic and extrinsic) to readiness.[21, 22] Five out of the eight domains of the TFF framework – environmental, medical and dental preventive care, nutritional, psychological, and social fitness – impact reproductive and urogenital health and ADW's readiness. The stressors that affect ADW's health over their lifecycle include limited access to contraceptive services and methods, inadequate hygienic practices in the field and deployed settings, and unhealthy

Box 4. Selected Best Practices Related to Reproductive and Urogenital Health

Walk-in Contraception Clinic
Full service walk-in clinic that provides contraceptive care to ADW at no cost
Best Practice: Process Improvement for Non-delayed Contraception (PINC) Clinic
Owner: Navy Office of Women's Health

Use of Long-acting Reversible Contraceptive (LARC) at Basic Training
Counseling services and insertion of the LARC for ADW to decrease rates of unplanned pregnancies and non-deployable days to pregnancy
Best Practice: Navy's LARC Forward
Owner: Navy's Office of Women's Health

Collation of Information about Contraception Options via Mobile Application
Educate women about the different options and method to use for contraception
Best Practice: Decide + Be Ready App
Owner: DHA Connected Health

Self-Diagnosis and Treatment Kits
Provides ADW the resources to comfortably self-diagnose and treat common urogenital conditions in field environments
Best Practice: Women in the Military Self-Diagnosis Kits
Owner: Daniel K. Inouye Graduate School of Nursing at Uniformed Services University of the Health Sciences

Urinary Diversion Devices in ADW Gear
FDA-approved urination device that increase comfortability, privacy and safety for ADW to void in field environments and deployment
Best Pratice: Female Urinary Diversion Device (FUDD)
Owner: Daniel K. Inouye Graduate School of Nursing at Uniformed Services University of the Health Sciences

sexual behaviors that lead to unintended pregnancies or infections. Stressors that affect ADW's lifecycle in mid- to late career are decisions about family planning, pregnancy while in service, infertility due to occupational hazards, and access to fertility treatments. The accumulation of the various stressors at different points within an ADW's career hinders mission readiness and compromises their health.

ADW encounter unique challenges because of their military assignments, such as potentially hazardous exposures, unpredictable and demanding work schedules, and frequent moves and deployments that may affect fertility and fragment their reproductive health care. The deployment and field settings bring an additional set of challenges that can escalate gynecologic and urogenital conditions and interfere with access to timely treatment leading to preventable complications. This chapter outlines the status of reproductive and urogenital health care for ADW's health.

Norms, Expectations, and Military Culture

Institutional cultural barriers combined with increased risks for physical ailments challenge ADW's reproductive health. For example, ADW experience higher rates of stress fractures due to modifiable and non-modifiable risk factors (discussed in more detail in Chapter 5), challenges with accessing resources that support their basic reproductive and urogenital health needs, and receipt of the appropriate gender-response to mental health care (discussed in more detail in Chapter 7). For ADW, these situations occur while navigating the traditional male norms, expectations, and culture of the military environment. This section aims to discuss how the military's culture affects ADW's health regarding pregnancy and other health needs.

Pregnancy Discrimination

Pregnancy brings physiological and lifestyle changes for ADW. The DoD recognized the need to adjust policies that support ADW's needs during pregnancy with the extension of convalescent leave and guidelines to support breastfeeding and lactation. Despite the pregnancy policy modifications, ADW still experience pregnancy discrimination in their work environment. For example, some military leaders incorrectly perceived that the allocated break times for pumping breast milk was a method for ADW to avoid work obligations.[197] The DoD, on the recommendation of DACOWITS and other women-focused groups, extended pregnancy protections in the updated DoD Instruction 1350.02, *DoD Military Equal Opportunity Program.*[198]

Stereotype of ADW and Health Needs

In addition to pregnancy discrimination, there are other challenges and stereotypes that ADW face. Promotion and attainment of leadership roles are common obstacles cited by many ADW who often delay starting a family until they reach certain positions. However, when ADW are finally able to advance to those career positions, they are expected to have a family as this aligns with the male image of a leader.[199] Aside from these cultural expectations, ADW consistently respond in multiple DoD surveys that they experience a constant need to "prove themselves worthy" to their commanders and

male counterparts.[200, 201] In deployed environments, this expectation is an added burden on ADW when male counterparts express distrust in women's physical capability to thwart off imminent danger.[200] Gender-specific standards, where the female standard is lower than the male, convey that women are less capable than men.[201] In already challenging environments, ADW may often delay seeking medical care for health concerns because of gender stereotypes and stigma of perceived inferiority compared to their male counterparts.[202]

Female Readiness in the Field and During Deployment

Field assignments and deployments are an integral part of an ADSM's military experience. Field and deployment environments vary in temperature, climate, and terrain requiring ADSMs, especially ADW, to adapt accordingly. An Army Training Circular instructs all Soldiers to shower daily or at least once a week while in deployed settings, with particular attention to areas on the body that are prone to holding in moisture.[203] However, if there are no available shower facilities with adequate privacy, it is the responsibility of the Service member to establish an area that affords enough privacy and has adequate water drainage.[203] The added stress of establishing a private bathing area while in the field or deployed setting forces ADW to alter their normal hygiene practices, which increases susceptibility to urogenital conditions.

Hygiene Practices

The deployed and field environments pose an anatomic challenge for women to urinate in a safe, hygienic, and private space.[204] Due to this challenge, many deployed military women defer perineal hygiene and withhold urination, behaviors that lead to an increased risk of urinary tract and gynecologic infections.[204] Additionally, ADW face barriers to accessing care for their urogenital needs, including limited access to health professionals trained in female urogenital conditions, lack of or altered urogenital hygiene practices due to concerns for privacy within military units, and erratic work schedules that inhibit timely medical response to treatable conditions and preventable outcomes.[205]

Urogenital Infections

Urogenital conditions are among the top reasons for medical encounters and evacuations of deployed women. The top three urogenital issues for ADW are urinary tract infections, bacterial vaginosis, and yeast infections.[206] An inability to maintain proper feminine hygiene increases the risk of developing infections affecting the urinary tract or reproductive organs. Disease progression of treatable conditions, primarily in the urogenital system, leads to adverse reproductive health outcomes in ADW.

Approximately 30% of deployed ADW report a vaginal infection, while approximately 10% report having a yeast infection.[202] Symptoms related to vaginal infections may cause ADW to lose duty time and experience increased physical, social, and psychological discomfort.[202] In deployed settings, ADW are further challenged in mitigating these health conditions as resources such as soaps and various feminine hygiene products are limited and difficult to access.[206] This can increase ADW's likelihood of being medically evacuated from combat areas for further evaluation of urogenital conditions.[207]

Bacterial vaginosis (BV) is a common urogenital infection ADW may experience while in the field or deployed setting. Bacterial vaginosis is associated with an overabundant growth of flora, which causes changes to the natural pH level.[208] Risk factors for bacterial vaginosis include new or multiple sexual partners, past pregnancies, and douching. Evidence suggests that ADW who experience bacterial vaginosis are at an increased risk for contracting chlamydia and gonorrhea. This evidence is especially important due to reports of higher rates of chlamydia and gonorrhea in ADW on deployments in Iraq and Afghanistan.[209]

Yeast infections are the second most common type of urogenital infection observed in women, with approximately 75% experiencing this infection at least once in their lifetime.[210] Women with a first time diagnosis and treatment of yeast infections are susceptible to recurrent infections, but can manage symptoms with over-the-counter medication. ADW are five times more likely than ADM to have an increased risk of urogenital infections from working in the field and deployed settings.[207] Limited hygiene products in a resource-constrained environment are primary reasons for the increased risk. Most scientific evidence associates yeast infections to irregular menstruation and unspecified inflammation or pain in the female genital organs.[207] Concerns exist with possible underreporting of urogenital infections in deployed ADW.

Urinary tract infections (UTIs), most commonly diagnosed in women aged 18 years and older, may progress to severe health complications, such as pyelonephritis, if left untreated. UTI symptoms (painful urination [dysuria], frequency, and urgency of voiding) interfere with focus and concentration during mission duties, work availability, and overall well-being.[211, 212] Compared to non-deployed ADW, ADW in deployed or field environments experience more UTIs.[201, 202] The harsh environments due to geography, terrain, weather, and infrastructure, in addition to discomfort from poorly fitting garments and equipment, lack of privacy, and limited hygiene facilities and practices increase ADW's susceptibility to UTIs.[211] Nearly 10% of deployment outpatient clinic visits from 2006 to 2008 were military women with UTIs, while only 0.05% were military men.[203, 208, 209] Of these visits, 1.3% required hospitalization and 0.5% resulted in air evacuations.[209] Military women with UTIs and urinary complaints also take up appointment slots for outpatient visits, leaving few slots available for deployed Service members with other medical conditions.

Self Care Kits: Education and Availability

Availability of self-testing kits for urogenital conditions enable ADW to maintain optimal hygienic practices and sanitation in deployed settings and decrease the incidence of medical evacuations.[206] In addition, the Food and Drug Administration's (FDA's) approval of the FUDD affords ADW the safety and privacy to void in austere environments, decreasing incidence of urinary tract infections and disease progression.[213]

Reproductive Health and Mission Readiness: Pregnancy, Parenting, and Reproductive Hazards

Several reproductive health issues influence ADW's readiness. ADW are in constant struggle between mission-related obligations and planning for when to start or expand their families. It is common for ADW at the start of their military service (i.e., E1 – E5) to defer pregnancy in favor of more career growth opportunities. However, multiple deployments require extra effort for strategizing the most opportune time for becoming pregnant, while avoiding unintended pregnancies.[209] This section discusses the various factors that affect ADW's reproductive health and methods that support their readiness.

Contraceptive Education, Access, and Use

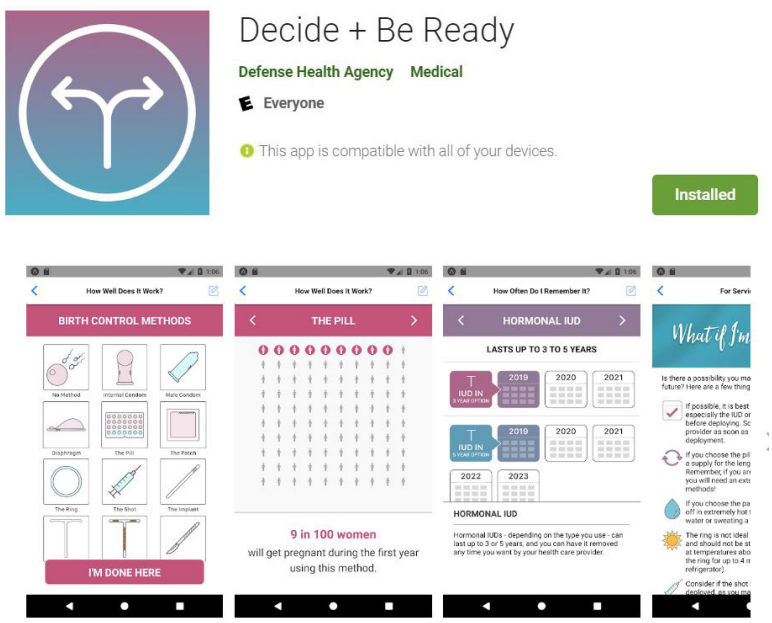
Menstruation and unintended pregnancies can negatively impact ADW's mission readiness, particularly for deployment.[214] Knowledge of, access to, and consistent use of contraception are key to preventing pregnancy and promoting menstrual suppression for ADW's mission readiness.[214, 215] Contraception has multiple benefits for ADW beyond just its contraceptive properties, including minimizing menstrual blood flow and loss, treating menstrual-related disorders like endometriosis, and mitigating the effects of polycystic ovarian syndrome. ADW who decide to defer pregnancy can strategize the most opportune time for becoming pregnant and avoid unintended pregnancies before deployment or other service-related commitments.[208] ADW can procure birth control options at no cost and require no insurance preauthorization for procedural contraceptive methods.[205] Although ADW have full health insurance coverage provided by the MHS, these women still face barriers accessing reproductive health services.[205] Mandatory work and training obligations may result in ADW missing contraceptive-related appointments because of scheduling conflicts made months in advance.[205]

Contraceptive education varies by Service, suggesting that service-specific policies and culture may contribute to differences in unplanned pregnancy rates and contraceptive use (Table 6).[215]

Table 6. Basic Training Contraceptive Education and Access Policies by Services

Contraceptive education and access policy	Army	Air Force	Navy	Marines
Contraceptive education is part of standard basic training curriculum	Yes	No	Yes	No
Tiered education emphasizes the most effective methods	No	Yes	Yes	No
Contraceptive specific appointments are available outside of sick call	No	Yes	Yes	No
All long-acting reversible contraceptive methods available during basic training	Yes	No	Yes	No
Availability of LARC methods is restricted	No	Yes	No	Yes
Long-acting reversible contraceptive methods available without a referral to an outside provider	No	Yes	Yes	Yes
Same day insertion of LARC methods is available	No	No	Yes	No

Figure 15. Decide + Be Ready Mobile Application



The DHA developed the mobile application, Decide + Be Ready, to inform women of different contraceptive options (Figure 15). A military physician spearheaded its development and based it on a University of California-San Francisco shared-decision making tool.[216] Since its debut in the Google and Apple mobile application platforms, only 694 downloads have occurred as of September 2019.[216] The low number of downloads may result from minimal marketing and distribution to ADW and MHS physicians and other providers.

ADW's contraceptive use rates while stationed in the United States are 50-88% and 39-77% for ADW in deployed settings.[217, 218] The most common contraceptive method is oral contraception, typically administered in the form of a daily pill. One of the primary reasons ADW choose oral contraception is for menstrual suppression during deployment.[217] However, it may be difficult for deployed ADW to regularly maintain scheduled oral contraceptive use due to time zone changes from traveling and mission demands.[219]

In 2016, the Navy introduced Operation PINC (Process Improvement for Non-delayed Contraception), a full-service walk-in contraceptive clinic, to improve access to contraceptive care and decrease the unintended pregnancy rate.[205] The Marine Corps and Air Force have adopted their version of the PINC clinic. The DHA is developing policy to institute this model for contraceptive clinics MHS-wide.

The Navy's 'LARC Forward' program has documented success in decreasing unplanned pregnancy and decreasing pregnancy-related non-deployable days by improving the rate of contraceptive use in recruits to approximately 37%, compared to 27% of Air Force recruits, 26% of Marine Corps recruits, and 18% of Army recruits, by six months.[215] Initiated in 2015, the program focused the Navy's contraceptive efforts on long-acting reversible contraceptives (LARCs) and incorporated implementation considerations into policy to further its success. The Navy and Marine Corps programs resulted in female trainees' contraceptive use of 37% and 26%, respectively.[215] The Navy built in time during the third and fourth week of training (when most menstruating women would have had at least one period) for LARC counseling and insertion in 2015. In 2016, the Marine Corps began scheduling LARC counseling, which is optional, for the last two weeks of training. The Marine Corps experienced increases or no change in their pregnancy rates and non-deployable days, while the Navy experienced decreases in pregnancy rates and non-deployable days.[215]

Unintended Pregnancies

Unintended pregnancies are either mistimed (i.e., wanted but occurring unexpectedly) or unwanted (i.e., not wishing to become pregnant at that time or in the distant future) pregnancies. ADW have higher rates of unintended pregnancies than civilian women, after adjusting for age.[220-223] A majority of ADW currently serving are of reproductive age, making the concern for unintended pregnancy greater due to the limitations it imposes on finances, mission readiness, health, and quality-of-life.[221] According to the 2005 version of the Health Related Behaviors Survey, the most common factors associated with unintended pregnancies in ADW were: young age, low educational attainment, cohabitation (as opposed to being married), and non-Hispanic Black or Hispanic race/ethnicity.[224] In addition, the rate of unintended pregnancies was highest among single ADW.[11] ADW of lower enlisted ranks affiliated with the Marine Corps reported more cases of unintended pregnancies than any other military Service.[224] This high percentage of unintended pregnancies resulted in greater economic cost, medical complications, significant impacts on readiness, and negative effects on ADW's quality-of-life.[221]

Unintended pregnancies also produce serious outcomes for ADW who deploy to settings outside of the United States. For example, 11% of ADW deployed during Operation Iraqi Freedom (OIF) were evacuated because of pregnancy in one brigade.[223] Pregnancy-related emergency evacuations accounted for approximately 74% of medical evacuations for women during OIF in this brigade. The deployment location limited pregnancy termination options available for ADW due to the country's laws about abortion, accessibility for abortion services, or abortion services not covered by ADW's health insurance.[223] High rates of unintended pregnancies in the military are not isolated occurrences in deployment settings. Equal rates of unintended pregnancies occur at ADW's home base, preparation for deployment, and during deployments.[225] Several factors inherent to the military environment may contribute to the military's high rates of unintended pregnancies. McFarlane lists the following factors[225]:

- High rates of rape in the military
- Lack of comprehensive TRICARE coverage for all types of contraception
- Women's bodies and pregnancy cannot be fully controlled through the use of contraception
- Fear of stigma and punishment from asking providers about contraception
- The Military Abortion Amendment condemnation of abortion of an unintended pregnancy unless it is the result of rape or incest

Sexually Transmitted Infections

The CDC reports that adolescents and young adults (between the ages of 15-24 years old) account for over half of the 20 million new STI cases in the United States each year.[226] Also, young women are more susceptible to STIs, such as chlamydia, due to the types of cells located in the cervical canal. The incidence of chlamydia infections in young, civilian women between the ages of 20-24 years old, which aligns with the ages ADW begin their career in the military, was 4,064.6 per 100,000 females compared to 1784.5 per 100,000 males in 2018.[226] A similar trend of high rates of chlamydia infection is observed in the military population, with a 23% increase in new cases since 2012.[227] Significant gender disparities exist among young Service members and correlates with gender disparities observed in the civilian

population. According to Nadeau et al, ADW under the age of 25 were diagnosed with chlamydia infection at a rate 3.3 to 5 times higher than men.[227] However, the number of reported chlamydia cases in the military is underestimated as cases are often asymptomatic in men and women.[227] Chlamydia, if left untreated or recurrent, severely hinders mission readiness by increasing susceptibility to the following complications: pelvic inflammatory disease, chronic pelvic pain, tubal infertility, and ectopic pregnancy.[227]

In accordance with the U.S. Preventive Services Task Force, the CDC recommends chlamydia screening for sexually active women under the age of 25, and at-risk sexually active women older than 25 years, with a retest after three months of treatment if positive.[226] ADW, especially pregnant ADW, have difficulty keeping appointments and ensuring the continuity of care. Two military Services implemented education and awareness initiatives and screening and surveillance as strategies for combatting the increasing STI rates in military personnel entering service. The Sexual Health and Responsibility Program (SHARP) developed by the Navy, educates, monitors, and treats Sailors using evidence-based health promotion practices and chlamydia screening protocols to decrease incidences of STIs, HIV, and unplanned pregnancies.[227] In addition, the Air Force implemented an STI screening initiative, which includes participation in a basic sexual health education course for recruits upon entering service. Surveillance data from the Navy's SHARP and the Air Force's STI program reduce STIs in recruits, but not necessarily specific to chlamydia.[227]

Maternity Care Services

Maternal and infant health statuses are accepted indicators of a nation's overall health and the quality of care received within the health care system. The MHS eliminates barriers to affordable maternity care. The MHS offers basic and specialty obstetrics and gynecological services with varying levels of care across its direct care facilities. Complicated births are referred to tertiary level care at MTFs or out to the purchased care network.[196] Recently, with the MHS transformation, the MHS relies on its Clinical Communities, specifically the Women and Infants Clinical Community (WICC), to ensure standardized, safe, and quality care is provided to military women and their infants.

The WICC recently launched the Induction of Labor care pathway at the Naval Medical Center San Diego. The Induction of Labor care pathway is a standardized clinical care approach to induction of labor from the patient's perspective.[228] Implementation of this care pathway has decreased unplanned neonatal intensive care unit admissions and decreased the rate of chorioamnionitis infections.[228]
The WICC is developing an implementation plan for the Alliance for Innovation on Maternal Health Postpartum Hemorrhage Bundle. Adapted from the Navy Medicine Obstetric Hemorrhage Bundle, the Alliance for Innovation on Maternal Health Postpartum Hemorrhage Bundle will decrease morbidity associated with hemorrhage by standardizing obstetric hemorrhage supplies, equipment, and protocols.[228]

Perinatal Education

Medical visits due to pregnancy-related complications doubled from 2001 to 2010.[11] A few MTFs offer group prenatal care to improve pregnancy and infant outcomes. Group prenatal care helps maintain health care continuity, reinforces prenatal and postpartum knowledge/skills, and empowers women through community support with other women.[11] San Antonio Military Medical Center offers a group prenatal care service called "Centering." The obstetric department operates the Centering groups, and physician and nurse teams facilitate the program.

Another prenatal guidance tool is *Pregnancy and Childbirth: A Goal Oriented Guide to Prenatal Care,* also known as The Purple Book.[229] All military, veteran, or beneficiary pregnant women receive this book during their first prenatal visit. This book is a reference for prenatal care and childbirth and provides helpful information for the postpartum period. The book follows the VA/DoD Management of Pregnancy Clinical Practice Guidelines and includes evidence-based prenatal care recommendations.[230] It is a goal-oriented guide so that the mother knows what to expect during each stage of the pregnancy, what to expect at each prenatal visit with the provider, information about common complications, and general pregnancy education.[229]

Birth Rates

The direct care system of the MHS is the primary setting where ADW receive services for health care needs. A large part of this system involves pregnancy-related care and assisting ADW through the birthing process. The MHS reported approximately 109,000 births in 2019.[7] A 2012-2016 surveillance study determined the live birth rate for ADW was 64.9 per 1,000 person-years, with rates decreasing from 69.8 per 1,000 person-years in 2012 to 59.7 per 1,000 person-years by 2016.[231] The majority of live births among ADW occurred between the maternal ages of 30-34 years, were enlisted or junior officers, affiliated with the Army, worked in healthcare settings, and were married.[231]

Postpartum Policies and Resources

The DoD made efforts to accommodate the ADW's pregnancy needs with the implementation of Directive-Type Memorandum (DTM) 16-002, titled "DoD-Wide Changes to Maternity Leave".[232] The DTM is an addition to the "Leave and Liberty and Liberty Policy" mandated by DoDI 1327.06, which increased the length of time for maternity leave from six months to 12 months. Table 7 outlines maternity leave guidelines based on the Service.[128, 232, 233]

Table 7. Service-specific Policies on Postpartum Leave and Deployment Deferment

Service Branch	Postpartum Leave	Deployment Deferment (up to…)
Army	12 weeks nonchargeable leave	6 months postpartum
Air Force	12 weeks nonchargeable leave	12 months postpartum
Navy	12 weeks nonchargeable leave	12 months postpartum
Marine Corps	12 weeks nonchargeable leave	6 months postpartum

Breastfeeding and Lactation Practices of Active Duty Mothers

The American Academy of Pediatrics recommends mothers exclusively breastfeed infants for six months (i.e., no supplementation of formula), then breastfeed for six months to a year while introducing solid foods, and then continue breastfeeding based on mother and infant preferences.[233] Breastfeeding provides significant health benefits for infants and mothers especially after childbirth. Women who are breastfeeding experience faster postpartum uterine shrinkage and weight loss. Other lifelong benefits include reduced susceptibility to ovarian and breast cancers, diabetes, and coronary heart disease.[233] While medical and health professionals endorse breastfeeding, rates are rising but have not met the national goals.[234] In ADW, breastfeeding rates are below the general population rate.[233] Mothers often cite returning to work as a barrier to continued breastfeeding. The military addressed workplace and return to work policies for breastfeeding in a 2016 memorandum.[233] Table 8 outlines the lactation policy based on the Service.

