

Using Periodic Health Assessments to Assess Unmet Need for Contraception and Subsequent
Risk of Unintended Pregnancy Among Active-Duty Service Women in the U.S. Army

Jeremy Mandia

A thesis

submitted in partial fulfillment of the
requirements for the degree of

Master of Public Health

University of Washington

2024

Committee:

Paul Drain

Ronit Dalmat

Program Authorized to Offer Degree:

Department of Global Health

©Copyright 2024

Jeremy Mandia

University of Washington

Abstract

Using Periodic Health Assessments to Assess Unmet Need for Contraception and Subsequent Risk of Unintended Pregnancy Among Active-Duty Service Women in the U.S. Army

Jeremy Mandia

Chair of the Supervisory Committee:

Paul Drain

Department of Global Health

Introduction: The increasing representation of women in the military, and over 97% of Active-Duty Service Women (ADSW) of reproductive age, there is a need for effective contraception services for women. Despite universal healthcare coverage, including no-cost contraception, a significant proportion of ADSW experience unmet contraception needs, leading to higher rates of unintended pregnancies. This study examines the effectiveness of the Periodic Health Assessment (PHA) as a tool for identifying and addressing ADSW's contraception needs within the Military Health System (MHS).

Methods: A retrospective cohort study was conducted among ADSW in the Regular Army from August 31, 2021, to August 31, 2023. Data from the Armed Forces Health Surveillance Division's Defense Medical Surveillance System database was analyzed, including PHAs,

electronic health records, and pharmacy records. Inclusion criteria for the study were being female sex, serving in the RA, being over 18 years of age but under 46 years old at the time of initial PHA, and completing two or more PHAs during the study period. Contraception need was determined based on PHA survey responses, categorizing ADSW into groups either having met or unmet contraception needs, based on responses to PHA questions on pregnancy desire, sexual practices, and contraception.

Results: Out of 23,015 ADSW included in the study, 46.4% expressed a need for contraception. Among those, 25.3% had an unmet need within the MHS. ADSW with an unmet need for contraception experienced a 2.45 times higher rate of unintended pregnancy compared to those with met need. The study also revealed racial, rank, and occupational disparities in contraception access. Less than half of the women who expressed a desire for contraception services on their PHA received counseling. The mean duration from PHA completion to contraception counseling was 114 days.

Conclusions: This study describes a critical gap in contraception services provided for ADSW within the MHS, despite the availability of universal healthcare. The PHA has potential as a valuable tool for improving contraception access and suggests that optimizing its use could significantly reduce unintended pregnancy rates in the military population. Addressing the identified disparities and systemic barriers to contraception access may be essential for enhancing reproductive health services and supporting military readiness.

Introduction:

Women are the fastest-growing demographic in the U.S. Military (Wolf, 2022). In 2021 women made up 17.3% of the active-duty force and 21.4% of the Reserve and National Guard, comprising 231,741 and 171,000 Service Members, respectively (DoD, 2023). Over 97% of Active-Duty Service Women (ADSW) are of reproductive age (Ibis Reproductive Health, 2017). Stahlman et al. (2016) found that 13.1% of ADSW of childbearing age had at least one pregnancy event per year. Pregnancy was highest among those 30-34 years old, enlisted or junior officer rank, and those who served in the Army. Notably, women serving in the Army are less likely to receive contraception than those serving in other branches of the U.S. military (Wilkop et al, 2017). Lack of contraception access represents both a personal health issue and military readiness concern. Military service is unique as it provides healthcare benefits including medical visits and contraception at no cost to ADSW. Despite having universal health care, one in 15 ADSW experiences unintended pregnancy annually, with 41% of ADSW reporting not using birth control at the time of conception (Grindlay & Grossman, 2015).

The World Health Organization (WHO) links unintended pregnancies to gaps in a healthcare system's family planning services (Bellizzi et al., 2020). Unintended pregnancy has been shown to impact a woman's mental health negatively (Bahk et al., 2015). Congress has directed the creation of contraception care clinical guidelines (Title 10 U.S.C § Chapter 55), and the newly created Defense Health Agency (DHA) has mandated that, at a minimum, contraception counseling occur yearly at well-health visits (DHA, 2019). The U.S. Department of Defense (DoD) mandates that every Service Member complete a periodic health assessment (PHA) every 12 months. The PHA is a web-based screening tool followed by a face-to-face healthcare provider visit (Office of the Under Secretary of Defense for Personnel and Readiness,

2018). Linking contraceptive counseling to the DoD's annual PHA is a method to capture all ADSW at risk for unintended pregnancy, with the opportunity to maximize contraception education, counseling, and delivery if indicated.