Table 8. Service-specific Lactation Policies

Service Branch	Lactation Policy
Army	Commanders shall allow lactation breaks for up to 1 year postpartum. Commanders are responsible for providing appropriate rooms, that are not restrooms, and that have adequate privacy, locking capabilities, and a water source. ADW are eligible for mission-related trainings but are still provided areas for breastfeeding, regardless of potential transportation of breastmilk.
Air Force	Breastfeeding schedules shall allow 15 – 30 minutes of pumping every 3 – 4 hours in a clean room or area that provides adequate privacy, a water source, and electrical outlets. The use of restrooms is not considered appropriate for breastfeeding. ADW are responsible for supplying their own equipment for pumping and storing breast milk.
Navy	The number of lactation breaks are highest when the infant is young and decrease as the infant gets older. An example schedule is 15 – 30 minutes every 3 – 4 hours. ADW requests for breastfeeding are handled on a case-by-case basis. ADW are provided clean areas with adequate privacy and water sources. Commands must ensure ADW have refrigerated storage to preserve breast milk.
Marine Corps	Supervisors and ADW shall determine the minimum amount of time required for breastfeeding based on factors like amount of milk pumped and location of lactation rooms. ADW are provided a clean, private area that is not a restroom and has access to water.

Mothers returning to the workforce may choose to terminate breastfeeding early due to the lack of support in their workplace. Options that allow mothers to sustain breastfeeding infants are delayed returned to work, part-time employment, and access to employer-supplied breastfeeding accommodations.[93] Active duty mothers experience additional challenges with breastfeeding compared to civilian mothers due to the work environment (i.e., work-related occupational hazards) and no part-time employment opportunities. Compared to civilian mothers, active duty mothers stopped breastfeeding their infants earlier at 4 months, with enlisted mothers being the least likely group to breastfeed compared to officers.[93] The extension on maternity leave mandated by DTM 16-

002 provides active duty mothers time to breastfeed infants in accordance with American Academy of Pediatrics recommendations.[232] Delle Donne et al confirmed this correlation of extended maternity leave and increased breastfeeding initiation rate in a 2014 – 2016 cohort of active duty mothers and infants at Brooke Army Medical Center.[93] A 95% breastfeeding initiation rate was reported within the hospital, surpassing the national average of 83% and the Healthy People 2020 objectives. Although the DTM 16-002 allows postpartum ADW to continue with breastfeeding efforts and Delle Donne et al. confirmed the maternity leave extension benefits, anecdotal evidence suggests the 12-week timeframe is not sufficient for full recovery from child delivery, especially if an active duty woman delivered via cesarean section.[93, 232, 235]

Reproductive Hazards

Endocrine disrupting chemicals are of great concern for ADW due to the severity of adverse effects on the reproductive system. ADW's expanding military roles increase the risk of exposure to hormone-disrupting chemicals (i.e., working in the field and deployed environments and wearing pre-treated insect repellant uniforms).[212, 213] Exposure to endocrine disrupters such as bisphenol A and dichlorodiphenyltrichloroethane act as antagonists to the thyroid hormone and estrogenic and androgenic receptors.[213] Specifically, these disrupters increase ADW's susceptibility to fertility issues and development of endometriosis or breast cancer.[236]

Infertility Issues

During 2013-2018, 8,744 ADW were diagnosed with infertility for the first time, resulting in an overall incidence of 79.3 cases per 10,000 person-years.[214] The annual prevalence of infertility in ADW is 1.6%, which is lower than the average infertility prevalence of 8.8% of civilian women of childbearing potential.[237, 238] Military women in their 30s, non-Hispanic blacks, those in the aviation field, Army personnel, and married women had the highest incidence of infertility.[238] Most infertility cases in women are caused by disruption of ovarian function attributed to age (menopause), infectious diseases, chronic conditions and diseases, behavioral factors, occupational and environmental hazards, and genetic influences.[214, 238]

Assisted Reproduction

Most MTFs provide basic infertility diagnosis and treatment to ADSMs and TRICARE beneficiaries. These basic infertility services, including fertility testing, ovulation induction medications, and fertility monitoring are limited in MTFs outside of the continental United States. TRICARE benefits cover infertility testing for ADSMs who lost their natural reproductive ability due to injury or illness while in the line of duty.

The DoD covers fertility services such as hormone treatments, diagnostic services, corrective surgery for infertility related to a physical condition, and erectile dysfunction care. DoD provides in vitro fertilization procedures only under certain circumstances to Service members who have experienced urogenital trauma or had cancer treatments that can cause infertility. Treatments include egg and

semen cryopreservation and storage until procedures can be undertaken. Across the Enterprise, in vitro fertilization is available at only six MTFs at an average cost of $5,000 per cycle for Service members and their families whose infertility is not directly related to a combat injury.[239] This is lower than costs outside of the MHS at around $12,000 per cycle.[240] The Air Force invested $50,000 in a progesterone-testing kit company that may help Service members who are trying to conceive.[241] The five-minute at-home kit is used by women to self-diagnose low progesterone levels and gain information about possible infertility factors.[241]

Menopause Considerations

Perimenopause is the period when the body transitions to menopause. During this time, women can report more physiological difficulties because of decreased physical and emotional health, and more somatic symptoms that affect the quality of life during the transition to menopause.[242]

Women's average age to transition from perimenopause to menopause is between 50-52 years, although women can begin natural menopause around 45 years old.[243, 244] ADW experiencing menopause may notice its effects on various organ systems like the cardiovascular system, skeletal system, nervous system, and urogenital system.[245] Common menopause symptoms in ADW are vasomotor symptoms (e.g., hot flashes), depressive mood or anxiety with vasomotor symptoms, poor sleep, and sexual dysfunction.[244] The effects of menopause symptoms range from mild to severe. Severe symptoms can lead to decreased ability to deploy, even if ADW in this stage of the lifecycle do not deploy often. Evidence recommends using hormone replacement therapy as a best practice for reducing symptoms of moderate to severe menopause. TRICARE covers hormone replacement therapy under two conditions: it must be FDA approved and it must be prescribed with instructions relating to the prescription.[246]

Most ADW do not stay in military service long enough to make it to this point of their reproductive cycle. It is common for ADW to separate at or around the rank of E-5 for personal reasons like starting a family.[235] ADW who stay in service until this stage of the reproductive cycle experience psychological, physiological, and hormonal changes and fluctuations that can affect their quality-of-life and military readiness. Nevertheless, equipping ADW with the appropriate resources during this period will enhance mission readiness, even if they are not stationed in deployed or field settings.

DoD Reproductive Health Benefits Coverage

The MHS provides a full range of clinical preventive services to support the health of active duty personnel.[246] Specifically, the preventive services that ADW need include but are not limited to cancer screenings, mammograms, and STI screenings via the health promotion and disease prevention exam (discussed in more detail in the subsequent section).[246] Mammograms are covered annually for all women over the age of 40, and women who are 30 years and older who have a 15% greater lifetime risk of developing breast cancer.[246] In addition, women can undergo breast magnetic resonance imaging (MRI) if they are at a higher risk (> 20% based on current guidelines) of developing breast cancer due to a known gene mutation, family history of breast cancer, and history of certain medical

syndromes.[246, 247] Medical support for ADW's health and readiness also encompasses screening for cancers in the female reproductive organs using pelvic examinations performed in conjunction with Pap smear testing and human papillomavirus (HPV) DNA testing (for women age 30 and older).[246] Current guidelines recommend ADW receive Pap smears at least every three years, but is also up to the providers' and ADW's preference.[246] Regular screenings for breast and cervical cancers following clinical preventative services recommendations occur annually in the MHS but are not included in the individual medical readiness for ADW. TRICARE also covers chlamydia, gonorrhea, and syphilis screenings as part of the health promotion and disease prevention examinations. These screenings are not typically completed during the well-woman exams but may be completed only if recommended by the provider or requested by the patient.[246]

Direct Care Coverage

In 2015, all 41 domestic hospitals within the MHS offered general gynecological care with 37 hospitals also offering basic or specialized level of maternity and neonatal care to ADW.[8] Level of reproductive health care and scope of services available for ADW depends on geographic location as military hospitals can vary in the size of the population it serves and in the availability of civilian network resources, especially in remote areas. For gynecological care, all hospitals offer contraceptive services and cervical cancer screenings.[8] Contraceptive services include contraceptive education and the insertion and removal of intrauterine devices.[8] Maternity care ranged from basic services to specialized subspecialties.[7] At the basic level of maternity care, hospitals are staffed with obstetric-gynecologists capable of handling uncomplicated pregnancies. For specialized care, hospital staff includes specialists who can treat certain high-risk pregnancies. Fewer hospitals offer more specialized care through maternal-fetal medicine. Lastly, three hospitals within the MHS are regional perinatal health care centers capable of treating the most complex maternal conditions and critically ill pregnant women and fetuses throughout a pregnancy.[8] Table 9 outlines the different gynecological and maternity services offered at domestic MHS locations. When a hospital or provider within the MHS cannot provide an adequate level of service to the ADW, the first alternative is to refer the patient to the next MTF. Other alternatives include referring the ADW to a civilian hospital within the TRICARE network.

Table 9. Number of Domestic MHS Hospitals by Level of Gynecological and Maternity Care, by Service and the National Capital Region (NCR), as of July 2015

	Army (n=20)	Navy (n=11)	Air Force (n=8)	NCR[a] (n=2)	Total (n=41)
Gynecological Care Services					
Contraceptive Services[b]	20	11	8	2	41
Cervical Cancer Screening	20	11	8	2	41
Mammography Screening	19	10	7	2	38
Osteoporosis Screening	15	7	6	2	30
For Gynecological Cancers[c]					
Surgical Treatment	9	3	1	1	14
Medical Treatment	8	2	1	1	12
Radiation Treatment	4	2	2	1	9
Level of Maternity Care					
No labor or delivery services	2	2	0	0	4
Basic Care	9	2	5	0	16
Specialty Care	4	5	3	1	13
Subspecialty Care	2	2	0	1	5
Regional Perinatal Health Center	3	0	0	0	3

[a]The NCR was created by the Defense Health Agency in 2013 so that one entity, the National Capital Region Medical Directorate, would have oversight over all the military treatment facilities, including two hospitals, in the Washington, D.C. area.
[b]Contraceptive services include contraceptive counseling and intrauterine device insertion and removal.
[c]Gynecological cancers refers to ovarian, cervical, and uterine cancer.

TRICARE Coverage

ADW can also receive reproductive health care services through TRICARE network providers if not available in the direct care system. TRICARE covers a range of reproductive health services for ADW with some exceptions. Additional coverage to TRICARE's maternal care such as services and supplies associated with antepartum care (including the fetus's well-being), childbirth, postpartum care, and pregnancy complications may be cost-shared.[246] All screening tests that TRICARE covers to support maternity care align with U.S. Preventive Services Task Force recommendations. TRICARE's benefit program considers the option for genetic testing a covered preventive service. High-risk pregnancies are an exception to genetic testing, which is covered as a part of routine prenatal care.[246] TRICARE states that genetic testing may include specific tests used to detect developmental abnormalities and specific genetic defects. Table 10 outlines the reproductive health services covered by TRICARE.[248]

In special circumstances, ADW and ADM who lost their natural reproductive ability from serious injury or illness while on active duty are eligible to receive infertility services that are generally not covered. These Service members must have a lawful spouse to receive TRICARE coverage for the following services: sperm retrieval, egg retrieval, in vitro fertilization (coital), artificial insemination, blastocyst implantation, cryopreservation, and storage of embryos.[246]

Table 10. Reproductive and Urogenital Services Covered in the Military Health System

Services	Direct Care	TRICARE
Infertility services for AD with severe illness or injury to reproductive organs	✓	✓
Diagnostic services for infertility Hormone evaluation Chromosomal studies Immunologic studies	✓	✓
Bacteriologic investigations	✓	✓
Laboratory services	✓	✓
Contraceptive services	✓	✓
Cervical Cancer		
Pap smear (includes HPV DNA testing)		
Pelvic examination	✓	✓
Well-Woman examinations	✓	✓
Breast Cancer: Clinical Breast examination BRCA1 or BRCA2 Genetic Counseling and Testing Screening Mammography Breast Screening MRI	✓	✓
Infectious Diseases: Tuberculosis (TB) Screening Rubella antibodies Hepatitis B Virus screening Hepatitis C Virus screening Human Immunodeficiency Virus infection screening Syphilis infection screening Chlamydia and Gonorrhea screening	✓	✓
Osteoporosis screening	✓	✓
Intensive behavioral counseling for STIs	✓	✓
Intensive, multi-component behavioral interventions for obesity	✓	✓
Prenatal screening tests	✓	✓
Breast pumps, breast pump supplies, and breastfeeding counseling	✓	✓
Artificial and intrauterine insemination*	✓	
Expenses to donor or semen bank*	✓	
Non-coital procedures*	✓	
Services and supplies involving fertilization and transfer*	✓	
Multivitamins/megavitamins*	✓	
Pregnancy Termination in situation of rape, incest, and life endangerment**	✓	

**Available only at 6 MTFs*
***Service covered only in situations of life endangerment*

ADW seeking birth control coverage can receive service via a TRICARE authorized provider prescription instead of through a direct care provider. The birth control services available are contraceptive diaphragms, intrauterine devices, prescription contraception that include the Previn Emergency Contraceptive Kit, and the FDA-approved implantable prescription contraceptives if used to prevent pregnancy, surgical sterilization, and a non-prescription emergency contraceptive kit.[246] TRICARE does not cover condom expenses, non-prescription spermicidal foams, jellies, sprays, or reversal of surgical sterilization unless medically necessary.

MHS Women's Health Care Services: Human and Physical Resources

Physicians, nurses, nurse practitioners, nurse-midwives, physician assistants, enlisted providers, and other health professionals deliver health care services to ADW. Enlisted providers are generally unlicensed and consist of hospital corpsmen, medics, and medical technicians. Health care education for enlisted providers is dependent on individual Service requirements. Enlisted providers' education does not incorporate a comprehensive training course that focuses on women's health.[11] There are advanced enlisted medical training pathways but none focused on women's health. Service members rely on enlisted providers' capability to attend to their health needs, especially in smaller units, such as deployed and shipboard settings.[11] ADW can experience gender-specific barriers to health care utilization while in these settings, including concerns of patient confidentiality, lack of confidence in providers' knowledge, inadequate availability of services, inadequate access to services, and restricted genitourinary symptom management.[11] In addition, some of the barriers that hinder ADW's reproductive health are the availability of refilling medications for contraceptives and stigmatization associated with seeking health services.[249] Many of the primary care practitioners in the military medical systems are mid-level providers or unlicensed practitioners not trained to educate women regarding contraceptive options or licensed to perform procedures to insert LARCs.[205] The previously mentioned barriers, along with the variability of specialized women's health facilities and knowledgeable providers, may increase ADW's risk of progression of developing treatable conditions that are normally diagnosed with pelvic examinations.[219]

The U.S GAO reported on women's health care services at military hospitals in 2016.[8] The shift in the authority of military hospitals to the DHA resulted in downsizing the number of hospitals under the DHA's jurisdiction. Even with the downsizing, all hospitals provide contraceptive and cervical cancer screening services, and all but a few provided mammography for breast cancer screening and osteoporosis screening (Table 9). The GAO report, limited to the direct care system and released before the transition of MTFs to the DHA, did not make recommendations nor address access to reproductive preventive health screenings and other services for ADW.[8] Women's health care services in the MHS require special attention to ensure that ADW have access to maternity care, contraception counseling, preventive screening, and fertility services.

Outcome Metrics: Measuring the Effective of Reproductive Health Initiatives

The MHS is moving to a value-based health care model focused on health outcomes. Standardization is key to a value-based health care model. For the DHA, the WICC oversees and reviews clinical outcomes

related to women's health. The WICC is monitoring and working to improve the following outcomes, postpartum hemorrhage rates, other delivery complications, elective deliveries, cesarean sections, use of antenatal steroids, and exclusive breastfeeding of newborns during hospitalization. The DHA compares metrics with the National Perinatal Information Center on primary cesarean deliveries, postpartum hemorrhage, maternal morbidity and mortality, and maternal readmissions. The MHS also tracks preventive women's health metrics including breast and cervical cancer screening, through the Primary Care Clinical Community and Patient-Centered Medical Homes at MTFs.

Recently, DHA commissioned RAND to deploy a "DoD Women's Reproductive Health Survey" to assess ADW's reproductive health, health preferences, health behaviors, and health outcomes.[250] Results from the study will be used to improve policy and support services, education, treatment, and counseling to optimize ADW's health, well-being, and fitness.[250] The survey covers menstrual suppression, birth control and contraceptive usage, vaccination, and health care accessibility.

Foreign Military, Civilian, and Other Governmental Approaches to Women's Reproductive and Urogenital Health

Foreign Military

The IDF requires military service for women beginning at age 18. However, women are not eligible for service if they are pregnant, not of Jewish religion, or have medical, mental, or intellectual issues.[251] Israel's cultural traditions prohibit women soldiers from serving in combat roles but women are vital contributors to providing logistic support and health care services for their military counterparts. Any unintended pregnancy inhibits the IDF's and women soldiers' military readiness and leads to a military service release.

According to Kupemen-Shani et al, it is difficult to accurately calculate the rate of unintended pregnancies and recurrent unintended pregnancies within the Israeli military population.[252] Challenges in accurately calculating the rate of unintended pregnancies in the IDF include: Female soldiers separating from the IDF after the mandatory two-year service; termination of pregnancy without IDF knowledge; and choosing to continue with pregnancy resulting in discharge from the military. IDF's centralized military pregnancy center cares for female soldiers who become pregnant during service. The military pregnancy center is a confidential support and coping center with an all-female staff of social workers, psychologists, and gynecologists that offer guidance, counseling, and medical care for female soldiers who carry to full-term or terminate.[251, 252] In addition, the military pregnancy center promotes the use of LARC as contraception for female soldiers.

Civilian Health Systems

Kaiser Permanente

Kaiser Permanente is known for its streamlined health care services and access for its over 12 million members across eight regions of the United States.[253] Kaiser Permanente addresses various health-

related topics for men, women, and children that range from annual preventive visits to specialty care visits.[254] Women's health is a primary health care service area, with specific focus on gender-neutral issues like mental health and stress management and gender-specific issues like breast health and pregnancy services.

Kaiser Permanente's women's health care specialty provides female members the option of self-referring to different health care providers, such as obstetrics and gynecology specialists, physician assistants, advanced nurse practitioners, and midwives.[255] These health care providers associated with Kaiser Permanente have advanced women's health training and use a strong connection of specialists and evidence-based practices to optimize women's health.[255]

Pregnancy services are one of the 11 women's health specialty areas. This service area provides a holistic experience for women and their partners throughout pregnancy. Pregnant women's experience encompasses streamlined health services from health care providers, facilities, and innovative technology in medical apps. Pregnant Kaiser Permanente members can download apps like Baby Kicks Monitor©, Full Term – Labor Contraction Timer©, and Pregnancy Companion© to monitor the various stages of pregnancy and encourage social interactions among other pregnant women.[256]

Menopause care, another women's health focus at Kaiser Permanente, concentrates on women's blood pressure control. The estrogen hormone protects women against the likelihood of high blood pressure by maintaining sufficient cholesterol levels and the flexibility and elasticity of artery walls.[256] The onset of menopause prompts a decrease in estrogen levels, which causes cholesterol to increase and allows for more fats to build onto artery walls.[256] The increased likelihood of high blood pressure can result in women becoming more susceptible to complications such as stroke, congestive heart failure, kidney failure, heart attack, and impaired vision.[256]

Planned Parenthood

Planned Parenthood is a nonprofit organization that provides affordable reproductive health care needs and sex education to men and women, nationally and globally. Over 600 health facilities focus on the community's specific needs and services and foundational health care services that center on preventive care.[257] One of the primary missions for Planned Parenthood is advocating for policies that promote women's health, allowing individuals to prevent unintended pregnancies via affordable contraceptive options, and providing learning opportunities for comprehensive sex education for young adults.[257]

Women's services provided by Planned Parenthood include various tests and screenings specifically for women's health needs and abortion services options. If women consider an abortion, Planned Parenthood provides them with comprehensive educational materials that assist with decision-making. Women can choose between two options: the RU486 pill that works up to 11 weeks of pregnancy or scheduling an in-person appointment at a Planned Parenthood clinic.[258] Planned Parenthood allows women adequate time to make decisions that are most beneficial for their health and quality of life.

Government Models

Centers for Disease Control and Prevention-Division of Reproductive Health

The Centers for Disease Control and Prevention (CDC) has a Division of Reproductive Health that focuses on each stage of a woman's reproductive cycle, like preconception and after birth. Specifically, the Division of Reproductive Health strives to[259]:

- Improve women's reproductive health from the start of menstruation through menopause
- Improve women's health and care during pregnancy
- Improve the health of a fetus, newborn, or infant

The CDC specifies interventions to advance each of its reproductive health goals. The first goal, Women's Reproductive Health, seeks to decrease the percentage of unintended pregnancies and increase the number of women practicing preventive behaviors.[259] The second goal, Pregnancy Health, addresses methods that increase screening, prevention, and treatment for infections and conditions prior to, during, and after pregnancy; increase the number of women who practice positive behaviors that lead to healthy pregnancies; and increase the number of states and countries that implement surveillance monitoring systems for maternal health.[259] The last goal, Infant Health, addresses ways that reduce preterm births by decreasing morbidity and mortality, reducing rates of sudden unexpected infant death with surveillance initiatives, and decreasing disparities to improve the baby's health before, during, and after pregnancy.[259] The CDC's 6|18 Initiative, separate from the Division of Reproductive Health, targets six health conditions including preventing unintended pregnancies.[260] The unintended pregnancy interventions prioritized by the 6|18 Initiative include reimbursement for the full range of contraceptive services and removal of administrative barriers to the receipt of accessing services.[260] The U.S. military, through its universal health benefit, mitigates these barriers for ADW accessing contraceptive services and supports efforts to decrease unintended pregnancies.

Center for Disease Control and Prevention-The National Center for HIV/AIDS, Viral Hepatitis, STD and TB Prevention

The National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention (NCHHSTP), another CDC office, focuses research on sexual health topics such as[261]:

- HIV/AIDS prevention
- Lesbian, Gay, Bisexual, and Transgender health
- STI
- Sexual violence prevention
- Healthy pregnancy
- Reproductive health

NCHHSTP's foundation is built on the World Health Organization's definition of sexual health "as the state of emotional, physical, social, and mental well-being that pertains to sexuality."[261] The NCHHSTP outlines, discusses, and describes strategies, like STI prevention techniques, to optimize health outcomes. The NCHHSTP discusses STI prevention techniques within the overarching theme of sexual

health and disease prevention. The NCHHSTP does not specifically tailor STI information based on gender but does call attention to the higher incidence of contracting STIs in women than men and provides information about treatment methods for both men and women.

Centers for Disease Control and Prevention-The National Center for Chronic Disease Prevention and Health Promotion

The National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP) is responsible for monitoring chronic diseases like heart disease and stroke, cancer, and diabetes in the American public. The NCCDPHP uses the information gathered to inform the public about methods for improving lifestyle changes and optimizing their quality of life. The CDC's NCCDPHP estimates approximately 1.7 million people are diagnosed with cancer each year, with breast cancer and cervical cancer among those diagnoses.[262] To increase the screening rates for breast and cervical cancer set by Healthy People 2020, the NCCDPHP offers the National Breast and Cervical Cancer Early Detection Program for low cost screening tailored to the state, territory, or tribe of women. Women are eligible for this program based on the following qualifications[263]:

- No insurance or current insurance does not cover screening exams
- Annual income at or below the federal poverty line by 250%
- Between the ages of 40-64 years for breast cancer screening
- Between 21-64 years for cervical cancer screening
- Women who are younger or older than the age guidelines for the program

Moving Towards a Lifecycle Perspective

ADW cite their current and future reproductive and urogenital health as major health concerns. ADW, stationed in austere environments, are often ill-equipped with personnel, supplies, and policies to prevent and treat their female-specific medical conditions. Successes with initiatives with LARCs and quality improvement in perinatal services are promising but reveal a narrow view of the breadth of reproductive health issues requiring attention across the lifecycle of an ADW, such as a comprehensive approach to fertility and addressing the continuum of menarche-to-menopause. Growing the proportion of ADW through recruitment and retention demands addressing these needs with a comprehensive approach of education, health care professional workforce development, standardization of policies to ensure equitable access, and establishment of metrics to guide improvement. The more formidable challenge lies in changing the culture to make women's health and well-being, not just about their reproductive and urogenital health, but also about addressing sexual harassment and reducing the stigma around the medical issues of sexuality and the organs and body parts involved.

Chapter 7: Delivering Mental Health Care Designed for Active Duty Women

The World Health Organization characterizes mental health as a sense of well-being that stems from an awareness of one's abilities and an ability to manage life stressors, function as an efficient employee, and contribute to one's community.[264] These functions may be compromised in individuals with mental illness; a vulnerability to mental illness may also result from ineffectiveness in one or more of these areas. Of particular relevance to military personnel, "mental health problems can affect energy levels, concentration levels, motivation, and judgment, which are required for successful performance in military occupations."[265]

Box 5. Selected Best Practices Related to Behavioral Health

Comprehensive and Integrative Sexual Assault Victim Response Team
A comprehensive team and program that provides gender-sensitive support and care to victims of sexual assault
Best Practice: Sexual Assault Program Response
Owner: DoD Sexual Assault Prevention and Response Office

Embedded Behavioral Health Professionals in Basic Training Unit Clinics
Accessibility to early intervention behavioral health services for referred trainees, especially women, to decrease attrition
Best Practice and Owner: Air Forces Behavioral Analysis Service

Standardization of Behavioral Health Screening for Recruits
A questionnaire that gathers information on different behaviors and emotions to identify female and male trainees with potential pre-enlistment behavioral health concerns
Best Practice: Lackland Behavioral Questionnaire
Owner: Air Force Behavioral Analysis Service

Seven of the eight domains in the TFF framework– financial, ideological and spiritual, preventive care, nutritional, physical, psychological, and social – relate to the psychological and mental health readiness of Service members.[21, 22] Stressors unique to ADW may occur in each domain and can accumulate to inhibit ADW's ability to perform optimally or maintain resilience. Gender differences in physical capabilities due to factors like increased susceptibility to musculoskeletal injuries and pregnancy may be extrapolated to devalue the abilities of ADW, undermining resilience to mental health conditions.[266] Weight and fitness requirements, and combat exposure, can increase the prevalence of eating disorders and lead to nutritional deficits in vulnerable women.[267] Sexual assault and sexual harassment, some of the most pressing and significant threats to mental health readiness, can also negatively impact ADW's reproductive and musculoskeletal health.[268]

This chapter provides an overview of conditions with significant gender differences in epidemiology within a military context. The DHB explores these conditions as they present in the ADW population and investigates optimal treatments, best practices, and current policies to support ADW's operational readiness.

Impact of Military Culture and Deployments on the Mental Health of ADW

Military life brings a specific set of stressors, including the requirement to maintain physical fitness, abide by strict rules, put the needs of the military first, and be ready to deploy at short notice; all can

contribute to the development of mental health issues.[269] Both men and women must acculturate to the norms of "making weight" for military standards or "sucking it up" for acceptance. With the added gender stereotypes on women's capabilities, these cultural norms influence ADW's mental and cognitive performance.[270]

Aligning with cultural norms is a challenge for many female Service members. The effort to assimilate into a male-dominated culture may contribute to a pattern of internalizing stress and engagement in harmful behaviors (e.g., disordered eating behaviors, substance use problems).[271-274] Additionally, fielding negative perceptions about one's ability to serve due to physiological gender differences may impact ADW's performance and resilience to the vicissitudes of military life.[270] Military women may counter or conform to others' beliefs by over-performing or under-performing relative to gender expectations.[235,272] Such performance behaviors can result in feelings of burnout or mental distress as well as injury.[235,272]

Research on field and deployment stressors' impact indicates that military experiences influence different stress responses in men and women. ADW who manage the dual roles and responsibilities of family and military life experience more stress than men in similar circumstances. Such stress is three times more likely to contribute to the breakdown of intimate relationships in military women than men. Women who were divorced, widowed, or separated had increased odds of screening positive for a mental health condition, which may be due to the lack of social support.[275-277] Concerns about family disruptions may have greater implications for women's post-deployment adjustment, as family concerns were more strongly associated with post-deployment anxiety in women than men.[277]

Long deployments increase the risk of psychological stressors that can develop to depression, anxiety, sleep disturbances, and impaired concentration.[269] Women, particularly those who are young (17-25 year age group), White, and non-college educated, account for the majority of psychiatrically driven aeromedical evacuations from combat theater.[278] Common diagnoses include depressive disorders (25%), adjustment disorders (18%), PTSD (9%), bipolar disorders (6%), and anxiety disorders (6%).[278] Given that psychiatric conditions are one of the leading reasons for aeromedical evacuation of military personnel from combat theater, these findings are significant – most notably as an indicator that female deployment and combat deployment experiences must be better understood.[278] Several studies highlight relevant gender-specific stressors among women, including threats of imminent danger, barriers to personal hygiene, and privacy and convenience issues with respect to urination in deployed environments.[204, 206, 269] More significantly, studies indicate that deployed ADW who experience combat are more likely to report sexual harassment and assault.[275, 276] Consistent with these results, ADW serving in a non-combat environment have reduced odds of mental health symptoms compared to those deployed in a combat environment.

Impact of Interpersonal Violence on the Mental Health of ADW

While culture alone does not drive victimization, "[c]ulture promotes and maintains beliefs that determine dysfunctional behaviors in men and women and sustains the cycle of violence."[279] Gendered ideologies of militarism shape military cultural perspectives of meritocracy and hyper masculinity.[280]

Militarism fosters a climate that supports military sexual violence, family violence, and alcohol abuse.[281, 282] Culturally supported gendered roles and military structure contribute to the staggering number of sexual assaults committed by higher-ranked military personnel.[276]

Interpersonal Violence

The CDC and the World Health Organization declared interpersonal violence (IPV) as a public health crisis for women domestically and internationally.[283] IPV is described as physical violence, sexual violence, stalking and psychological abuse exhibited by a spouse or partner.[283] IPV cases are reported more frequently among females than males, although male victims are not uncommon. The lifetime prevalence of IPV in the U.S. population is approximately 37% for women and 31% for men.[284]

According to the DoD FY 18 Report on Child Abuse and Neglect and Domestic Abuse, IPV occurred in 24.3 per 1,000 married couples with at least one spouse an AD Service member. Sixty-five percent (65%) of IPV victims were women; 54% of victims were ADW.[285] Among unmarried individuals, 1,024 cases of IPV involving 822 victims were reported.[285] Various factors may account for the higher incidence of IPV among ADW and female partners of Service members, including[286]:

- Operational deployment
- Deployment-related injuries
- Combat exposure
- Service-related mental health and behavioral problems
- Frequent relocation
- Family separation

Sexual Violence

The CDC categorizes sexual violence into four types: rape, forced penetration, sexual coercion, and unwanted sexual contact. Nearly 44% of women in the United States (an estimated 52.2 million) have experienced some form of sexual violence in their lifetime.[287] Lifetime prevalence of unwanted sexual contact and rape, the most prevalent forms of sexual violence, among women are approximately 37% and 21%, respectively. Eighty one percent (81%) of female rape victims reported the first occurrence prior to 25 years, with nearly half occurring before 18 years.[287] In 2015, 5% of U.S. women experienced sexual violence and 1% were victimized by rape.[287]

The DoD defines sexual violence as intentional sexual contact involving the use of force, threats, intimidation, or coercion.[288] Reports suggest that sexual violence occurs more often within the military population than the civilian population, after considering differences in surveillance periods (i.e., lifetime occurrences in civilian population versus average military career of two- to six-years in ADW population).[289, 290] Over 50% of ADW report experiencing some form of sexual violence and of these, 75% reported sexual harassment.[291] Approximately 9-43% of ADW experience some form of sexual violence per year of service and experience the occurrence of assaults more commonly than their male counterparts (who report a rate of 1-2% per year of service).[289] In FY 2017, the DoD received a total of 6,769 reports of military-connected sexual assault (victim or perpetrator), a nearly 10% increase

in reporting from FY 2016.[292] FY 2018 reports indicate increased prevalence of sexual assault among ADW, primarily in those under 25, while the prevalence for ADM was unchanged.[292] A female active duty victim often knows her perpetrator, who may be a friend, coworker, former partner, or family member.[283]

Reporting and Interpersonal Violence Convictions

The definition of sexual violence in DoD includes specific offenses noted in the Uniform Code of Military Justice: rape, sexual assault, aggravated sexual contact, abusive sexual contact, nonconsensual sodomy, and attempts to commit these acts.[288] Sexual assaults and harassment against ADW are consistently unreported, minimizing their significance and negative impact on operational readiness.[293] Frequently cited reasons for reluctance to report include command climate, fear of retaliation, and disillusionment about the likelihood of fair justice.[283, 294] A commander's behaviors and attitudes drive command climate; when commanders take limited actions against sexual violence or harassment, perpetrators escape accountability and victims face increased exposure to recurrent interpersonal violence.[295] Command climate also influences the likelihood of retaliation against victims who report. A conviction for a sexual assault requires evidence that consent was not obtained, a requirement responsible for the limited number of convictions in civilian populations and the military community.[288] An increase in reporting in recent years reflects greater awareness of these drivers and is paradoxically encouraging. In fact, recent high-profile sexual assault cases have led to proposals to remove responsibility for investigating and addressing sexual harassment and assault allegations from individual commands.

Mental Health and Economic Effects of Interpersonal Violence

Interpersonal violence significantly impacts victims, regardless of gender.[283] ADW, and men who are victims of sexual assault or rape, report elevated rates of mental health conditions like PTSD and exhibited increased risk of suicide attempts.[296] Victims of interpersonal violence also incur financial costs, estimated at $122,000 per person, due to medical expenses, legal fees (if the case is tried in a court of law), and loss of productivity.[283]

The occurrence of sexual violence in the military can produce adverse physical and psychological outcomes for all ADSMs – victims and non-victims alike. The low conviction rate following interpersonal or sexual violence can have long-term negative effects on Service members' physical and psychological health if not addressed in an efficient and productive manner.[288] The sequela of IPV and sexual harassment and violence include physical health complications like STIs and unplanned pregnancies along with psychological consequences, including depression, alcohol and substance abuse, eating disorders, PTSD, suicidal ideation and behavior, and decreased quality of life.[297, 298] ADW experiencing depressive episodes as a result of interpersonal violence report difficulties in completing activities of daily living, making decisions, overcoming fatigue, and tolerating otherwise routine stressors.[298]

Mental Health Conditions with Significant Gender Differences in Epidemiology

Mental health disorders in the military account for significant morbidity, healthcare utilization,

disability, and attrition.[266] Between January 2007 and December 2016, there were 1,672,809 incident diagnoses of mental health disorders.[266] In 2018, 8.3% of ADSMs had a diagnosed mental or behavioral health disorder.[89]

Military epidemiological studies have identified gender differences in incidence and prevalence of adjustment, anxiety, and depressive disorders, with a higher incidence among ADW than ADM [12.8% vs. 7.5%].[266, 299] These results are consistent with civilian sector findings, where women present with higher rates of mood, eating, anxiety, obsessive-compulsive, borderline personality and PTSD than men.[267] Research on gender differences in mental health conditions implicate biological, pathophysiological, psychosocial, and cultural causal mechanisms.[299] For instance, females are more likely to experience stressful life events, such as limited or stagnated upward mobility and exposure to childhood adversities such as interpersonal and family violence, neglect, trauma, social isolation, and intimate partner abuse.[299, 300] Similar findings have emerged in the military population, where rates of mental health problems related to family/support group problems and maltreatment were higher among women and Army personnel, non-Hispanic blacks, those aged 20-24 years, and those in motor transport occupations.[266] The figures below display the incidence and annual and lifetime prevalence rates by sex (Figures 16, 17).

Figure 16. Incidence Rates of Mental Health Disorder Diagnoses, by Category and Sex, Active Component, U.S. Armed Forces, 2007-2016

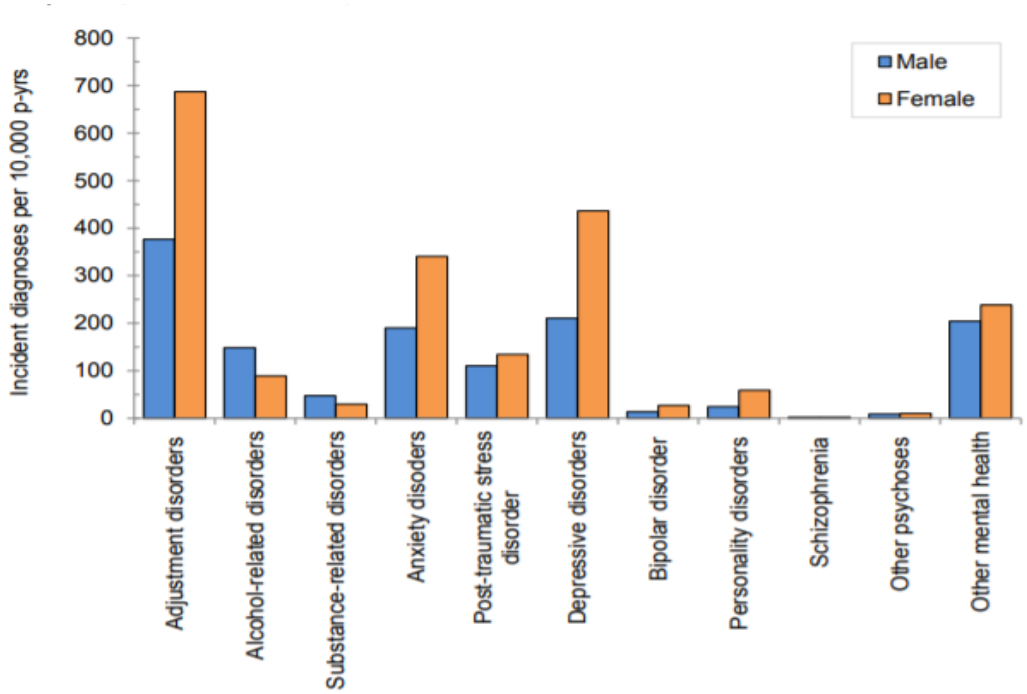
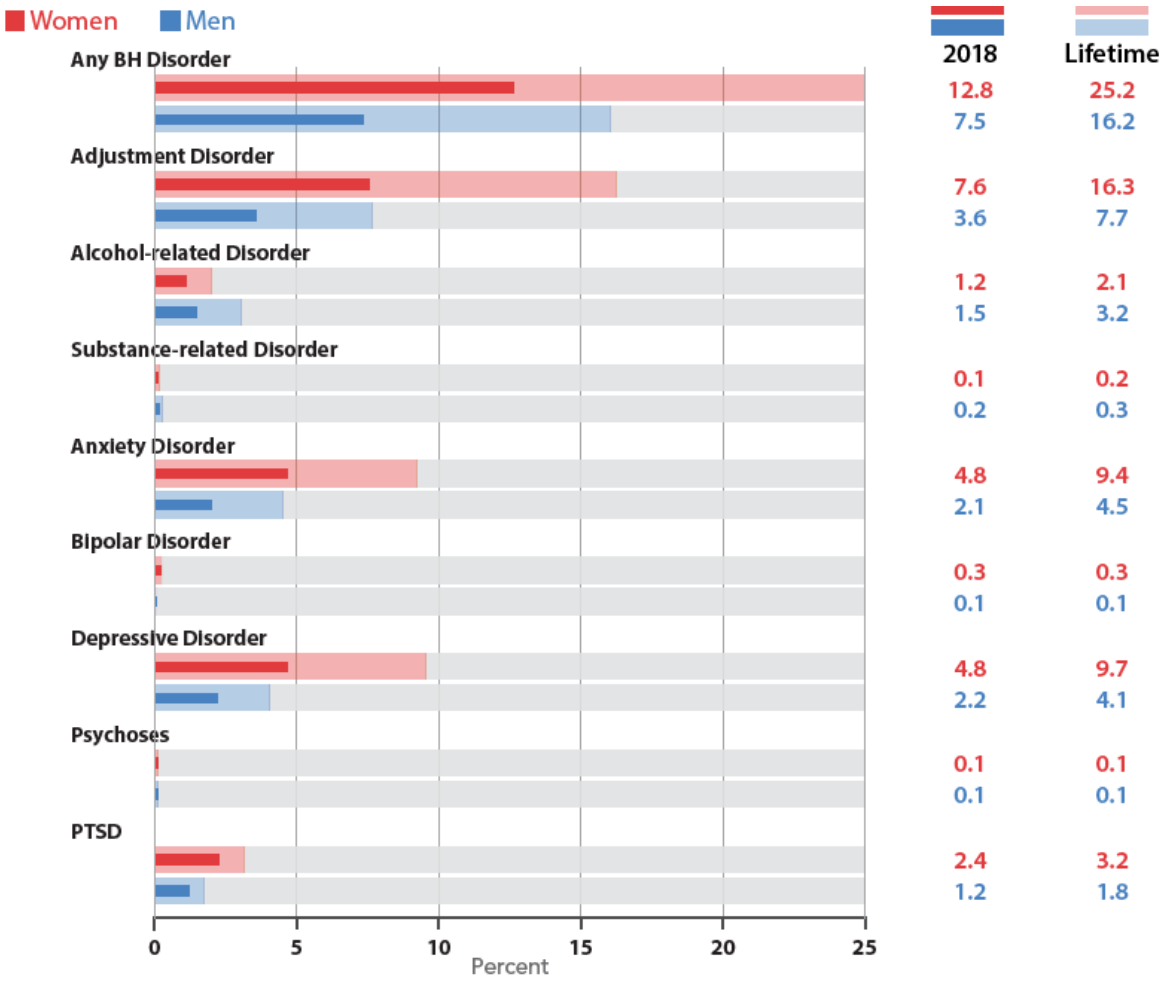


Figure 17. Annual and Lifetime Prevalence of Behavioral Health Disorders by Sex and Condition, 2018

Note: N=1,295,000; Annual (2018) prevalence was calculated on Service members receiving the same diagnosis code for the sasme condition within 365 days of each other, and at least one of these diagnoses occuring during the calendar yeaer 2018. Lifetime prevalence was calculated on Service members receiving the same diagnosis code for the same condition with in 365 days of each other at any time between 2002-2018, and they were still in Service by December 2018.



Stress- and Trauma-Related Disorders

Adjustment disorders are emotional and behavioral symptoms that begin within three months of a stressful event and resolve within six months of the event's termination.[301, 302] Adjustment disorders are the most commonly diagnosed group of mental health conditions but the least researched.[303] PTSD, in contrast, is the most studied mental health disorder in the military. PTSD rates are higher among enlisted Service members and warrant officers, women, non-Hispanic blacks, and those with lower education levels.[89, 224, 266] Sex differences in risk to exposure and expression of symptoms to traumatic events may account for the differing diagnosis rates of PTSD between men and women.[304]

Gender differences in PTSD symptoms are related to types of trauma, type of combat exposure, and timing of sexual abuse.[304] ADW express more distress than ADM across nearly all PTSD symptom categories. However, men who experienced sexual abuse either before or after joining the military

are more distressed on most symptom factors except thought-avoidance and sleeping difficulties.[304] Women who experienced warfare are more distressed about the violent aspects of warfare, wounds, and death.[304]

Diagnoses of Adjustment Disorder and PTSD follow specific patterns. Providers tend to diagnose an adjustment disorder for Service members who have never deployed, while diagnosing PTSD for Service members returning from deployment.[303] More severe, complex cases receive a diagnosis of PTSD, and less complicated cases are diagnosed as an adjustment disorder.[303] Compared to adjustment disorders diagnoses, depressive disorders, anxiety, and PTSD, if untreated, have more costly effects such as low work productivity, lost wages, and absenteeism, which negatively impacts operational readiness.[224]

Depressive Disorders and Suicidality

Depression affects one in six U.S. adults at some point in their lifetime.[224] However, this condition is manageable with treatments that are tailored to the individual. Untreated depression can negatively impact an individual's social well-being and financial situation and lead to co-morbid mental health problems (e.g., substance and alcohol abuse, anxiety) and physiological issues (e.g., cardiovascular conditions or diseases).[224, 266] Depression is one of the more common mental health conditions evident in AD personnel, with approximately 16% diagnosed during a 10-year surveillance period.[266] Rates of depression are higher among women, enlisted personnel, younger age groups (17-25 years), single people, and those with less than a college education.[224] Depression is more common among Active Duty personnel than PTSD, yet research is disproportionate to prevalence.

Women have a higher prevalence of depression than men. The DoD HOF Report places the overall incidence of depression among ADW at 500 per 10,000 person-years and the annual and lifetime prevalence at 4.8% and 9.7%, respectively.[89, 266] However, the report does not identify accompanying life events that are well-established precursors to hormonally-induced depression. Hormonal differences contribute to an increased prevalence of depression in women compared to men. Natural and medication-induced hormonal fluctuations in women, such as those associated with the premenstrual period, the puerperium, menopause, use of oral contraceptives, and use of hormone replacement therapy, can trigger depressive moods.[305] Depression rates, caused by changes in estrogen and progesterone, increase substantially during the postpartum period, as discussed in the previous chapter.[306] Cases that first emerge during this period are more frequent among women with any of the following: strong personal or family history of depression, issues with social relationships, financial issues, previous drug and alcohol abuse, younger age, unwanted or unplanned pregnancies, and difficulty breastfeeding.[299, 307]

Self-Injurious Behavior

Non-suicidal self-injury (NSSI) is an intentional and deliberate act to cause harm to oneself.[301, 307] The Diagnostic and Statistical Manuals of Mental Disorders cites the absence of intent to die as the discerning factor for diagnosing NSSI.[301, 307] However, NSSI can be predictive of suicide attempts in civilian and military populations.[224, 308] NSSI in all its forms is equally prevalent by gender in civilian

young adults; cutting oneself, one of the most common and recognizable NSSI behaviors, is more common in women.[309]

The Lifetime prevalence of NSSI ranges from 4-30% in military studies and 3-6% in civilian studies.[308] The 2015 HRBS notes a lifetime prevalence of NSSI among military members of 11.3%, an increase from the 10.8% prevalence rate reported in the 2011 HRBS.[224] AD personnel who are junior-ranking Service members (enlisted and officers) between the ages of 17-24 years and 25-34 years, non-Hispanic Whites, and with less than a college education are most likely to report NSSI.[224]

Anxiety Disorders

General anxiety disorder (GAD), one of the most common anxiety disorders, affects approximately 6% of U.S. adults in their lifetime.[224] Common symptoms include excessive worrying, feelings of unease, fatigue, difficulty with concentration, irritability, sleep disturbances, and excessive nervousness.[310] Like depression, anxiety disorders have social and financial costs that can negatively impact operational readiness if left untreated.[224]

The 2015 HRBS reported the prevalence of GAD in AD personnel as 14.2% compared to 3% in the civilian population.[224] Reporting of GAD was significantly higher in ADW, enlisted personnel, warrant officers, and personnel with lower levels of education.[224] Similarly, studies of military personnel indicate a higher incidence rate of anxiety in ADW compared to ADM (350 vs 200 per 100,000 person-years); lifetime prevalence of GAD among is two times higher in ADW (9.4%) than ADM.[89, 266] ADW report experiencing more symptoms, exhibit greater specificity in clinical presentation, and experience a more negative impact on their quality-of-life than ADM.[310] Combat exposures, sexual trauma, and societal expectations may contribute to ADW's anxiety, negatively impacting mental health and mental readiness.[310]

GAD is a common occurrence during pregnancy, with approximately 20% of women presenting with GAD during this time.[310] Women may experience anxiety about various aspects of pregnancy and birth, including fear of health abnormalities or nervousness about possible delivery complications.[310] GAD also extends to the postpartum period, with a prevalence rate of 6.7% at five to 12 weeks postpartum.[310] The 2015 HRBS and 2019 DoD HOF reports do not specify anxieties experienced during pregnancy as a part of the survey questions. Therefore, knowledge about the effects of GAD in pregnant ADW is limited.

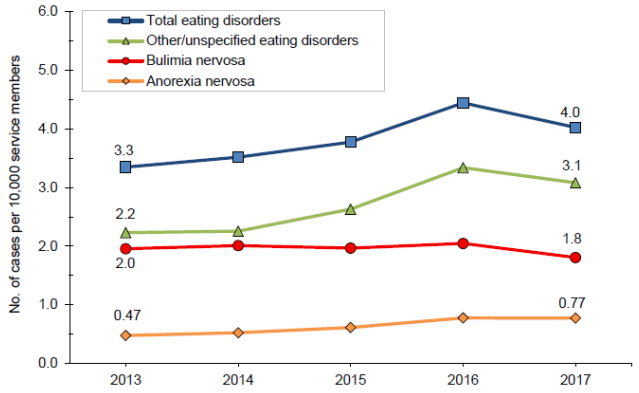
Eating Disorders and Disordered Eating in ADW

Eating disorders disproportionately affect women than men. These disorders relate to persistent eating behaviors that involve a fixation on weight, body shape, and food.[311] The three most common eating disorders are binge eating disorder, bulimia nervosa (BN), and anorexia nervosa (AN).[312] Co-occurrence of mental health disorders such as anxiety, panic disorder, obsessive compulsive disorder, PTSD, and substance use are an added complexity when managing eating disorders.[313, 314] Eating disorders, when left untreated, negatively impact nutrition status and the cardiovascular and musculoskeletal sytems;

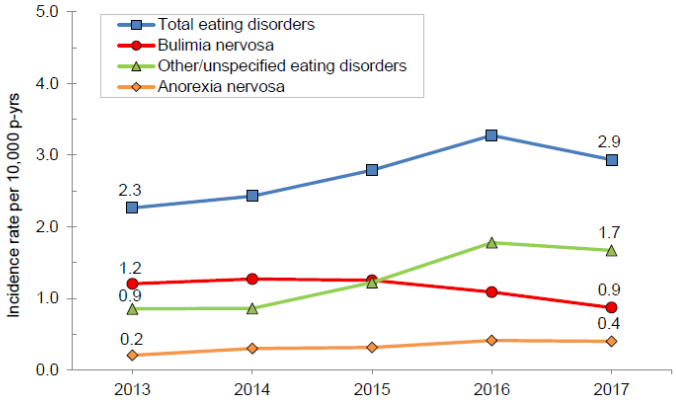
they also create an economic burden in terms of loss of work productivity and increased healthcare resource utilization and costs.[313-315] Thoughts and behaviors associated with the most common eating disorders manifest in the prime military recruiting age group - the early to late teenage years.[291] Globally, the prevalence of eating disorders is greater among young females and in high-income countries.[315] Nationally, lifetime prevalence of AN and BN were 0.9% and 1.5% among women and 0.3% and 0.5%, respectively, among men.[315]

Figure 18. Annual Prevalence and Incidence Rates of Eating Disorders, Active Component, 1 January 2013 to 30 June 2017

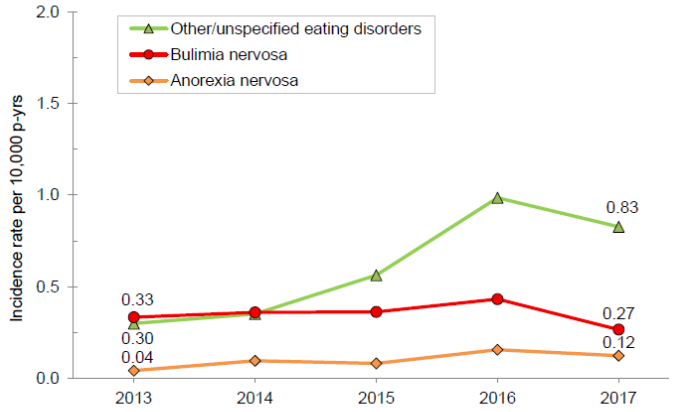
A. Annual Prevalence of Eating Disorders



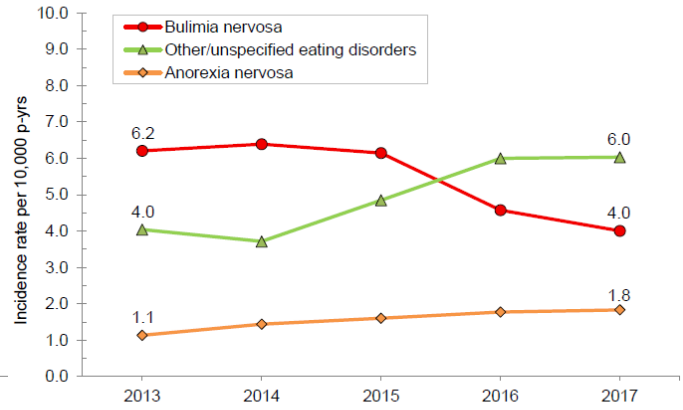
B. Annual Incidence Rates of Eating Disorders



C. Annual Incidence Rates of Eating Disorders, Males



D. Annual Incidence Rates of Eating Disorders, Females



Note: ICD-10 code F50.8 (Other eating disorders) was added to the ICD-10 coding system on 1 October 2015 and was changed to a parent code on 1 October 2016. F50.81 (Binge eating disorder) and F50.89 (Other specified eating disorder) were added to the ICD-10 codying system on 1 October 2016. This likely affected the rates of "other eating disorders" around this time period.

Eating disorder prevalence in Active Duty populations shows a similar pattern. Peak prevalence rates from 2013-2017 for AN were higher for ADW than ADM (3.7 vs 0.22 cases per 10,000 person-years); likewise, ADW had higher rates of BN than ADM (10.3 vs 0.64 cases per 10,000 person-years).[315] Prevalence estimates of AN, BN, and eating disorder 'not otherwise specified' obtained from recorded hospitalizations and outpatient encounters were approximately 0.25%, 0.79%, and 0.72% among women, respectively.[315] Period prevalence rates of diagnosed eating disorders are similar in pattern of annual incidence rates of the same disorders (Figure 18). In comparison, eating disorder diagnoses (AN, BN, eating disorder not otherwise specified) determined from validated instruments were much higher, with approximately 1.1%, 8.1- 12.5%, and 36-62.8% among women, respectively.[315] Non-Hispanic White junior-ranked female Marines have the highest eating disorders rate (20.4 cases per 10,000 person-years).[315] Female Marine Corps recruits reported high body dissatisfaction rates (38%) and previous abnormal eating behaviors (77%).[267] Studies suggest perceived stigmatization and the career-ending consequences of an eating disorder diagnosis leads to underreporting and underdiagnoses of eating disorder symptoms.[315-317]

Variability in military screening protocols result in the stark differences in the reported prevalence of diagnosed eating disorders. There is no policy or DoD- or DHA-level guidance on the preferred or required diagnostic assessment of eating disorders. Factors contributing to eating disorders and disordered eating behaviors in the military include the "stuff your face" eating culture, strict service-specific physical fitness and body composition regulations (see Chapter 5), and the regimented lifestyle.[291, 315] Service members, especially ADW, often resort to non-physician recommended methods such as crash dieting, extreme exercising, and various alternative approaches (e.g., body wraps, sauna suits).[269]

Behavioral Health Care Policy and Services

DoD Behavioral Health Care Policies

As the MHS undergoes transformation, many policies are under development or consideration for modification to reflect women's health needs, including psychological health. The DoDI 6490 series (6490.03 - 6490.16) outlines policies and procedures relevant to mental health evaluations, treatments, and guidance for medical facilities in the garrison and deployment settings for AD members and beneficiaries.[318] DoDI 6495.02 is the only policy instruction that mentions a gender-specific consideration, specifically for sexual assault response services.[318] Other policy instructions might better benefit military women by including gender-specific considerations.

Behavioral Health Care Coverage Through the MHS

DoDI 6490.06, *Counseling Services for DoD Military, Guard, and Reserve, Certain Affiliated Personnel, and Their Family Members*, institutes a systems approach that provides Service members multiple psychological and mental health support and care options.[319] This DoDI outlines the counseling services accessible in the MHS Direct Care System, online or by telephone[319]:

- Military Health System (MHS)
- Military OneSource and Military and Family Life Counseling programs
- Personal Financial Counseling
- Family Centers
- Chaplains
- Family Advocacy Program (FAP)
- Sexual Assault Prevention and Response (SAPR)

These counseling services closely align with the TFF framework, with context to financial issues and challenges with the military lifestyle and family centers that focus on baseline services for individuals, couples, and families. Military chaplains and religious leaders with large military congregations provide services similar to the family centers but with a spiritual foundation.

Service members have equitable access to mental health care services in the MTFs and covered civilian networks. There are exclusions to the mental health services TRICARE covers for AD members and beneficiaries. However, TRICARE provides a guide to help members and beneficiaries determine services needed. TRICARE recommends that AD personnel receive a referral and prior authorization for mental health care when possible.

Behavioral Health Care Access for ADW

Proximity to traditional mental health care services may be lacking in non-clinical settings where ADW serve (e.g., in-theatre, training and deployment sites, and operational settings). Behavioral Health Technicians (BHTs), enlisted Service members under licensed providers' supervision and assigned to an operational unit or embedded with a deployed behavioral health team, provide access to mental health care in these settings.[320, 321] BHTs are often an ADW's point of entry for mental health care. BHTs perform screenings and assessments, psychosocial interventions, case management, deliver outreach and prevention program protocols, and provide behavioral health consults with unit leaders and tele-behavioral health assistance.[321] Although BHTs can perform a wide range of clinical tasks, reports state that they are often utilized for clerical functions instead of therapeutic support roles.[321] An effort to embed advanced degree Behavioral Health officers in units includes many females.[322]

Wait times for mental health appointments are inversely proportional to the probability of keeping an appointment. Women are more likely to keep scheduled appointments than men. However, as mentioned earlier in this chapter, ADW's dual-hatted roles add to the difficulty of keeping appointments especially when not immediately scheduled. One ADW reported paying out of pocket and going out-of-network to receive timely care.[273] Federal regulations define DoD access to care standards for mental health care.[323] These standards detail acceptable wait times for services such as urgent care (not to exceed 24 hours), routine visits (not to exceed seven days) and specialty care (not to exceed 28 days).[324] A 2016 Congressionally-commissioned task force recommended the DoD improve access to basic mental health services to mirror the primary care service model of a wait time less than or equal to seven days.[324] Also, the Assistant Secretary of Defense for Health Affairs provided clarifying language which includes behavioral health needs in access to care standards. Thus, access to

non-urgent behavioral health assessments is part of routine care if a patient pursues treatment from primary care or self-referral to a specialty care service.[324] The NDAA FY 2020, Section 722, further requires the Secretary of Defense to provide alternative access to mental health services, such as referral to TRICARE network providers, if Service members are unable to receive mental health care at an MTF within 15 days of the first request for service. The DoD Office of Inspector General (OIG) evaluated DoD mental health services and determined the DoD did not meet the established access to care standards.[324] The DoD OIG report made 14 recommendations that focus on[324]:

- Improving access to mental health care
- Removing the eight-visit limitation for outpatient mental health care
- Developing a single MHS-wide model to identify appropriate staffing levels
- Updating and clarifying DoD and DHA policies
- Developing a method to book patient appointments in the private care sector
- Developing standardized mental health access to care measures

In summary, DoD policies, including DoDI 6495.02, and the DoD OIG recommendations focus on systems issues and interventions that benefit the genders equally.

Non-medical Interventions and Counseling Support

Installation commanders provide operational oversight of several non-medical mental health care support services. Programs such as the Chaplaincy Corps, Military and Family Life Counseling (with local resources accessed by Military OneSource), and Family Centers offer overlapping services on stress and anger management, grief and loss, marital issues, couples communication, parent-child relationships, and coping with stresses of the deployment cycle.

Military OneSource

Military OneSource provides 24 hours a day confidential counseling, guidance, and other free services to eligible AD Service members and their dependents through in-person visits or via the internet or telephone.[325] Additional services provided by Military OneSource focus on areas such as: coping with deployment and frequent moves, financial guidance including tax preparation, disability care, and spouse employment.[325]

Other Military OneSource mental health services include the Military Crisis Line, resources for abuse and assault victims, information on PTSD, and resources for substance abuse. Military OneSources's services are available for up to one year after AD personnel separate from the military.[326] The Military and Family Life Counseling program offers similar services and partners with Military OneSource. These treatment options do not directly address maternal mental health issues.

Program Counselors

Military OneSource and Military and Family Life Counseling program counselors must have at least a master's degree in a mental health-related field to provide clinical therapy or receive restricted reports

on intimate partner violence or sexual assault. Service members seeking support from either the Military OneSource or Military and Family Life Counseling programs can receive services face-to-face, via telephone, or the internet.

One gender-specific consideration is the gender of the counselor. For counseling associated with sexual trauma, having the option to seek treatment with a provider of a specific gender (i.e., a female sexual trauma victim preferring a female counselor or psychiatrist) decreases barriers and increases the comfort between patient and provider.[327] Among the non-medical counseling services available, the Chaplain Corps might have the least ability to offer a female chaplain due to the traditional exclusion of female religious leaders among several major religions.

Digital Health

The DHA is working on increasing its arsenal of digital health resources. Integrating digital health resources into the clinical care setting can better support military women in alleviating challenges with clinicians identifying their unique mental or behavioral health needs. The DHA Connected Health currently markets nine free mobile applications targeted for use by Service members and their families and health providers for download on two mobile device platforms.[328] These applications provide behavioral health resources ranging from relaxation techniques to self-assessments for mental health conditions. The Rape, Abuse and Incest National Network (RAINN) created the DoD Safe Helpline mobile application specifically for the military community to help members manage short- and long-term effects of sexual assault. The application creates a customized self-care plan that is gender responsive. Of the above mentioned mobile applications, the DoD Safe Helpline is the only one with options to customize based on gender-specific experiences.

Medical Interventions

The MHS provides screening and diagnostic assessments, treatment, rehabilitation, and follow-up care for mental health conditions (Table 11).

Table 11. Military Health System Direct Care Behavioral Health Screening Tools and Services

Condition	Screener/Diagnostic Tool	Where tool is administered	BHCC Approved Evidence Based Treatment
History of mental health and behavioral problems	Lackland Behavioral Questionnaire (LBQ)	Air Force basic training	Not applicable
General psychological distress and functioning	BHM-20 PHA (DD Form 3024) Deployment Mental Health Assessment (DD Form 2978)*	Primary care Electronically Electronically	None specified
Depressive disorders	PHQ-9	Primary care and speciality care	• Cognitive Behavioral Therapy • Meedication Management • Cognitive Therapy • Interpersonal Therpay • Acceptance and Commitment Therapy • Behavioral Activation • Mindfulness-based CT • Problem-solving Therapy
Anxiety Disorder	Generalized Anxiety Disorder Scale - 7 (GAD)	Primary care	None specified
Adjustment Disorder	Deployment assesment tools (DoDI 6490.3)	Military OneSource Military and Family Life Counseling	None Specified
Posttraumatic Stress Disorder	PCL-5	Primary care and specialty care clinics	• Cognitive Behavioral Therapy • Medication Management • Cognitive Therapy • Interpersonal Therapy • Patient Centered Therapy • Stress Inoculation Therapy • Trauma-Focused CBT • Written Narrative Exposure
Eating Disorders	No approved tool	Military enlistment Processing Stations**	None specified

**Deployment Mental Health Assessment also inlcuded in Pre-Deployment Health Assessment and Post-Deployment Health Reassessment. Service members may complete the Deployment Mental Health Assessment as part of the Annual Periodic Health Assessment*
*** Military enlistment processing stations are not under the authority of the Military Health System*

DoD Instruction 6490.15 - *Integration of Behavioral Health Personnel (BHP) Services Into Patient-Centered Medical Home (PCMH) Primary Care and Other Primary Care Service Settings* requires embedded behavioral health services in primary care settings to decrease health costs and improve patient access to behavioral health care.[329] The same types of behavioral health providers (e.g., psychiatrists, psychiatric nurse practitioners, doctoral and master's level psychologists, social workers, behavioral health technicians) are available in primary care and specialty behavioral health care settings. Before transferring the authority of MTFs to the DHA, each Service was responsible for its mental health workforce. Most licensed clinicians in the mental health workforce are master's level (psychologists and social workers), the remaining include doctoral level psychologists, psychiatrists, and psychiatric nurse practitioners.[329]

The DoD and Department of Veterans Affairs developed Clinical Practice Guidelines (CPG) for several conditions as clinical decision-making tools to assist VA and DoD health care providers in the standardization of care. The following mental health clinical practice guidelines are available for DoD providers:

- Assessment and Management of Patients at Risk for Suicide
- Major Depressive Disorder
- Posttraumatic Stress Disorder
- Substance Use Disorder

These CPGs incorporate algorithms that detail critical decision points on assessment, management, and treatment selection. The Major Depressive Disorder CPG is the only DoD/VA CPG that provides gender-specific treatment considerations, specifically addressing depression during a woman's pregnancy and the postpartum period.

Mixed Medical & Non-Medical Interventions and Counseling Support

Several mental health support and treatment programs involve a close team-based collaboration of medical and non-medical services. The FAP and the Sexual Assault Prevention and Response (SAPR) program provide a hybrid of non-medical and medical support services. Similar to non-medical support programs and services, the FAP and SAPR programs are located on military installations, with installation commanders providing operational oversight. Installation commanders ensure coordination between the programs for the facilitation of patient transfers. The FAP provides support and treatment for perpetrators and victims of interpersonal violence through clinical therapy, marital therapy, and support groups.[325] FAP provides victim advocacy, prevention services, and direct services for problematic sexual behavior in children and youth.[325] FAP medical support staff must have a master's degree and licenses in either social work, psychology, or marriage or family therapy. FAP incorporates universal and targeted prevention approaches, including public awareness, information, and education about healthy interpersonal relationships, and the New Parent Support Program. As women are disproportionately the victims of interpersonal abuse and often the primary caregivers for children, they may interact with FAP and receive their services more frequently than men. The FAP has no requirement for considering the gender of counselors in a treatment plan.

The SAPR program staff collaborates continually with MTF providers to ensure comprehensive support and care for sexual assault victims. The multidisciplinary team includes a sexual assault response coordinator (SARC), sexual assault prevention response victim advocates (SAPR VA), military criminal investigators, DoD law enforcement, healthcare providers, mental health and counseling services, a chaplain, command legal representatives, and the victim's commander.[318] At the MTFs, medical forensic examiners and healthcare providers, including psychotherapists, assess and treat sexual assault victims. DoD Instruction *Sexual Assault Prevention and Response Program Procedures* requires that medical care and SAPR services are gender-responsive, culturally competent, and recovery-oriented.[318]

Behavioral Health Screening Tools and their Gender Considerations

The MHS Direct Care system uses multiple tools – both general and military-specific – to assess the mental health of Service members.

Most Service members' first documented medical encounter occurs in basic training, granting an opportunity for a baseline mental health assessment. Female recruits are the at most risk population for attrition. Attrition rates for female recruits with a mental health diagnosis are significantly higher than male recruits with a mental health diagnosis (60.2% vs 37.0%; $p < 0.001$).[330] Trainees are more likely to be referred for a mental health evaluation in the first two weeks of basic training.[330] A seven-year Air Force study on referrals to the Behavioral Analysis Service concluded that white, female, and/or younger trainees were more likely to be referred than other trainees for a mental health evaluation.[331]

Screening and diagnostic assessments during basic training vary greatly across Services.[320] Garb, Wood, and Baker theorized that "improved screening [in basic training] could lead to lower rates of general attrition, a decrease in the severity of mental health problems, and a reduction in disciplinary problems."[320] Screening of early career Service members can establish a knowledge base of prior behavioral and mental health problems that assist the diagnosis and improve clinical decision-making for current mental health issues.[299, 320] The Lackland Behavioral Questionnaire administered at Air Force basic training helps create an inventory of biographical events and identifies trainees with pre-enlistment mental health events. The questionnaire collects responses to items pertaining to anger, anxiety, somatic symptoms, self-harm behaviors, school conduct problems, psychiatric medications, previous psychotherapy, and substance use.[320] Questions about eating disorders are notably absent despite the higher prevalence among adolescent females. Military Enlistment Processing Stations collect assessments about eating disorders although they do not transmit these results to the basic training command or enter them into an electronic database for future reference.[320]

DoD Instruction 6490.03 - *Deployment Health* requires a mental health assessment within 120 days before deployment and between 90 and 180 days upon return.[332] A deploying or recently deployed Service member takes the Deployment Mental Health Assessment in conjunction with the Periodic Health Assessment (PHA) if the deadline for the PHA falls within the timeframe for a pre- or post-deployment health assessment.[332] The PHA's behavioral health component screens for PTSD with the PC-PTSD-5 (Primary Care PTSD), depression with the PHQ-2 (Patient Health Questionnaire), alcohol use

with the AUDIT-C (Alcohol Use Disorders Identification Test-Concise), and suicide risk with the PHQ-9.[336] These are validated screening instruments. However, even validated tests may lose validity when applied to groups with different demographics than the test population, such as language, culture, and gender.

The Deployment Mental Health Assessment tool uses several of these screening instruments.[332] The assessment tool includes the PHQ-2, the PC-PTSD, the AUDIT-C, and another unnamed instrument for Traumatic Brain Injury with unknown psychometric characteristics.[332] Among the three validated screens, only the AUDIT-C has published validity for women. A follow-up clinical interview occurs at a face-to-face encounter if the Service member scores above a certain threshold on any of the instruments. A positive PTSD or depression screen may result in a suicide risk assessment. A positive PHQ-2 screen triggers the delivery of the PHQ-9, from which the PHQ-2 derives and which has published validity for women.[299] Referral to a behavioral health clinic occurs if a Service member has a positive screen on the PHQ-9 or PTSD tool.

Pregnancy and other life events in a woman's reproductive lifecycle warrant additional screening with either general tools or reproductive event specific tools, especially for mood and anxiety disorders that are more likely to present or worsen during hormonal changes.[299] The military endorses three assessment tools to detect mental health conditions during the perinatal period: the Edinburgh Postnatal Depression Scale (EPDS), the PHQ-9, and the GAD-7. The EPDS, built to screen for postpartum depression, can also detect general depression and anxiety.[299] Pediatric and family practice clinics administer the EPDS to mothers during their baby's first check-ups within the first two months of life. The sensitivity of the EPDS score of 10 or more for detecting depressive disorders ranges from 0.63 to 0.84 (95% confidence interval for the former estimate is 0.44-0.79).[299] With the recommended cut-off score, the PHQ-9's sensitivity to detect depressive disorders during pregnancy and postpartum was 0.89.[299] At a score of 13, the GAD-7 sensitivity to detect perinatal anxiety was 0.61.[299] The Behavioral Health Data Portal administers the GAD-7 and the PHQ-9 tools; clinic staff administer the EPDS as detailed above.[329, 333]

Mental health screenings in primary care clinics occur when a patient is new to a practice or annually for patients at higher risk for depression. Primary care clinics in the Direct Care system administer the PHQ-9, the PCL-5 (PTSD Checkist-5), the BHM-20 (Behavioral Health Measure-20), and the GAD-7 (General Anxiety Disorder-7) instrument for general anxiety disorder. The Behavioral Health Data Portal (BHDP) and the soon-to-deploy DHA Survey Portal provide access to a host of other screening tools for use in clinical practice. The BHDP collects demographics, tracks behavioral health outcomes, and measures results of multiple screening and assessment tests including the PHQ-9, the Posttraumatic Stress Disorder Checklist for Diagnostic and Statistical Manual for Mental Disorders, the GAD-7, the Alcohol Use Disorders Identification Test-Consumption, and the Brief Addiction Monitor.[332] The DHA designated the BHDP as the preferred method for collecting behavioral health data; dissemination and implementation efforts are underway to fully integrate the BHDP into every MTF and adult primary care clinic.[333] In addition to providing individual patient behavioral health data to a provider at the point of care, the BHDP can aggregate data for populations. As of September 2020, the BHDP cannot aggregate results of its measures or outcomes by gender or active duty status.[334, 335]

Outcome Measures for Women's Well-being, Resilience, and Mental Health Services

Mental health disorder diagnoses accounted for 15.4% of all "limited duty" dispositions.[336] As described in a previous chapter, understanding ADW's health requires a comprehensive set of process, compliance, and outcome measures relevant to the significant health issues affecting ADW's readiness. The high prevalence of behavioral health disorders in ADW requires assessments with metrics to detect, measure, and track ADW's mental health functioning. Specialty care mental health metrics are standardized and tracked with the BHDP, as mandated by DHA-PI 6490.01.[95] The metrics, which are not stratified by sex when aggregated, track the following measures:

- Facility BHDP adoption rate
- Treatment dosage rate
- Provider utilization rate
- Evidence-based treatment utilization rate
- PTSD outcomes
- Major depressive disorder outcomes

These outcomes are not gender specific. Stratification of statistical data by gender likely would reveal gender differences in mental health outcomes.

As sexual harassment and assault are key drivers of poor mental health in ADW, Congress requires the DoD to submit an annual report detailing information and statistics about sexual assault in the military. The foundation of this annual report began in 2014 with a White House collaboration to develop the means to track the DoD's progress in sexual assault prevention and response.[292] The DoD's search of standardized, population-based metrics to meet this goal was unsuccessful, and this prompted the DoD to develop its own set of 11 metrics and six 'outputs' from the military justice system.[292] Table 12 lists a small subset of gender-specific metrics the DoD uses to track sexual assault.

Table 12. Sexual Assault Metrics and Process Outputs for Fiscal Year 2019

Type of Metric	Source of Metric	Health Care Measurement Taxonomy
Metric 1: Past year estimated prevalence as a share of the active duty population, by sex	RAND Military	Clinical Defect
Metric 3b: Inappropriate behavior or comments observed	Patient/subjective reported	Patient-reported
Metric 4: Immediate supervisor addresses the continuum of harm	Patient/subjective reported	Process & Compliance
Metric 10: Perceptions of leadership support for SAPR	Patient reported	Patient reported

DoD Health Related Behaviors Survey

The Department of Defense Health Related Behaviors Survey (HRBS) is a cross-sectional survey administered every three years to investigate Service members' health behaviors relating to mental and physical health, sexual behavior, and deployment.[224] The section on mental and emotional health focuses on the outcomes of three mental health conditions common in military personnel: depression, general anxiety disorder (GAD), and PTSD. In addition, the mental and emotional health sections measure factors related to social and emotional factors associated with mental health, self-inflicted injury, and suicide ideation and suicide attempts.[224] The HRBS uses the following screening tools in the mental health portion of the survey: PHQ – 9, GAD – 7, and PCL – C.[224] The 2015 HRBS reported approximately 9% of Service members with probable depression, as measured by PHQ-9 – an estimate higher than the Healthy People 2020 objective.[224] Fourteen percent of Service members reported GAD, as measured by the GAD-7, with ADW reporting a higher prevalence than ADM.[224] Approximately 8.5% of Service members reported probable PTSD, as measured by the PCL-C, with ADW reporting a higher but small difference in the prevalence of PTSD symptoms than ADM.[224] The survey also highlighted a four times higher prevalence of ADW reporting unwanted sexual contact than ADM.[224]

Other Government Agency and Civilian Practices

As previously described in this chapter and throughout this report, there is no single, centralized, accountable office that provides oversight on policy and practices specific to ADW's health – physical or mental. The VA recognized the importance of centralized women's care and embedded mental health services within the Veterans Health Administration (VHA) Women's Health Clinic (WHC). The WHC offers gender-specific psychotherapy groups and allows veterans who have experienced military sexual violence to choose the gender of their provider.[337] Upon visit at the WHC, female veterans are evaluated on their psychiatric history, addictive substance use, and reproductive influences on mental health through self-administration of the Women's Mental Health questionnaire.[337]

While not responsible for health policy, staffing, and care delivery like the MHS and VHA, the Department of Health and Human Services and its operating divisions (CDC, NIH, SAMHSA) provide centralized policy and education to the public about women's mental health conditions.[338, 339] The most comprehensive information source is DHHS' Office of Women's Health (OWH) (see Chapter 2 for additional detail). The OWH provides general information on mental health conditions with known gender-specific symptoms or complications, such as depression, eating disorders, and bipolar disorder.[338] Additionally, OWH provides resources linking abuse and trauma to women's mental health.[338]

In 2009, OWH published *Action Steps for Improving Women's Mental Health* which recognized the burden of mental health conditions on women and proposed ways to address the disparities that put women at higher risk for certain conditions.[338] In the last decade, policies such as the Affordable Care Act have made treatment more affordable. Many health organizations are working to destigmatize mental health help-seeking behavior and address other social factors contributing to women's mental health wellness. The American Psychiatric Association published guides and toolkits for providers

working with female patients, and highlighted best practices.[340] For example, providers must understand that the link between psychosocial stressors and depression and anxiety in women may manifest differently than in men.

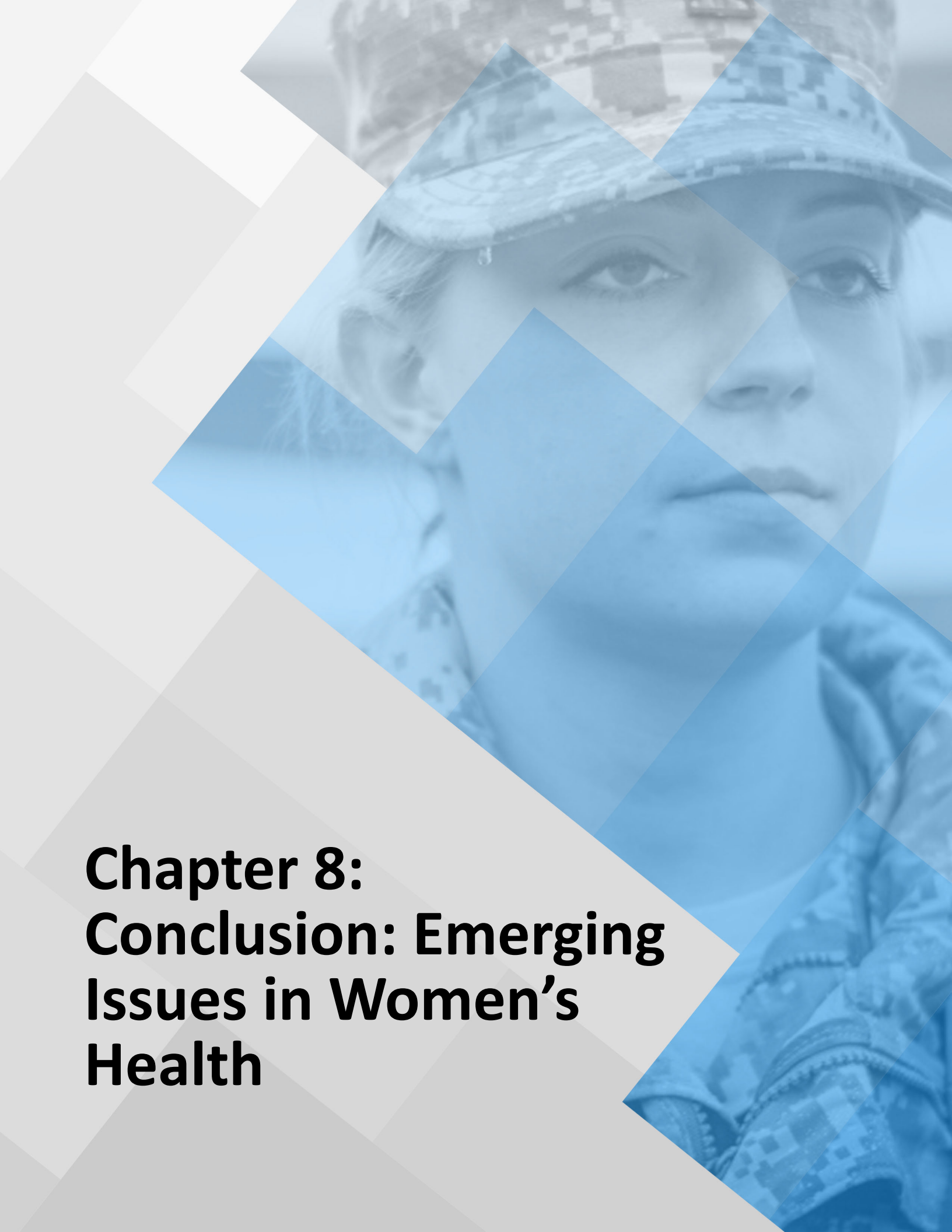
Outside the military and federal agencies, health care providers often provide women's mental health services as part of their general mental health services or other women's health care services. Typically, such services focus on the assessment and treatment of stress and mental health disorders for pregnant and postpartum women. An innovative tool initially piloted in Sonoma County, California screens for three prevalent behavioral health risk factors in pregnant women: substance use, mood disorder, and intimate partner violence. This bundled screener, the Confidential Women's Health Questionnaire, reduced the number of missed screenings among Medi-Cal eligible pregnant and postpartum women.[341] The Questionnaire was integrated into local prenatal screening programs and administered to all women of reproductive age.[342]

Centers that solely treat women's mental health conditions take a holistic approach to understand each case and work through a multilevel approach to help treat and build resilience in their female patients. For example, in Orange County, California, the Mariposa Center is the only women-specific substance abuse group treatment program in the region.[343] Originating from the understanding that women with a history of trauma or abuse are more likely to recover in treatment programs that address gender-specific factors, the Center expanded to focus on general women-specific mental health care. McLean hospital, the nation's leading psychiatric hospital, has a Center of Excellence focusing on women's mental health and the Hill Center for Women. The Hill Center for Women offers treatment services for those with histories of trauma and related disorders, borderline personality, mood, and anxiety disorders. Leading researchers in female psychology from the Center of Excellence in Women's Mental Health at McLean Hospital and Stone Center at Wellesley College lend their expertise to developing and modifying the Center's gender-specific treatment models.[344] The Center's mission is to "innovate and improve mental health care for all women and girls through their lives," and offers various female specific clinical services and treatment programs.[344] McLean monitors patient satisfaction with patient-reported outcomes collected with the Perceptions of Care survey and assesses psychiatric outcomes through the administration of the BASIS-24™.[344]

Holistic Approach to ADW's Mental Health

Understanding gender-specific symptoms and other social characteristics influencing women's mental health status is key to successfully maintaining mental health fitness in women – including ADW. Many mental health conditions co-exist with other behavioral conditions or manifest because of a unique situation that ADW face in their daily lives as women, wives, or mothers. To improve ADW's mental health state, access to care, and ensure readiness and resilience, the MHS must consider the gender-specific epidemiology of these conditions and how women respond differently to specific treatment options. Many tools, treatments, and delivery mechanisms currently in use in the MHS behavioral health ecosystem are gender-agnostic. However, there are opportunities to fine-tune and ensure screening tools are valid for women, place more emphasis on conditions disproportionately affecting women (e.g., eating disorders), provide greater awareness of disparities in diagnosis and treatment

by making gender and active duty-status behavioral health outcomes stratified as a standard (e.g., BHDP, MHS Dashboard), and fully embracing a disruptive approach to eliminating sexual assault and harassment of ADW.



Chapter 8: Conclusion: Emerging Issues in Women's Health

Emerging basic science, clinical research, and medical practices hold promise to improve ADW's health. Specifically, the current and growing basic science understanding of cellular, epigenetic, microbiomic, and neuroplastic processes have created the clinical basis for not only preventing, but treating and *reversing* common diseases such as cardiovascular disease, diabetes, multiple inflammatory conditions, and certain cancers through the use of healthy behaviors (i.e., "lifestyle medicine") and aligned environmental changes.[345] Over the past decade the emergence of *lifestyle medicine,* namely addressing the root causes of disease mediated by the common pathway of inflammation through plant-based nutrition, physical activity, stress/resilience/mindfulness, restorative sleep, elimination of addiction(s), and positive psychology/social connection has been accelerated by both basic science and clinical application. The growing acceptance by scientists and physicians nationally, including military providers, promises the avoidance and arresting of the biologic consequences due to worsening health behaviors (including chronic and systemic stress) and unhealthy built environments.

ADW may especially benefit from initiatives that improve or reduce *chronic low-grade stress, which may be systemic in nature.* Military culture, deployment, and combat are just several unique sources of stress that add to the demands common to all women. Many military occupations where ADW work may involve direct or indirect exposure to chemicals and toxins that cause long-term health effects. Multiple confounding factors may obfuscate these effects over time and space. Additionally, recent research increasingly recognizes environmental and *endocrine-disrupting chemicals*, food additives, and toxins as deleterious to health, and particularly for women in pregnancy and through the germ line affecting multiple generations.

Expanding the Understanding and Practice of Lifestyle Medicine

Lifestyle medicine, an evidence-based medical practice, encourages individuals and families to adopt and sustain healthy lifestyle behaviors to treat and even reverse disease. Such behaviors include whole-food plant-based diets, adequate physical activity, restorative sleep, effective stress management practices, avoidance of tobacco and alcohol, and positive psychology and social connections. These behaviors address the leading contributors to morbidity and mortality in American adults and do so through positive modification of the body's inflammatory state, epigenetic changes, and other biologic and metabolic processes.

Despite a growing portfolio of basic and clinical lifestyle medicine research, the number of studies addressing disease prevention and reversal with diet, activity, stress reduction, sleep, and substance use avoidance is small. Smaller yet is the number of studies focusing on women and gender; of the 3% of all NIH-funded studies on multiple risk factors and behaviors in lifestyle medicine, less than 10% involved women or pregnant women, or focused on the effect of gender. Following lifestyle medicine recommendations can enable military women to improve their tolerance to both acute and chronic stresses, reduce systemic inflammation that promotes health, accelerate injury repair, and improve cognitive and physiological performance. Adopting healthy lifestyle behaviors of moderate exercise, avoid smoking, moderate alcohol consumption, and maintenance of a healthy weight and diet can prolong a woman's life by 14 years. The VA recently launched its system-wide Whole Health Initiative, which aims to expand lifestyle medicine for all veterans.[346]

Unlike many reactive treatments for disease, promoting positive behaviors that lie at the heart of lifestyle medicine easily scale from individual doctor-patient interactions to broader public health and community re-design and interventions. The latter include public health campaigns, policies, or behavioral economic approaches that nudge individuals to make healthy choices and shape the built environment. The DoD, as a large organization with command and control of base housing, a commissary system, base dining facilities, recreational facilities, work and shift schedules, general military training requirements, and other resources, possesses levers of incredible power – not available to most U.S. populations - to influence the lifestyle choices of its Service members, both female and male, and ultimately the downstream effects on their health.

Mitigating the Biologic Effects of Systemic Stress

Today, women experience more stress at every stage of their lives than in the past.[347] Women's increased roles in the workplace and society have a direct effect on their stress level. Acute stress may often present as tolerable stress resulting in positive, adaptive responses that promote resilience in the face of adversity.[348, 349] Prolonged or chronic stress increases vulnerability to maladaptive behaviors and physical maladies such as substance use problems, loss of focus or judgment, muscle aches and pains, lower self-image, or change in appetite and eating habits.[348, 350] Accumulation of work and life stressors augments the duration of stress and increases the susceptibility to some types of cancer and age-related diseases, putatively through dysregulation of inflammatory responses in the body.[351] Inflammation is linked to other conditions, many relevant to ADW throughout their lifecycle, and include breast cancer, osteoporosis, diabetes, hypertension, dysmenorrhea, endometriosis, fibroids, and infertility.[212, 351] The DoD can position itself to leverage the emerging findings in the field of chronic stress to improve readiness in both ADW and men.

Studying and Minimizing the Effects of Endocrine-Disrupting Chemicals

International, expert advisory groups have become increasingly concerned about hormonally-mediated disease and genetic germ-line changes of endocrine-disrupting chemicals. The major classes of hormone-disrupting chemicals with evidence linking cause and effect is strongest currently for pesticides, flame retardants, plasticizer chemicals, and bisphenols. Based on animal and a growing number of human studies, clinicians and basic scientists internationally are increasingly aware of these growing threats to women and children's health.[352]

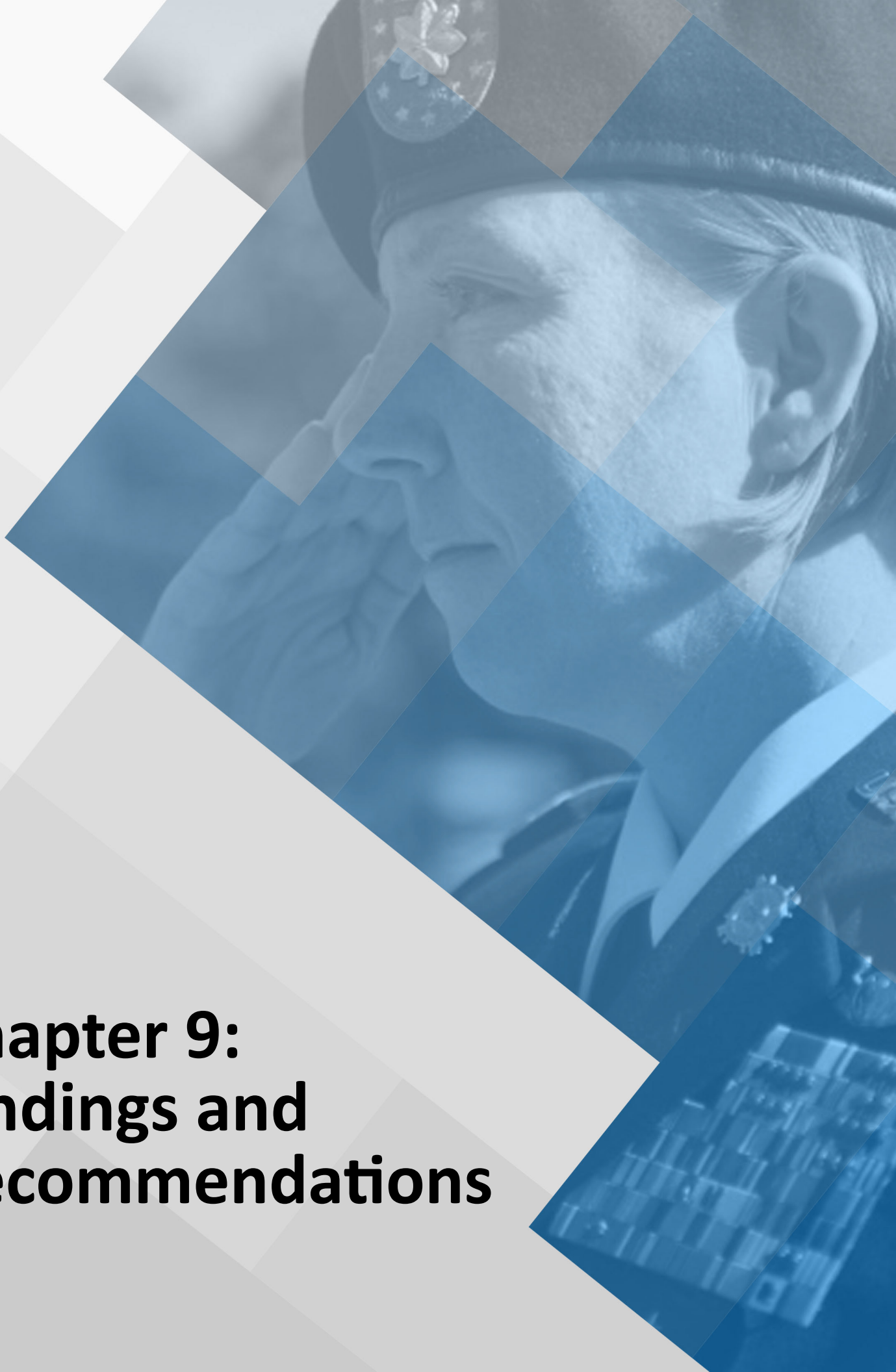
Deployment and military work environments may expose women to chemical and radiological compounds which adversely affect biologic processes – some known and other unknown.[351] Large epidemiological exposure studies and new assays have shed light on immediate, long-term, and trans-generational effects of chemicals, especially those disrupting the female reproductive system. One prominent example relevant to women is phthalates from newer plastics. Phthalates can disrupt normal fetal development during pregnancy, and decrease fertility long after the initial exposure.[353] Other environmental chemicals, such as tributyltin used in the paint applied to the hulls of ships, make one prone to obesity, and make successive generations susceptible.[354] Active management to minimize and eliminate potential toxic exposures requires the partnership of military engineers, chemists, and

health experts, including those knowledgeable of gender-specific toxicology issues. The DoD should proactively identify emerging potential threats, monitor emerging science and data, and proactively design studies and future initiatives to address them.

Understanding and deploying lifestyle medicine science and clinical practices, minimizing and addressing the effects of systemic stress, and monitoring the growing evidence linking endocrine-disrupting chemicals to health will be essential to meet emerging opportunities and threats to ADW health and readiness.

Conclusion

Twenty-five years of reports and recommendations – many unrealized – provided the blueprint for the DHB findings and recommendations for ADW's health services. The next 25 years will bring new and previously unknown threats to the medical readiness of ADW. The next 25 years will also bring new initiatives, preventive measures, treatments, and policies that can promote ADW's health. Many of these will come from DoD health and non-healthcare personnel, and many will come from ADW themselves. The DHB believes, through standardization of health services and a commitment to becoming a learning healthcare organization under the DHA, that the DoD possesses the skills, personnel, and commitment to advance ADW's health and to anticipate both emerging threats and promising care models thoughtfully. Above all, ADW's health requires a governance structure that endows ADW health subject matter experts with the influence at all potential points of failure to optimize health, accountability to outcomes that matter to ADW readiness, and the ability to apply high-reliability organizational principles to eliminate the drivers of poor health and to identify and encourage the development of best practices.



Chapter 9: Findings and Recommendations

Finding 1.1: Active duty women (ADW) continue to experience high rates of stress fractures and other musculoskeletal injuries, urogenital infections, unintended pregnancies, sexual and intimate partner violence, anxiety, depression, adjustment disorders, and eating disorders. These conditions adversely affect ADW's readiness and health. The differential incidence of these conditions among ADW have persisted despite 70 years of integration efforts and the creation of more than 10 advisory and decision-making groups, specifically created to improve ADW's health, fitness, safety, and performance. The groups capably identified best practices and recommended their adoption. But, lacking authority and accountability, few of their recommendations have been implemented.

> **Recommendation 1.1:** With urgency and commitment, the DoD should establish an overarching office with a clear charter to approve recommendations necessary to improve ADW's health, fitness, safety, and performance. This office should be both authoritative and accountable for outcomes and for minimizing undesirable gender-associated differences in:
>
> i. Health care delivery
> ii. Health care personnel
> iii. Research, dissemination, and implementation of best health care practices
> iv. Supply chains (e.g., clothing, equipment, medical products)
> v. Personnel policies (e.g., fitness standards, parental leave) and
> vi. Culture (i.e., traditional male-centric values).

Finding 1.2: All military personnel – not just health professionals – influence, support, or detract from the health and health care of ADW.

> **Recommendation 1.2:** Expand general awareness of the gender-specific health and health care issues affecting ADW particularly among line commanders and senior non-commissioned officers.

Finding 1.3: The availability and scope of women's health services vary significantly at their point-of-access (home station, field, deployment, or military treatment facility).

> **Recommendation 1.3:** Standardize availability and scope of ADW's health care services.

Finding 2: Both basic training programs and ongoing fitness-for-duty evaluations have two foundational fitness components: health fitness standards that are gender-specific, and occupationally-focused fitness standards that should be gender-neutral. A "one size fits all" approach for health fitness contributes to training injuries in a mixed-gender population. Women enter the military with lower fitness levels than men and are more susceptible to overuse and lower limb injuries. Their musculoskeletal injury risk is further increased when they attempt to meet gender-neutral health fitness standards during BMT and without access to gender-customized equipment (see Finding 3). Research also suggests that a higher percentage of ADW can make the transition to meet occupationally specific, operationally-relevant (OSOR) standards by using more focused, structured, and monitored training approaches.

Recommendation 2.1: The DoD and Recruiting commands should improve preparation of recruits by emphasizing healthy behaviors (stop smoking, reduce excess alcohol consumption, and adopt healthy eating habits) and gender-specific aerobic and strength conditioning prior to accession to reduce the risks of injury and increase the likelihood of success in basic military training (BMT) and military service.

Recommendation 2.2: The DoD should implement two-level fitness assessments: (i) gender-specific fitness standards and (ii) gender-neutral occupational-specific, skill- and operationally-relevant standards.

Recommendation 2.3: Basic training programs should embed licensed sports medicine professionals within the unit. These professionals can promote and implement evidence-based practices for training and rapid injury recovery, which are particularly valuable for ADW. The VIPER program at Joint Base San Antonio – Lackland represents a best practice for embedding a sports medicine trainer in a unit during BMT.

Finding 3: ADW lack access to gender-customized equipment (e.g., properly fitting sports bras, backpacks, protective armor, footwear, and insoles) necessary for (i) achieving training standards, (ii) reducing musculoskeletal injuries, and (iii) decreasing attrition.

Recommendation 3: The DoD should define and ensure procurement and distribution of gender-customized equipment to reduce injuries and improve the health, performance, and readiness of ADW.

Finding 4: Studies of BMT injuries observed an association between increased risk of stress fractures and injury in women with iron and vitamin D deficiencies. Women who incurred injuries in BMT also were more likely to have poorer pre-accession health and fitness levels, higher rates of smoking, and amenorrhea. Blood donation is expected of all trainees at the end of BMT. Donations from female trainees contribute 6% of the Armed Forces Blood Program supply. Blood donation causes a significant decrease in iron stores, which take up to 10 months to replenish in women.

Recommendation 4: The DoD should conduct well-designed studies of ADW to determine the association between hematologic and nutritional deficiencies and the incidence of ADW injuries and sub-standard performance. Studies should also assess the efficacy of interventions or policies to remediate such deficiencies, including the benefits of calcium, vitamin D, iron supplementation, and restricting ADW blood donations.

Finding 5: ADW's limited access to and awareness of products and services for self-care of treatable and preventable urogenital conditions hinders their capability to actively manage symptoms and

prevent disease progression, especially in the deployed or field environment.

Recommendation 5.1: The DoD should educate pre-deployment women about urogenital infection prevention, self-diagnosis, and treatment particularly when deployed.

Recommendation 5.2: The DoD should enable women to perform self-medical care by incorporating urogenital infection self-testing and self-treatment kits and hygiene devices (e.g., Female Urinary Diversion Device (FUDD)) into standard equipment kits and supply chains.

Finding 6: Unintended pregnancy is approximately 50% higher for ADW than for civilian women, and is approximately the same as the incidence of planned pregnancy among ADW. The occurrence of unplanned pregnancies creates significant adverse health and major mission impacts. Studies show that long-acting reversible contraception (LARC) counseling and walk-in contraceptive clinics decrease unintended pregnancies.

Recommendation 6: The DoD should improve contraceptive education and services through the following actions:

1. Launch a sexual and relationship health education campaign for all Service members at all accession locations to include knowledge and access to contraception options
2. Provide the military-designed mobile contraceptive decision-support "Decide + Be Ready" counseling app
3. Promote the use of the most effective LARC method by establishing and expanding walk-in contraceptive clinics [best practice Navy PINC clinic], and
4. Provide convenient mobile women's health services where ADW work

Finding 7: The Services do not uniformly apply evidence-based standards and practices for postpartum fitness recovery and return-to-duty. The Air Force's post-pregnancy event return-to-duty sliding scale represents a best practice model for optimal postpartum fitness recovery and evaluation.

Recommendation 7: The DoD should standardize policies for post-pregnancy fitness evaluations and return-to-duty that are contingent on types of pregnancy outcomes (e.g., miscarriage, stillbirth, pre-term, full-term).

Finding 8: Breastfeeding has positive effects on the physical, emotional, and psychological health of ADW and their infants. ADW breastfeeding rates are below the Healthy People 2020 goal. The Services do not uniformly apply or execute policies to support breastfeeding.

Recommendation 8: The DoD should continue to improve and standardize policy, education, and infrastructure to encourage and facilitate breastfeeding.

Finding 9: Fertility services available to ADW show particularly high variation across military treatment facilities and locations.

> **Recommendation 9:** The MHS should standardize the fertility benefit and access to services.

Finding 10.1: Despite efforts to reduce sexual harassment, assault, and intimate partner violence, ADW continue to experience elevated and unacceptable rates of gender-related, intentional trauma. Such actions against women are more likely to lead to post-traumatic stress disorder (PTSD) than exposure to combat. DoD efforts to raise awareness of the magnitude of the ongoing problem, and line commander and non-commissioned officer accountability for a zero-tolerance culture, need to be continually reinforced.

> **Recommendation 10.1:** Continual reinforcement of zero-tolerance for workplace sexual harassment and assault and for intimate partner violence must be emphasized in Service member training, particularly for line commanders and non-commissioned officers.

Finding 10.2: Stigma and fear of reprisal for reporting sexual harassment and assault continue to exist.

> **Recommendation 10.2:** Allegations of sexual assault should be reported and investigated promptly including medical forensic examinations resulting in a timely adjudication, delivery of judgment/punishment, and whenever possible, communication to commanders, non-commissioned officers, and Service members to reinforce that the culture of zero-tolerance is, in fact, in place.

Finding 10.3: Women respond better to established PTSD treatments than men, especially when the diagnosis is made early. The full complement of health professionals and services for victims of sexual assault, however, does not exist at all locations where ADW serve.

> **Recommendation 10.3:** The DoD should expand adequately trained and gender-responsive staffing for timely medical and psychological evaluation and counseling for sexual harassment, assault, and intimate partner violence. Evaluation and counseling can be provided at an MTF, private care, or telehealth.

Finding 10.4: DHA Connected Health has at least seven publicly available mobile apps to support Service members with behavioral health issues. The DoD has an app that specifically supports military victims of sexual harassment or assault.

> **Recommendation 10.4:** The DoD and DHA Connected Health should re-evaluate and standardize existing digital health tools for ADW's mental health needs, especially regarding sexual harassment and assault. The DoD Safe Helpline app is a potential best practice resource

for guiding military members to much needed care and support for sexual assault.

Finding 11: Anxiety, depression, and adjustment disorders are more prevalent in ADW than men. Women and men respond similarly to treatment and counseling for anxiety and depression. Gender- and military-specific identification, screening, and treatment modalities have not been comprehensively studied or deployed.

> **Recommendation 11:** The DoD should validate the gender- and military-appropriateness of all currently used mental and behavioral health screening tools and treatment modalities.

Finding 12: Body appearance standards and Service-specific cultures may contribute to ADW's eating behavior disorders and body image issues. Eating disorder prevalence varies among Services.

> **Recommendation 12:** The DoD should study whether the body appearance standards for women are appropriate to promote physical fitness and attainment of military occupational standards, without inadvertently motivating ADW into disordered eating.

Finding 13: The MHS Dashboard and the Women and Infant Clinical Community Dashboard, maintained by DHA, display different types of women's health measures but mainly measures of inputs, process, compliance, and complications. Few of the dashboards measure outcomes; patient-reported outcome measures are especially rare. The Dashboard data do not show performance at different times of ADW's lifecycle of military service.

Dashboard data are at least 3-6 months out of date, and often much longer. Beyond the lack of timeliness, the Dashboards have restricted access, and lack metrics on ADW's medical readiness (unplanned pregnancy, musculoskeletal injuries, sexual assault). These data deficiencies limit the Dashboards' relevance for identifying and responding to differential rates of ADW health, readiness, and safety.

> **Recommendation 13:** Create an interactive and customizable ADW's MHS Dashboard that provides line and health personnel with access to up-to-date data on key drivers and outcome measures of ADW's readiness. The Dashboard should track both nationally-accepted and military-relevant women's health metrics, and feature customizable options to reflect the differential needs of the end-users (e.g., Commanders tracking musculoskeletal injury rates and outcomes by gender). The Dashboard should feature patient-reported outcome metrics (PROMs) specific to the needs and concerns of ADW over their lifecycle in the military.

Finding 14: The DoD electronic medical record (EMR) system does not systematically collect PROMs for conditions relevant to women's health and readiness. The EMRs have inadequate and inconsistent

documentation of military-relevant medical issues and constrain personnel from documenting specific conditions, their treatment, and the outcomes produced. As a part of MHS' transformation efforts to streamline healthcare services, the DHA has adopted frameworks for measuring and entering PROMs into the EMR, which will allow identification of ADW's health-related drivers of quality and continuous improvement. Currently, however, no standardized ADW-specific readiness metrics are under development in the new set of PROMs.

Recommendation 14.1: The DHA should establish a set of ADW metrics that are informed from review of the universe of women-specific metrics, including inputs like (i) health care personnel training, (ii) compliance with recommendations, (iii) complications, and (iv) PROMs of health and personnel outcomes (e.g., treatment success or failure, readiness return times, attrition rates, and retention rates). Ensure integration of these metrics into the EMR and dashboards.

Recommendation 14.2: The DHA should provide ongoing support and resources to those who have a stake in developing, documenting/reporting, implementing, validating, and tracking of metrics relevant and specific to ADW's health and readiness.

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Appendix B: Terms of Reference

OFFICE OF THE UNDER SECRETARY OF DEFENSE
4000 DEFENSE PENTAGON
WASHINGTON, D.C. 20301-4000

PERSONNEL AND READINESS

JUL 29 2019

MEMORANDUM FOR PRESIDENT, DEFENSE HEALTH BOARD

SUBJECT: Request for Defense Health Board Review, Active Duty Women's Health Care Services

Pursuant to the attached Terms of Reference (TOR) on Active Duty Women's Health Care Services, I direct that the Defense Health Board ("the Board") provide recommendations to the DoD to identify Active Duty women's health care needs, improve accessibility and quality of health services, and optimize individual medical readiness. Specifically, the Board should address and develop findings and recommendations on the policies and practices in place to:

- Determine how the DoD should improve research, quality of care, and access to health services for Active Duty women, while maintaining a focus on readiness;
- Address psychological and mental health conditions with gender-specific epidemiologies;
- Evaluate access to reproductive health services, including preventive care, for Active Duty women throughout the deployment cycle; and
- Identify best musculoskeletal injury prevention practices for Active Duty women.

The TOR for this review provides a detailed description and scope of the tasking. The point of contact for this action is CAPT Gregory Gorman. He may be reached at (703) 275-6060, or gregory.h.gorman.mil@mail.mil. Thank you for your support and commitment to optimizing the health and force-readiness of the military.

James N. Stewart
Assistant Secretary of Defense for Manpower and Reserve Affairs, Performing the Duties of the Under Secretary of Defense for Personnel and Readiness

Attachment:
As stated

Defense Health Board
Active Duty Women's Health Care Services
TERMS OF REFERENCE

These terms of reference (TOR) establish the objectives for the Defense Health Board ("the Board") review of the provision of health care and related services for Active Duty women through its Health Care Delivery Subcommittee.

Mission Statement: The mission of the Board is to provide independent advice and recommendations to maximize the safety and quality of, as well as access to, health care for members of the Armed Forces and other Department of Defense (DoD) health care beneficiaries.

Issue Statement: Women serve in increasing numbers in the U.S. Armed Forces, now comprising 16.6 percent of the Active Duty force.[1] Women held approximately 10 percent of all deployed positions[2] in recent conflicts and their presence in combat is expected to grow[3] in light of 2015 guidance opening all combat roles to women. More than one-quarter (26 percent) of the total cadet and midshipmen seats at Military Service Academies are women.[1] As women emerge as the fastest growing military population and assume additional operational responsibilities, the Military Health System must institute best practices and policies to meet the health care needs of our Active Duty women.

Women differ from men in fundamental ways that impact their operational performance and well-being. These include musculoskeletal, nutritional, metabolic, genitourinary, reproductive, and stress management differences.[4] However, most military medical research is focused on males. Resulting gaps in knowledge regarding gender-specific health risks, health care needs, and health care delivery concerns were identified in 2005; the same gaps were identified in a systematic review of military women's health completed a decade later.[2] Other studies have identified contraception, preventive health services, musculoskeletal injury, and mental health conditions as areas in need of additional research.[4,5]

Women's health has been an intermittent concern within DoD for over 2 decades. In 1994, the DoD created a Defense Women's Health Program as a special, 2-year congressional appropriation. While the program identified knowledge disparities in musculoskeletal injuries, reproductive hazards, and field care for gynecological health, there were no long-term institutional changes to sustain the momentum.[2,6] Gap analyses were conducted in 2005 and 2015, as discussed above, but gaps have not been addressed at the Enterprise level to date. Promising efforts include incorporation of a U.S. Navy Bureau of Medicine and Surgery model for walk-in contraception clinics into the Defense Health Agency (DHA)[7,8]; the ongoing Military Women's Health Research Interest Group, sponsored by the TriService Nursing Research Program; and the recent creation of the Women and Infant Clinical Community within the DHA as mechanisms to standardize care for Active Duty women.

Objectives and Scope: The Defense Health Board's Health Care Delivery Subcommittee should:

- Determine what policies, practices, structure, and capabilities the DoD should implement to improve the quality of and access to women's health services, with a focus on maintaining readiness of Active Duty women. Consult findings and experiences from the Veterans Health Administration and the Department of Health and Human Services in making those determinations.
- Review available psychological and mental health services for Active Duty women that address conditions with gender-specific epidemiology, prevention, diagnosis, or treatment considerations such as suicidal ideation, mood disorders, eating disorders, and adjustment disorders.
- Evaluate access to reproductive health services for Active Duty women, including contraception, fertility treatments, genitourinary infections, and obstetric care. Specifically evaluate contraception access and availability in the pre-deployment period and deployed environment and access to and availability of female preventive services such as mammograms and cervical cancer screening in the deployed environment.
- Assess available and currently implemented musculoskeletal injury prevention practices for their effectiveness and applicability to Active Duty women and recommend changes as necessary.
- Provide recommendations on how the DoD can best identify, prioritize, and implement research on Active Duty women's health issues.

Methodology:

1. The Health Care Delivery Subcommittee's assessment will be conducted in compliance with the Federal Advisory Committee Act, DoD Instruction 5105.04, and the Board Charter.
2. The Health Care Delivery Subcommittee should focus on improving the policies and practices currently in place to provide health care services to Active Duty women.
3. The Health Care Delivery Subcommittee may conduct interviews and site visits as appropriate.
4. The Health Care Delivery Subcommittee may seek input from other sources with pertinent knowledge or experience.
5. In accordance with Deputy Secretary of Defense Memorandum, "Advisory Committee Management," dated November 26, 2018, and DoD Instruction 5105.04, the Health Care Delivery Subcommittee shall receive full and timely cooperation of each Office of the Secretary of Defense and DoD Component Head in providing analyses, briefings and other DoD information or data necessary for the fulfillment of its responsibilities as provided for by this TOR.

Deliverables: The Health Care Delivery Subcommittee will complete its work within one year of receiving the tasking and report to the Board in a public forum for a full and thorough deliberation. The Board will, in accordance with its Charter, report to the Assistant Secretary of Defense for Health Affairs, who has been delegated the authority to evaluate the independent advice and recommendations received from the Board and, in consultation with the Under

Secretary of Defense for Personnel and Readiness, identify actions or policy adjustments to be made by DoD in response. Progress updates will be provided at each Board meeting.

Required Support:

1. The Defense Health Board Support Division will provide any necessary research, analytical, administrative, and logistical support for the Health Care Delivery Subcommittee.

2. Funding for this review is included in the Division's operating budget.

References:

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8. Myers L. BHC Norfolk Expands Walk-In Contraception Clinic Hours. 2018. https://www.navy.mil/submit/display.asp?story_id=106579. Accessed April 7, 2019.

Appendix C: Crosswalk TOR Objectives and Recommendations

Terms of Reference Objectives	Report Recommendations
• Determine what policies, practices, structure, and capabilities the DoD should implement to improve the quality of and access to women's health services, with a focus on maintaining readiness of ADW. Consult findings and experiences from the Veterans Health Administration (VHA) and the Department of Health and Human Services (DHHS) in making those determinations.	1.1, 1.2, 1.3, 13, 14.1, 14.2
• Review available psychological and mental health services for ADW that address conditions with gender-specific epidemiology, prevention, diagnosis, or treatment considerations such as suicidal ideation, mood disorders, eating disorders, and adjustment disorders.	10.1, 10.2, 10.3, 10.4, 11, 12
• Evaluate access to reproductive health services for ADW, including contraception, fertility treatments, genitourinary infections, and obstetric care. Specifically evaluate contraception access and availability in the pre-deployment period and deployed environment and access to and availability of female preventive services such as mammograms and cervical cancer screening in the deployed environment.	5.1, 5.2, 6, 7, 8, 9
• Assess available and currently implemented musculoskeletal injury prevention practices for their effectiveness and applicability to ADW and recommend changes as necessary.	2.1, 2.2, 2.3, 3, 4
• Provide recommendations on how the DoD can best identify, prioritize, and implement research on AWD's health issues.	1.1

Appendix D: Selected Best Practices for Active Duty Women by Chapter

Chapter	Selected Best Practices	Page
3: Health Impact of Gendered Cultural Norms, Ideologies, Governance, and Health Services	**Centralized Women's Health Services Office** *Supports medical readiness of Active Duty Women of the Navy by implementing a Female Force Readiness Strategy* Best Practice: Navy Office of Women's Health Owner: Navy Bureau of Medicine and Surgery **Grassroots Organization with Direct Communication to Policymakers and Service Leaders** *Promotes female-specific health care programs, and policies in support for individualized health care* Best Practice: Air Force Women's Initiative Team Owner: Air Force Barrier Analysis Working Group	3
4: Optimizing Women's Health: Measurement, Attainment, and Systems Improvement Processes	**Customized Women's Health Metrics Dashboard** *Transparent, up-to-date visual of 14 women's health metrics* Best Practice: Military Health System (MHS) Dashboard and Woman and Infant Clinical Community (WICC) Dashboard Owner: Defense Health Agency (DHA) J-5 Strategy, Plans and Functional Integration, and WICC **Service-level Gender Stratification of Health Measures** *Health index measures stratified by gender that provide overview of ADSMs' health* Best Practice: DoD Health of the Force Index Owner: Armed Forces Health Surveillance Branch **High Reliability Organization Status to Support ADW's Health** *Subject-matter expertise to support and establish quality improvement methods to measure and improve health outcomes of ADW* Best Practice: Clinical Communities and Quadruple Aim Performance Plans Owner: DHA J-3 Operational, Clinical Support Division **Patient-Supported Health Decision-Making for Better Outcomes** *DHA Survey portal that provides expert-selected or developed patient reported outcomes with the potential to be stratified by gender and active duty status* Best Practice: Clinical Community-Driven Patient Reported Outcomes Owner: DHA Value Metrics Team	45

Chapter	Selected Best Practices	Page
5: Addressing the Disproportionate Burden of Musculoskeletal Injury on Active Duty Women	**Embedded Athletic Trainer** *Reduced number of duty days cause from MSKI by providing on-the-spot care for injured Service members* Best Practice: Air Force Versatility Injury Prevention and Embedded Reconditioning (VIPER) Clinic Owner: United States Air Force **Command Accountability for MSKI** *Implementation of protocol for command to follow in or to decrease stress fractures during training* Best Practice: Injury Reduction Program Owner: Israeli Defense Force **Customized Training Exercises** *Step progression used during training to decrease the likelihood of sustaining MSKI* Best Practices: Air Force Tiered Physical Fitness Test; Israeli Defense Force Modified Gradated Exertion Table Owners: Air Force Exercise Science Unit; Israeli Defense Force's Medical Corps **Pregnancy and Postpartum Reconditioning Training** *A standardized training curricula to maintain adequate fitness levels in pregnant ADW and reduced the number of failed physical tests in postpartum ADW* Best Practice: Army's Physical Activity and Exercise during Pregnancy and the Postpartum Period Owner: Army Public Health Center	61

Chapter	Selected Best Practices	Page
6: Reproductive and Urogenital Health Care Services for Active Duty Women	**Walk-in Contraception Clinic** *Full service walk-in clinic that provides contraceptive care to Active Duty women at no cost* Best Practice: Process Improvement for Non-delayed Contraception (PINC) Clinic Owner: Navy Office of Women's Health **Use of Long-acting Reversible Contraceptive (LARC) at Basic Training** *Counseling services and insertion of the LARC for ADW to decrease rates of unplanned pregnancies and non-deployable days to pregnancy* Best Practice: Navy's LARC Forward Owner: Navy's Office of Women's Health **Collation of Information about Contraception Options via Mobile Application** *Educate women about the different options and method to use for contraception* Best Practice: Decide + Be Ready App Owner: DHA Connected Health **Self-Diagnosis and Treatment Kits** *Provides ADW the resources to comfortably self-diagnose and treat common urogenital conditions in field environments* Best Practice: Women in the Military Self-Diagnosis Kits (WMSD) Owner: Daniel K. Inouye Graduate School of Nursing at Uniformed Services University of the Health Sciences **Urinary Diversion Devices in ADW Gear** *FDA-approved urination device that increase comfortability, privacy and safety for ADW to void in field environments and deployment* Best Pratice: Female Urinary Diversion Device (FUDD) Owner: Daniel K. Inouye Graduate School of Nursing at Uniformed Services University of the Health Sciences	81
7: Delivering Mental Health Care Designed for Active Duty Women	**Comprehensive and Integrative Sexual Assault Victim Response Team** *A comprehensive team and program that provides gender-sensitive support and care to victims of sexual assault* Best Practice: Sexual Assault Program Response Owner: DoD Sexual Assault Prevention and Response Office **Embedded Behavioral Health Professionals in Basic Training Unit Clinics** *Accessibility to early intervention behavioral health services for referred trainees, especially women, to decrease attrition* Best Practice/Owner: Air Forces Behavioral Analysis Service **Standardization of Behavioral Health Screening for Recruits** *A questionnaire that gathers information on different behaviors and emotions to identify female and male trainees with potential pre-enlistment behavioral health concerns* Best Practice: Lackland Behavioral Questionnaire Owner: Air Force Behavioral Analysis Service	102

Appendix E: Methods

The DHB Support Division team performed a comprehensive search and review of information, guided by the Public Health Approach, on women's health care needs, policies, and practices. The team gathered and reviewed surveillance data, peer-reviewed public health and military scientific research, systematic reviews, policies, and evaluation reports about ADW's health. The Public Health Approach sequentially structures the process of discovery and identification of a public health issue through a set of question[108]:

1) Is there a problem and how big is it;
2) What causes the problem;
3) What is already known about how to prevent the problem;
4) Who needs to know and do what;
5) How effective was the implementation?

Existing and best practices for health promotion of ADW were culled from women's health experts (in academia, private industry, professional sports, and the military), and from briefings, interviews, and site visits on prevention and treatment of musculoskeletal injuries, reproductive and urogenital needs, and mental health conditions. The team identified the initial pool of experts from published work relevant to the ToR's tasking and objectives. The pool expanded through a chain of referrals. Multiple sources available through the pool triangulated the information. Iterative review of the collated information using data condensation methods (e.g., categorizing, theming, indexing) uncovered findings to inform the recommendations. The Subcommittee provided input to refine the recommendations.

Appendix F: Key Legislative Actions and Policies Impacting the Health of Active Duty Women

Year	Key Legislative and Policy Actions[2, 355]
1951	Executive Order signed by President Truman gave the Services permission to discharge a woman if she became pregnant, gave birth to a child, or became a parent by adoption or step-parent.
1974	DoD directed the Service secretaries to develop new policies making separations for pregnancy voluntary.
1980	First DoD Sexual Harassment Policy issued.
1988	DoD implements "risk rule" which excludes women from noncombat units or missions if the risk of exposure to direct combat, hostile fire, or capture were equal to or greater than the risks in the combat unit they support.
1992	National Defense Authorization Act for FY 1992-1993 included authorization entitled Establishment of the Presidential Commission on the Assignment of Women in the Armed Forces
1994	National Defense Authorization Act for FY 1994 authorized: Establishment of the Defense Women's Health Research Center Inclusion of women and minorities in clinical research projects Repeal of the statutory restriction on the assignment of women in the Navy and Marine Corps Requirements for gender-neutral occupational performance standards Entitlement of primary and preventive health care services for female service members A report on the provision of primary and preventive health care services for women The "risk rule" is rescinded and DoD issues the Direct Ground Combat and Assignment Rule, which limits women from being assigned to units below brigade level whose primary mission is to engage in direct combat on the ground.
2005	DoD Confidentiality Policy for Victims of Sexual Assault – Confidential reporting gives the member access to medical care, counseling and victim advocacy, with/out initiating the investigative process. This memorandum implements NDAA FY 2005 Sec. 577 (b) (5), P.L. 108-375, October 28, 2004, which requires that DoD policy address confidential reporting of incidents of sexual assault.
2007	DoD Instruction 6400.06 (August 21, 2007): Domestic Abuse Involving DoD Military and Certain Affiliated Personnel
2011	Public Law 111-383; 214 Stat. 4217 (January 7, 2011): Congress mandates review of the Direct Ground Combat and Assignment Rule.
2012	DoD Directive 6495.01 (January 23, 2012): Sexual Assault Prevention and Response Program
2013	National Defense Authorization Act for FY 2013 authorized: • Use of DoD funds for abortions in cases of rape and incest. • Extension of Comptroller General report on women-specific health services and treatment for female members of the Armed Forces. • Report on feasibility of developing gender-neutral occupational standards for military occupational specialties currently closed to women. DoD repeals the Direct Ground Combat and Assignment Rule, removing barriers to the assignment of women to combat units and occupations, and directs implementation by January 1, 2016.
2014	Public Law 113-291; 128 Stat. 1919 (September 19, 2014): Congress issues validation criteria for the development of gender-neutral occupational standards.

Year	Key Legislative and Policy Actions[2, 355]
2015	National Defense Authorization Act for FY 2015 authorized: • GAO to describe the availability of women's health care services at military hospitals, particularly maternity care, and the measurement and monitoring of the quality of these services. • Directs the Secretary of Defense to direct the Secretaries of the military departments to ensure that female combat equipment is 1) properly designed and fitted, and 2) meets required standards for wear and survivability. Public Law 114-92, (November 25, 2015): Congress issues an additional validation criterion for the development of gender-neutral occupational standards and reduces the notify-and-wait period for congressional review to 30 calendar days. Secretary of Defense announces all combat roles and units open to women. National Defense Authorization Act for FY 2016 authorized: Comprehensive standards and access to contraception counseling for members of the Armed Forces
2016	DoD Instruction 1327.06 – Leave and Liberty Policy Procedures: Extends maternity leave to 12 weeks National Defense Authorization Act for FY 2017 (Public Law 114-328; 130 Stat. 2007; December 23, 2016) authorized: Incorporation into survey by Department of Defense of questions on experiences of members of the Armed Forces with family planning services and counseling.
2019	National Defense Authorization Act for FY 2019 (Public Law 115-232; August 13, 2018) authorized: • Pilot program on treatment of members of the Armed Forces for post-traumatic stress disorder (PTSD) related to military sexual trauma.
2020	National Defense Authorization Act for FY 2020 (Public Law No: 116-92; 12/20/2019) authorized: • Expansion of Special Victim Counsel services for victims of domestic violence • Prohibition of gender-segregated Marine Corps recruit training • Medical documentation and tracking requirements for Service members or family members exposed to certain environmental or occupational hazards • Standardizes new mother deployment deferral process across the Services for 12 months after childbirth

Appendix G: Defense Women's Health Research Program (DWHRP) Research Priorities Report Card[12]

Advertised issue or problem	*DWHRP94 Project Transitions*	*Significant DoD Follow-on Research*
1. Strategies to overcome strength limitations	*Successful* Provided a scientific basis for new physical training programs in development on the basis of female strength trainability	Defense Technology Objective on effective physical training without increasing injury
2. Incidence and causes of injury and illness	*Successful* Provided a foundation for current DoD electron medical surveillance systems and tools for injury and illness monitoring and risk mitigation	Establishment of Center for Deployment Health Research and Millennium Cohort study
3. Assessment of the stress of military life related to attitudes and social roles	*Limited Success* Focused new attention on the high prevalence of sexual harassment and violence, its importance in health, and the key role of leadership	UCSF-USARIEM study on health risk communication, including sexual harassment and violence prevention
4. Protection against reproductive and teratological materials hazards	*Limited Success* Provided alternative treatments for some key endemic diseases faced in deployments	DoD Birth Defects Registry and pediatric cancer research
5. Reduction in stress fracture incidence	*Limited Success* Reduced emphasis on techniques to assess recruit bone density, moving to bone geometry considerations in continuing research	Bone Health and Military Medical Readiness Research Program
6. Improvement of reproductive and gynecological healthcare	*Limited Success* Developed an effective training program for female Marine recruits to reduce STD and UIP prevalence	
7. Prevalence and consequences of mineral deficiencies (e.g., iron, zinc)	*Unsuccessful* (Some studies completed but inconclusive)	New USARIEM research initiative on iron and zinc nutrient requirements
8. Extending performance limits in extreme environments and continuous operations	*Successful* Put to rest gender issues about differential health and performance in extreme natural and occupational environments, and safety of drug countermeasures not previously tested in women	
9. Military equipment and material design considerations	*Limited Success* Identified need for equipment and task redesign solution for material developers	Army light-wheeled vehicle mechanic strength-injury study
10. Clinical health issues	*Limited Success* Identified challenges to smoking cessation programs for military women; seeded research on more effective antifungal drugs, migraines drugs, and treatments for PMS and breast pain	Defense Technology Objective on health behavior interventions

Appendix H: Research Gaps Related to the Health of Female Services Members and Accompanying Recommendations[17]

Area of Concern	Identified Research Gap	Recommendation
Operational Performance Research	Lack of research on human factors and ergonomics regarding equipment size for women and small men	Identify and evaluate equipment used in theater related to injuries and/or harm
	Define absolute fitness levels required for various Military Occupational Specialties (MOS) and identify intrinsic and extrinsic injury risk factors	Conduct longitudinal studies to determine cumulative effects of MOS on long-term health and injury rates
Physical Health and Well-being	Lack of research on why women in the military fail to use contraceptives and how to encourage their use	Review research in civilian literature to identify effective approaches for adaptation in a military context
	Lack of research on how nutritional and energy requirements differ between sexes/race/ethnicity	Identify key nutrients where nutritional and energy needs might differ
	Lack of emphasis on iron deficiency anemia and how it affects/may be worsened by military training	Prospective female Service members should be screened for iron deficiency anemia before accession
	Lack of sex-specific hygiene and self-care education, specifically genitourinary hygiene	Evaluate effectiveness and utility of preventative measures against genitourinary infections/symptoms
		Determine if current tools/equipment for women are useful in deployed settings
		Identify current research investigating these concerns
	Lack of research that identifies differences in rates and severity of TBI in women	Identify injury processes specific to women with TBI
		Investigate sex differences in TBI pathology, treatment, comorbidities, and health outcomes

Area of Concern	Identified Research Gap	Recommendation
Psychological and Social Health	Lack of research of the impact of combat-related stress on female veterans	Examine existing longitudinal datasets for evidence of unique combat exposure effects on women Conduct longitudinal studies to identify long-term effects of combat-related stress on female Service members
	Lack of research on the impact of deployment on the function of families for women in armed Services	Conduct research on military families to determine the impact of deployment on the spouse/partner and children Identify differences as a function of various family units
	Lack of research to validate the effectiveness of psychological health and treatment programs for men and women	Evaluate effectiveness of current military psychological health care programs
	Lack of research investigating the impact of deployment and combat exposure on violent behavior in men and women	Conduct research to evaluate the impact of military deployments on violent behavior
	Lack of research in developing and validating psychological screening tools related to combat-related duties, specific to sex	Establish validated metrics for assessing psychological health and well-being Evaluate sex-specific screening needed for distinct MOS

Appendix I: Recommendations on Military Women's Health and Readiness, 1984-2019

Year	Recommendation
DACOWITS[32]	
1984	Design uniforms and equipment for women (i.e., boot designed for women's feet).
1996	Fund the Defense Women's Health Research Program.
1997	Each Service establish a women's health curriculum for providers that would be applicable for each level of care.
2003	Establish additional safeguards to ensure patients' rights to privacy and confidentiality, be included in DoD policy to the extent feasible, widely disseminated, enforced, and included in on-going education for all health care professionals and commanders. Health care providers should be trained in a customer service-oriented model of patient service and care which includes sufficient time and opportunity for patient-provider dialogue that conveys the importance of patient needs, especially those of junior enlisted members. In the event of undue delay in access to Military Treatment Facility OB/GYN health care providers, that the Services outsource OB/GYN care for female military personnel.
2007	Incorporate more female-specific questions into the Pre-Deployment Health Assessment form. Require that all deploying females receive a comprehensive women's health evaluation approximately 90 days prior to the expected deployment date. Incorporate female-specific health and hygiene briefings as a standard component of the pre-deployment process for deploying female Service members to better prepare them for conditions in-theatre. Refresher training on female-specific health care be provided prior to deployment to physicians and other practitioners who do not routinely practice gynecologic care. Enhance female-specific health care capabilities in-theatre by increasing the inventory of gynecological equipment and supplies at centralized locations.
2009	Invest in research and development of equipment designed specifically for use by women. Improved equipment can facilitate the success of women in combat. For example, due to the difficult logistics of urinating while wearing their normally issued clothing and equipment, particularly in austere environments, women often minimize fluid intake, placing them at risk for dehydration and urinary tract infections.
2010	Ensure the timely development and delivery of properly designed and fitting combat-related equipment for women

Year	Recommendation
DACOWITS (continued)	
2012	Establish a means for oversight, collection and dissemination of research, lessons learned and best practices for the health of women. The pre-deployment health assessment for women should provide information on effective urogenital hygiene practices, use of female urinary diversion devices, symptoms and treatment of vaginitis and urinary tract infections, options for birth control and menstrual cycle control. All health care providers should be trained to diagnose and treat women's health issues in a deployed setting in a competent and professional manner, respecting the privacy of the women treated. Inventory and ready availability of equipment and supplies for women's health should be assured in deployed environments, including birth control, emergency contraception, medications for vaginitis and urinary tract infections, tampons and sanitary napkins, and female urinary diversion devices.
2013	Educate women on methods of contraception and make various contraceptive methods available. Ensure properly designed and fitted individual combat equipment is provided to women on an expedited basis.
2015	Require the Services to increase the number and quality of lactation rooms available throughout the Military Services. Issue a policy regarding the proper use and distribution of the computer generated Obstetrics Multidisciplinary Interdisciplinary (OB MultiID) Discharge Summaries and make every effort to eliminate the release of this protected health information.
2016	Issue a policy regarding the proper use and distribution of the computer-generated OB MultiID Discharge Summaries and make every effort to restrict the release of Protected Health Information (PHI).
2018	Require all Military Services, including the Reserve/Guard, to provide servicewomen with gender appropriate and properly fitting personal protective equipment and gear for both training and operational use. To improve their support to active duty women transitioning to the Reserve/Guard or civilian sector by offering programs similar to the Women's Health Transition Pilot Program. Direct the Marine Corps to eliminate the pregnancy references found in the Marine Corps' Performance Evaluation System, which currently identifies a female Marine's health status by using the code "PREG" in the weight section.
2019	Direct the Military Services to implement a holistic preventative health screening, conducted by medical professionals, as part of the overall physical fitness assessment and provide access to uniform and consistent health and nutritional counseling as part of their physical fitness program.

Year	Recommendation
Defense Women's Health Research Program: Committee on Body Composition, Nutrition, and Health of Military Women of the Institute of Medicine[356]	
1998	Revise the two-tiered body composition and fitness screen. The first tier should consist of semiannual assessment of body mass index and fitness. The second tier will be based on BMI and fitness. Individuals whose body fat exceeds 30% and who fail the fitness test will be referred to weight management and fitness programs Develop a single, service-wide, circumferential equation for assessment of women's body fat, to be validated against a four-compartment model using a population of active duty women or population that is identical in ethnic and age diversity to that of military women. Consider developing an appropriate minimum recommended BMI for accession of women Additional research to refine and standardize anthropometric equation for body fat prediction and to validate them against current four-compartment models Increase emphasis on the importance of general fitness for health and readiness by enforcing uniformly across all Services and military occupational specialties (MOSs) regular and monitored participation in a fitness program consisting of a minimum of 3 d/wk of endurance exercise at 60-80% of maximum capacity for 20 to 60 minutes and 2 d/wk of resistance exercise using all major muscle groups at 85% of 1 repetition maximum. Develop task-specific, gender-neutral strength and endurance tests and standards for use in the determination of placement in military occupational specialities that require moderate and heavy lifting. Pursue programs designed to increase strength as well as those seeking to redesign certain tasks along with the development and validation of task-specific, gender-neutral strength tests for use in determining placement in MOSs requiring moderate and heavy lifting. If the military deems appearance standards necessary) Develop and utilize objective criteria that do not discriminate on the basis of ethnicity. Research the incidence and risk factors for stress fracture and other MSKI in ADW. Reinforce the requirement for adequate energy and nutrient intakes to reflect the needs of the body at a moderate activity level (2,000-2,800 kcal/d). All military women maintain or achieve healthy weight through continuous exercise and fitness program. Additional research on the effects of environmental stressors on nutritional status and needs of ADW. Encourage all women to eat an adequate diet during pregnancy and lactation as recommended by the Institute of Medicine (IOM). Pregnant women without obstetrical or medical complications engage in moderate levels of physical activity to maintain cardiovascular and muscular fitness throughout the pregnancy and postpartum period. Endorse the IOM for gestational weight gain.

Year	Recommendation
Defense Women's Health Research Program: Committee on Body Composition, Nutrition, and Health of Military Women of the Institute of Medicine (continued)	
1998	Propose time allowance for compliance to weight and body fat standards postpartum be consistent with IOM recommendations for gestational weight gain. Promote and support breastfeeding among all Service women, where appropriate. Call attention to the persistent anemia and musculoskeletal and cardiovascular changes that may continue in some women postpartum. Increase the length of exemption from deployment from 4 to 6 months postpartum to support postpartum recovery, breastfeeding, and enhanced infant health and development. Train and educate all supervisory personnel on pregnancy policy, as well as a prenatal counseling program for pregnant ADW.
Army Women's Health Task Force White Paper: The Concerns of Women Currently Serving in the Afghanistan Theater of Operations[357]	
2011	Standardize educational training in women's hygiene, contraception management and menstrual cycle control for female Soldier readiness. Incorporate women's health issues into leaders pre-deployment medical briefs to increase awareness and sensitivity to female Soldier health. Create a series of Clinical Practice Guidelines (CPGs) to standardize provider care and implement in garrison and deployed environments. Develop Women in the Military Self Diagnosis (WMSD) kits for UTI/Vaginitis. Provide training and tools for female Soldiers to promote self-diagnosis and care of common gender specific infections. Ensure that there are multiple mechanisms for distribution of Female Urinary Diversion Devices Emphasize research and development on the fit, form, and functionality of uniform and protective gear for female body proportions. Develop deployment and redeployment preparedness programs, policies and behavioral healthcare that are tailored to meet the needs of all women. Explore feasibility of extending the postpartum deferment policy to 12 months. Support further DoD, VA, and academic research efforts on the psychosocial effects of combat on female Service Members.

Year	Recommendation
U.S. GAO Report 13-182: Military Personnel: DoD Has Taken Steps to Meet the Health Needs of Deployed Servicewomen, but Actions are Needed to Enhance Care for Sexual Assault Victims[10]	
2013	Enhance the medical and mental health care for servicewomen who are victims of sexual assault, GAO recommends that DoD develop department-level guidance on the provision of care to victims of sexual assault. Enhance the medical and mental health care for servicewomen who are victims of sexual assault, GAO recommends that DoD Take steps to improve first responders' compliance with the department's requirements for annual refresher training.
OASD HA's House Report 113-446, Page 164: Deployment Health for Women[358]	
2015	Expand the Women's Health Portal (Army Public Health Center). Enhance genitourinary hygiene training for Service women. Further evaluate feasibility of fielding the Women in the Military Self-Diagnosis and Treatment Kit. Expand activities of the PHA work group to include the Post-Deployment Health Reassessment. Examine the feasibility of developing an interactive mobile application to provide ready access to women's health treatment algorithms and educational content. Evaluate whether the Army courses in women's health for leaders at the Noncommissioned Officer and Officer levels should be adapted for use by all Services. Further evaluation of the pre-deployment training for all medical personnel providing direct patient care to women. Identify mechanisms to ensure continued support and updating of the research literature database and to evaluate mechanisms to support the military women's health research agenda.

Appendix J: Service-Specific Physical Fitness Test Components

Army Physical Fitness Standard

The Army recently updated its physical fitness test to a gender-neutral, operationally-specific Army Combat Fitness Test that consists of[359]:

- Deadlifts
- Standing power through
- Hand-release push-up
- Sprint, drag, and carry
- Leg tuck
- 2-mile run

In addition to the basic Army Combat Fitness Test, the Army has a variety of fitness tests to account for the diversity of operational-specific activities of its Soldiers: Army Basic Training physical fitness test, Army Physical Fitness Program, Army Airborne physical fitness test, Army Green Beret Training, and the Army Ranger physical fitness test.[124] Each variation includes different activities tailored for the specifications of the program but with the foundational goal of preparing Service members for combat readiness.

Air Force Physical Fitness Standard

AF policy instruction 36-29 supplements the DoDD 1308.1 guidelines for Airmen. The current AF physical fitness test utilizes the DoD fitness guidelines with the following activities[123]:

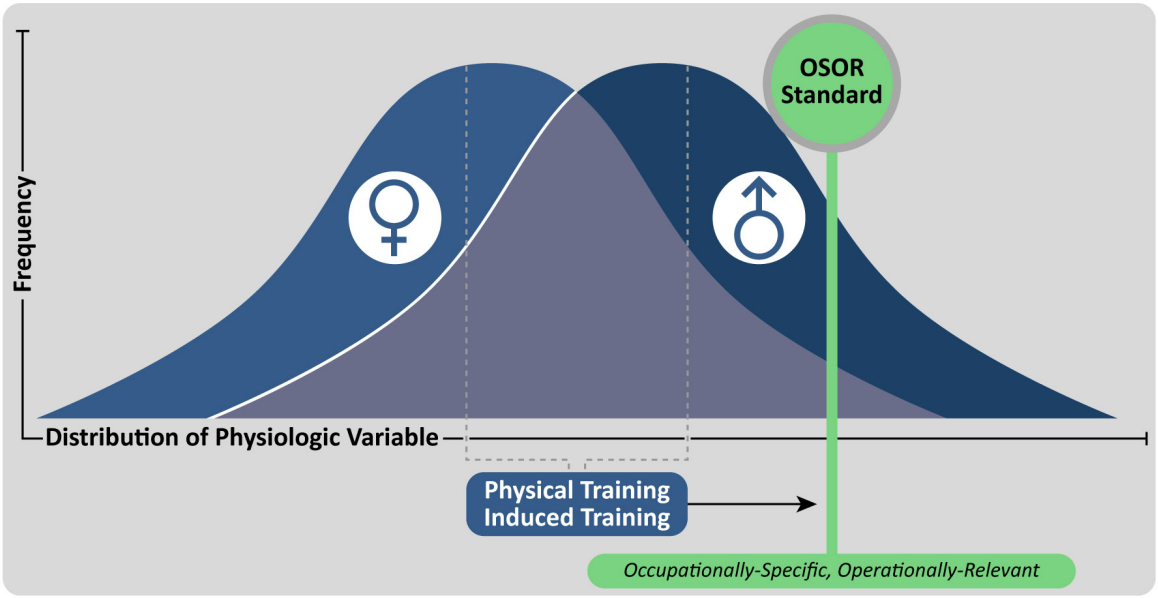
- 1.5-mile run
- 1-minute timed push-ups
- 1-minute timed sit-ups
- Waist circumference measurements

The AF implemented a PT tier system that ensures Airmen receive comprehensive health assessments that monitor overall fitness and health-related risk factors (Figure 19).[123, 360] The health-based Tier 1 system focuses on the five components of physical fitness: cardiorespiratory fitness, body composition, muscular strength, muscular endurance and stability (flexibility/mobility), while Tier 2 focuses on six skill components: agility, balance, coordination, power, reaction time and speed.[361] Tier 2's performance-based structure is occupationally-specific and operationally-relevant (OSOR) and gender, age, rank, ethnicity independent. Tier 1 is occupationally (Military Occupational Specialty) independent and gender dependent. Figure 20 displays the sex-specific difference for reaching the required fitness training standards for Airmen.

Figure 19. Air Force Physical Fitness Assessment Components

Physical Fitness Component	Recruit		Assess		Training		Operations
Power	Standing Long Jump		Med Ball Toss, back/side		Med Ball Toss, back/side		Med Ball Toss, back/side
Agility	Two Cone Drill		Two Cone Drill		Two Cone Drill		Two Cone Drill
Strength	Grip Strength		Grip Strength		Grip Strength		Grip Strength
					Introduce; at end of pipeline test		Trap Bar DL (5RM)
Endurance	Lunges-wtd, 50 lbs		Lunges-wtd, 50 lbs		Lunges-wtd, 50 lbs		Lunges-wtd, 50 lbs
	Pull-Up (6,8)		Pull-Up (7,10)		Pull-Up (8,12 / 9,14 / 11,17)		Pull-Up (11,17)
	Extended Cross Knee Crunch		Extended Cross Knee Crunch		Extended Cross Knee Crunch		Extended Cross Knee Crunch
Anaerobic	Shuttle Run, 300 yd		Farmer's Carry, 100 yd		Farmer's Carry, 100 yd		Farmer's Carry, 100 yd
Aerobic			Row Ergometer, 1000 m		Row Ergometer, 1000 m		Row Ergometer, 1000 m
	Run, 1.5 mile		Run, 1.5 mile		Run, 1.5 mile *(Tier 1)*		Run, 1.5 Mile *(Tier 1)*
SAT at MEPS	R1 Initial	R2 Pre-ship	A1 BMT WOT 0	A2 BMT - TT	T1 Intermediate	T2 Graduation	Operation Periodic with Random

Figure 20. Conceptual Map of the Relationship between Gender and Occupationally-Specific, Operationally-Relevant Standards



The Air Force developed easy-to-administer fitness assessments that correlate to operationally-specific job functions.[360] Only two tests, similar to two of the Marine Corps' Combat Fitness Test components, had the validity and reliability to serve as indicators for Air Force combat fitness and physical readiness: the 1.5-mile run and the repetitive dumbbell lift.[360]

Navy Physical Fitness Standards

Prior to completing the Navy Physical Fitness Assessment, Sailors must first meet body composition requirements, first with age and gender-specific height and weight standards, and then, if those standards are not met, with a body fat estimation using abdominal and neck circumference.[126] The Navy Physical Fitness Assessment consists of the following assessments[127]:

- Sit-ups in 2 minutes
- Push-ups in 2 minutes
- 1.5-miles run or 500-meter swim

Several alternative aerobic fitness tests are available, including use of elliptical and rowing machines. The Navy has re-evaluated its physical fitness assessment over the last two decades and made changes to decrease injuries (modification of arm position during sit-ups similar to the Air Force method), increase participation (alternative aerobic fitness tests), encourage improvement (linking overall score to the lowest individual score, allowing annual instead of bi-annual assessments for high performance), and better assess individual fitness components (planned substitute of the plank maneuver for sit-ups.[127]

Similar to the Army, the Navy developed the Navy Operational Fitness Test as an additional assessment that focuses on combat ready physical fitness, health and performance-related fitness, and reflects battlefield objectives.[126, 127] The Navy Operational Fitness Test consist of:

- 40-yard dash
- Standing long-jump
- Kneeling powerball toss
- 300-yard shuttle run
- 50-yard loaded carry

Marine Corps Physical Fitness Standards

Compared to the other Services, the Marine Corps physical fitness test is the most physically demanding and consists of[125, 362]:

- 3-mile run
- Abdominal crunches or planks
- Dead-hand pull-ups or push-ups

By 2008, the Marine Corps implemented a new component in conjunction with the physical fitness test, the combat fitness test, to better assess female and male Marines' operational fitness. The new combat fitness test includes the following weighted activities[362]:

- Movement to Contact: 880-yard run in combat boots and full battle dress uniform
- Ammunition Lift: lifting 30-pound ammunition over head for 2 minutes
- Maneuver under Fire: 300-yard obstacle course

Appendix K: Women Gradated Exertion Table – The Physiological Exertion Parameters for Proper Physical Training in the Israeli Defense Force: Guidelines for Female Soldiers

Women	Maximum Distance (km)											
Effort Level	Total Weekly Distance*			Single Efforts								
				Standing (hours)		Marches			Running			
	Full	Reduced	Over-reduced	Max Continuous Standing	Max Daily Standing	Regular up to 5 KpH	Fast up to 7 KpH	Stretcher up to 3 KpH	Regular	Sprinting (Total Volume)	With Gear (no more than 25% BW)	Stretcher any speed
A	B	C	D	E	F	G	H	I	J	K	L	M
1	M-15%	M-15%	M-15%	0^{15}	1^{00}	2	-	-	0.5	-	-	-
2	M-15%	M-15%	M-15%	0^{20}	1^{15}	3	-	0.5	1	0.4	0.25	-
3	M-15%	M-15%	M-15%	0^{25}	1^{20}	4	-	0.75	1.5	0.6	0.5	-
4	M-15%	M-15%	M-15%	0^{30}	1^{30}	5	-	1	2	0.7	0.5	-
5	M-15%	M-15%	M-15%	0^{35}	1^{40}	7	-	1.5	2	0.8	0.75	-
6	M-15%	M-15%	M-15%	0^{40}	1^{50}	9	-	2	2.5	1	1	-
7	M-15%	M-15%	M-15%	0^{45}	2^{00}	11	-	2	3	1.2	1.5	0.1
8	M-15%	M-15%	M-15%	0^{50}	2^{10}	14	7	3	3.5	1.4	1.5	0.2
9	M-15%	M-15%	M-15%	0^{55}	2^{20}	17	8	4	4	1.6	2	0.3
10	M-15%	M-15%	M-15%	1^{00}	2^{30}	20	10	5	4.5	1.9	2	0.4
11	M-15%	M-15%	M-15%	1^{05}	2^{40}	24	12	6	5	2.2	2.5	0.7
12	M-15%	M-15%	M-15%	1^{10}	2^{50}	28	14	7	6	2.6	3	1
13	M-15%	M-15%	M-15%	1^{15}	3^{00}	32	16	8	7	3	3.5	1.3
14	M-15%	M-15%	M-15%	1^{20}	3^{10}	37	18	9	8	3.4	4	1.6
15	M-15%	M-15%	M-15%	1^{25}	3^{20}	42	21	10.5	9	3.9	5	2
16	M-15%	M-15%	M-15%	1^{30}	3^{30}	48	24	12	10	4.4	6	2.5
17	M-15%	M-15%	M-15%	1^{35}	3^{45}	54	27	13.5	11	4.9	7	3
18	M-15%	M-15%	M-15%	1^{40}	4^{00}	60	30	15	12	5.5	8	3.5

*M-15 refers to kilometers on the male gradated exertion table minus 15%

Appendix L: Meetings and Presentations

September 16, 2019: Health Care Delivery Subcommittee Meeting
Falls Church, VA

The Subcommittee met in person and received briefings from military and civilian subject matter experts (SMEs) on military women's health. The Subcommittee members reviewed the tasking and discussed an outline for the report.

The SMEs who briefed at the meeting:

- Dr. Patricia Deuster, Consortium for Health and Military Performance (CHAMP) and Human Performance Resource Center (HPRC), USUHS
- Dr. Dorothy Fink, Office on Women's Health, DHHS
- Dr. Kate McGraw, Psychological Health Center of Excellence, DHA
- Dr. Richard Mooney, Health Services Policy and Oversight (HSP&O), OASD(HA)
- Dr. Timothy Roberts, Adolescent Medicine, Children's Mercy
- COL (Ret.) Lori Trego, Women's Health, United States Army

November 4, 2019: Defense Health Board Meeting
Tacoma, WA

The DHB, met in person and received briefings from military SMEs on women's health services and initiatives at Joint Base Lewis McChord.

The SMEs who briefed at the meeting:

- BG Jack Davis, Regional Health Command Pacific Market, US Army Nurse Corps
- LTC Kevin Goke, Department of Behavioral Health, Madigan Army Medical Center
- CAPT Shannon Johnson, Medical Service Corps, Naval Hospital Bremerton
- Col Robert McCoy, 62nd Medical Squadron, United States Air Force
- COL Scott Roofe, Otolaryngology, Madigan Army Medical Center
- LTC Leilani Siaki, Center for Nursing Science and Clinical Inquiry, Madigan Army Medical Center

November 22, 2019: Health Care Delivery Subcommittee Meeting Video Teleconference

The Subcommittee met virtually and received briefings from military and civilian SMEs on musculoskeletal injury prevention. The military SMEs provided data and background on epidemiology and surveillance of injury within the Services and the civilian SMEs provided information on practical applications for injury prevention and rehabilitation of collegiate-level and professional female athletes.

The SMEs who briefed at the meeting:

- Ms. Julie Beveridge, Athletic Training, Washington Spirit Professional Women's Soccer Team
- Dr. Theresa Casey, Trainee Health Surveillance, United States Air Force

- Dr. Michelle Chervak, Injury Prevention, US Army Public Health Center
- Dr. Thomas Cropper, Trainee Health Surveillance, United States Air Force
- Dr. Bruce Jones, Injury Prevention, US Army Public Health Center
- Dr. Brian Sennett, Department of Orthopedic Surgery, University of Pennsylvania
- Dr. Daniel Trone, Deployment Health Research Department, Naval Health Research Center

January 24, 2020: Health Care Delivery Subcommittee Meeting
San Antonio, TX

The Subcommittee met in person at Joint Base San Antonio (JBSA) and received briefings from military and civilian SMEs on topics related to the current tasking. The Subcommittee visited the dining facilities, dormitories, and other USAF training areas at JBSA-Lackland and toured the infertility clinic at San Antonio Military Medical Center (SAMMC).

The SMEs who briefed at the meeting:

- Dr. Neal Baumgartner, Air Force Exercise Science Unit, US Air Force Personnel Center
- Col Rebecca Blackwell, 59th Medical Wing, United States Air Force
- Dr. Theresa Casey, Trainee Health Surveillance, United States Air Force
- Dr. Thomas Cropper, Trainee Health Surveillance, United States Air Force
- Col Stephen Donaldson, 59th Medical Wing, United States Air Force
- Capt Zachary Fetterman, Clinical Psychology, 59th Training Group, United States Air Force
- Maj Dianne Frankel, Trainee Health Surveillance, United States Air Force
- Capt Korey Kasper, Sports Medicine, 559th Medical Squadron, United States Air Force
- Dr. Laura Munro, Air Force Basic Military Training, United States Air Force
- Col Patrick Osborn, Residency Program, Brooke Army Medical Center
- Col Greene Royster, IV, Reproductive Endocrinology and Infertility, San Antonio Military Medical Center
- CMSgt Keith Scott, 59th Medical Wing, United States Air Force
- CMSgt Sarah Sipe, 331st Training Squadron, United States Air Force
- Lt Col Joshua Smalley, Adolescent Medicine, 59th Medical Wing, United States Air Force
- Lt Col Dalia Wenckus, Obstetrics and Gynecology, San Antonio Military Medical Center

February 10, 2020: Defense Health Board Meeting
Falls Church, VA

The DHB met in person and received briefings from Foreign Service Liaisons on topics related to the current tasking. The liaisons were LCol Andrew Currie, Canada; LTC Shoko Edogawa, Japan; COL Raphael Grippi, France; COL Kai Schlolaut, Germany; and COL Chris Wright, United Kingdom, who briefed on their country's various women's health programs within the military. CAPT Kimberly Elenberg, Public Health Division, DHA, briefed on the TFF Framework. Dr. Parkinson provided an update of the tasking to the DHB.

March 30, 2020: Health Care Delivery Subcommittee Meeting Video Teleconference

The Subcommittee met virtually and received briefings from military and civilian SMEs on military women's health and musculoskeletal injury prevention.

The SMEs who briefed at the meeting:

- Capt Sarah Berheide, Air Force Women's Initiative Team, 316th Medical Group
- Dr. Elizabeth Kostas-Polston, Nursing, USUHS
- CDR Shannon Lamb, Office of Women's Health, Navy Bureau of Medicine and Surgery
- Maj Alea Nadeem, Air Force Women's Initiative Team, Air Force Reserves
- Capt Samantha Sliney, Air Force Legal Operations Agency, Trial Defense Division
- TSgt Natalia Wood, Air Force Women's Initiative Team, 20th Maintenance Group

April 28, 2020: Health Care Delivery Subcommittee Meeting Video Teleconference

The Subcommittee met virtually received briefings from military and civilian SMEs on eating disorders of ADW. LTC John Campagna, Adolescent and Young Adult Medicine, SAMMC, provided the epidemiology of eating disorders of women in the military. Dr. Kimberly Dennis, SunCloud Health, briefed on treating ADW for eating disorders at a private health care facility.

May 18, 2020: Defense Health Board Meeting Video Teleconference

The Subcommittee Chair provided a tasking update brief to the DHB Members. The DHB members discussed the report development progress.

May 20, 2020: Health Care Delivery Subcommittee Meeting Video Teleconference

The Subcommittee met virtually and discussed sections of the report. Dr. Brigid McCaw briefed the members on intimate partner violence.

June 17, 2020: Health Care Delivery Subcommittee Meeting Video Teleconference

The Subcommittee met virtually and discussed sections of the report. There were no briefings at this meeting.

July 8, 2020: Health Care Delivery Subcommittee Meeting Video Teleconference

The Subcommittee met virtually and discussed sections of the report. There were no briefings at this meeting.

July 30, 2020: Health Care Delivery Subcommittee Meeting Video Teleconference

The Subcommittee met virtually and discussed sections of the report. There were no briefings at this meeting.

August 7, 2020: Defense Health Board Meeting Video Teleconference

The Subcommittee Chair provided a tasking update brief to the DHB Members. The DHB members discussed the report development progress.

August 27, 2020: Health Care Delivery Subcommittee Meeting Video Teleconference

The Subcommittee met virtually and discussed sections of the report. There were no briefings at this meeting.

September 10, 2020: Health Care Delivery Subcommittee Meeting Video Teleconference

The Subcommittee met virtually and discussed sections of the report. There were no briefings at this meeting.

September 24, 2020: Health Care Delivery Subcommittee Meeting Video Teleconference

The Subcommittee met virtually and discussed sections of the report. There were no briefings at this meeting.

October 8, 2020: Health Care Delivery Subcommittee Meeting Video Teleconference

The Subcommittee met virtually and discussed the findings and recommendations of the report. There were no briefings at this meeting.

October 22, 2020: Health Care Delivery Subcommittee Meeting Video Teleconference

The Subcommittee met virtually and discussed the report. There were no briefings at this meeting.

November 5, 2020: Defense Health Board Meeting Video Teleconference

The Subcommittee Chair provided a decision brief to the DHB members. The DHB voted to approve the report and its findings and recommendations.

Appendix M: Glossary

ACL: Anterior Cruciate Ligament

ACRWH: Advisory Committee on Research on Women's Health

ACWV: Advisory Committee on Women Veterans

ADM: Active Duty Men

ADSM: Active Duty Service Member

ADW: Active Duty Women

AFWIT: Air Force Women's Initiative Team

AN: Anorexia Nervosa

AR: Army Regulation

AUDIT-C: Alcohol Use Disorders Identification Test-Concise

AWC: Army Wellness Centers

BHDP: Behavioral Health Data Portal

BHM-20: Behavioral Health Measure

BHT: Behavioral Health Technician

BMI: Body Mass Index

BN: Bulimia Nervosa

CC: Clinical Community

CCRWH: Coordinating Committee on Research on Women's Health

CDC: Center for Disease Control and Prevention

CHAMPS: Career History Archival Medical and Personnel System

CPG: Clinical Practice Guidelines

DACOWITS: Defense Advisory Committee on Women in the Services

DEXA: Dual Energy X-Ray Absorptiometry

DHA: Defense Health Agency

DHB: Defense Health Board

DHHS: Department of Health and Human Services

DNA: Deoxyribonucleic Acid

DNPAO: Division of Nutrition, Physical Activity, and Obesity

DWHRP: Defense Women's Health Research Program

DoD: Department of Defense

DoDD: Department of Defense Directive

DoDI: Department of Defense Directive

DTM: Directive-Type Memorandum

EPDS: Edinburgh Postnatal Depression Scale

FAP: Family Advocacy Program

FDA: Food and Drug Administration

FITT-VP: Frequency, Intensity, Time, Type, Volume, and Progression

FUDD: Female Urinary Diversion Device

FY: Fiscal Year

GAD: General Anxiety Disorder

GAO: Government Accountability Office

HA: Health Affairs

HA-WHIWG: Health Affairs Women's Mental Health Workgroup

HCD: Health Care Delivery

HEDIS: Healthcare Effectiveness Data and Information Set

HIV: Human Immunodeficiency Virus

HOF: Health of the Force

HPV: Human Papilloma Virus

HRO: High Reliability Organization

HRQoL: Health related Quality of Life

HRBS: Health-Related Behaviors Survey

HRSA: Health Resources and Services Administration

HSP&O: Health Services Policy and Oversight

ICD-9-CM: International Classification of Diseases, Ninth Revision, Clinical Modification

ICD-10-CM: International Classification of Diseases, Tenth Revision, Clinical Modification

IDF: Israeli Defense Force

IOM: Institute of Medicine

IPV: Interpersonal Violence

IQI: Inpatient Quality Indicators

JEC: Joint Executive Committee

LARCs: Long-Acting Reversible Contraceptives

LTG: Lieutenant General

METs: Mission Essential Tasks

MG: Major General

MHS: Military Health System

MHSPHP: Military Health System Population Health Portal

MOTION: Military Orthopedics Tracking Injuries and Outcomes Network

MSKI: Musculoskeletal Injury

MTF: Military Treatment Facility

MWHRIG: Military Women's Health Research Interest Group

NCAA: National Collegiate Athletic Association

NCCCDPHP: National Center for Chronic Disease Prevention and Health Promotion

NCHHSTP: National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention

NCQA: National Committee for Quality Assurance

NCR: National Capital Region

NDAA: National Defense Authorization Act

NIH: National Institutes of Health

NIOSH: National Institute for Occupational Safety and Health

NOM: National Outcome Measures

NPIC: National Perinatal Information Center

NPM: National Performance Measures

NSQIP: National Surgical Quality Improvement Program

NSSI: Non-Suicidal Self-Injury

OASD: Office of the Assistant Secretary of Defense

OIF: Operation Iraqi Freedom

OPM: Office of Personnel Management

ORWH: Office of Research on Women's Health

OSOR: Operationally-Specific and Operationally-Relevant

OWH: Office of Women's Health

PASTOR: Pain Assessment Screening Tool and Outcomes Registry

P3T: Pregnancy Postpartum Physical Training

PC-PTSD-5: Primary Care PTSD Screen

PCL: PTSD Checklist

PFA: Physical Fitness Assessment

PFT: Physical Fitness Test

PHA: Periodic Health Assessment

PHQ: Patient Health Questionaire

PINC: Process Improvement for Non-delayed Contraception

PQI: Patient Quality Indicator

PROCR: Patient Reported Outcomes and Clinical Record

PROM: Patient Reported Outcome Measures

PSI: Patient Safety Indicator

PT: Physical Training

PTSD: Post-Traumatic Stress Disorder

QPP: Quadruple Aim Performance Process

RAINN: Rape, Abuse, and Incest National Network

SAMHSA: Substance Abuse and Mental Health Services Administration

SAPR: Sexual Assault Prevention and Response

SAPR VA: Sexual Assault Prevention Response Victim Advocates

SARC: Sexual Assault Response Coordinator

SHARP: Sexual Harassment and Assault Response Program

SMART: Sports Medicine and Reconditioning Team

SME: Subject Matter Experts

SMM: Severe Maternal Morbidity

SSI: Sport Science Institute

STI: Sexually Transmitted Infections

TBI: Traumatic Brain Injury

TC: Training Circular

TFF: Total Force Fitness

TJC: The Joint Commission

TSNRP: TriService Nursing Research Program

TWH: Total Worker Health

USUHS: Uniformed Service University of Health Sciences

U.S.: United States

UTI: Urinary Tract Infection

VA: Veteran's Affairs

VBAC: Vaginal Birth After Cesarean

VHA: Veteran's Health Administration

VIPER: Versatile Injury Prevention and Embedded Reconditioning

WHTF: Women's Health Task Force

WICC: Women and Infants Clinical Community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