Despite these mandates, the Military Health System (MHS) does not utilize PHA encounters as a method to screen ADSW for contraception needs and/or family planning medical services. Also, the proportion of women who have received contraception counseling after self-identifying on their PHA is unknown. In August 2021, the PHA screening questionnaire was updated so it can now be used to ascertain a woman's need for contraception and whether the MHS is meeting that need. Determining unmet needs helps quantify the disparity between women's reproductive intentions and contraceptive behaviors (WHO, 2022). This study quantifies the number of ADSW with an unmet need based on PHA responses and determines the subsequent risk of unintended pregnancy.

Methods:

This retrospective cohort study was conducted with ADSW in the Regular Army (RA) from August 31, 2021, to August 31, 2023. Data were obtained from the Armed Forces Health Surveillance Division Defense Medical Surveillance System database, including PHAs, electronic health records (EHR) with ICD-10 codes, pharmacy and Tricare drug dispensing data, Post Deployment Health Assessments, and active deployment rosters.

Inclusion criteria for the study were being female sex, serving in the RA, being over 18 years of age but under 46 years old at the time of initial PHA, and completing two or more PHAs during the study period. Exclusion criteria were being a Reservist or National Guardswoman during the study period, if a second PHA occurred nine months before or greater than 15 months

after the index PHA, or omitting responses to the contraception question (section VII question 22) of the PHA.

Contraception need was defined based on survey responses during their annual PHA. ADSW were classified as not needing contraception based on affirmative responses stating they either were pregnant, intended to get pregnant, had their uterus and cervix removed, were postmenopausal, and/or were either not sexually active or in a same-sex relationship. An ADSW was classified as in need of contraception if they endorsed having a uterus and cervix, being sexually active, not in a same-sex relationship, and not currently pregnant or trying to conceive.

All ADSW classified as needing contraception were subdivided into either having a met need or unmet need from the MHS. ADSW were classified as having their contraception needs met if they were utilizing one of the following methods: sterilization (vasectomy, tubal ligation, or trans-cervical hysterectomy); long-acting reversible contraceptives (LARCs), including hormonal or copper intrauterine devices (IUDs), hormonal implants, or injectables; short-acting reversible contraceptives (SARCs), such as birth control pills, the hormonal contraception patch, or vaginal rings; or barrier methods, including condoms or diaphragms. ADSW with unmet need for family planning were those who were fecund, sexually active, not using any method of contraception, and reported not wanting additional children. ADSW utilizing levonorgestrel emergency contraception (Plan B), withdrawal method, rhythm by calendar or temperature method, and/or cervical mucus testing without another effective method of birth control were classified as having unmet need (*Appendix 1*).

The prevalence of contraception use at the time of PHA was stratified by category of need (met vs. unmet) for comparison. Univariate and multivariate logistic regression analyses were used to determine the odds of ADSW having met need based on individual characteristics

alone and together, including age, race, rank, occupation, deployment history, alcohol use, and prior pregnancy scare. Pregnancy scare was determined if ADSW responded yes to the following PHA prompt: “*You or your partner had a pregnancy scare, where you were not trying to get pregnant but were worried enough to use a home pregnancy test.*” Demand for contraception was determined if ADSW answered yes to the PHA question “*Do you wish to receive contraceptive counseling?*” Completed contraception counseling was determined by the appearance of an ICD-10 code associated with contraception management in the EHR (*Appendix 1*). Time to counseling was calculated from the first PHA to the appearance of the first contraception ICD-10 code in EHR, pregnancy, or exit from the cohort. The incidence of unintended pregnancy in person-days was similarly calculated within each of these groups. Time at risk was defined for each individual as the duration between the date of the initial PHA to either the pregnancy event or the next PHA completion date, whichever occurred first (*Appendix 1*).

Results:

A total of 23,015 ADSW met the inclusion criteria and were included in our analysis. The mean age across all individuals was 27.5 (SD 6.5) years. The cohort was racially and ethnically diverse but was prominently White (38.2%), Black/African American (28.7%), and Hispanic (20.8%). Over 75% were enlisted, with junior soldiers making up 43% of the total cohort. Junior officers were a substantial minority, accounting for almost 19% of the cohort. The cohort also spanned various occupations, with the two most common being communications/intelligence (30.3%) and healthcare (26.7%). Past deployment was reported by 22.3%, and alcohol

consumption patterns indicated that the majority drank once a week or less (57.3%), with a notable portion engaging in binge drinking (25.4%).

Overall, 46.4% (11,679/23,015) of ADSW expressed a need for contraception based on PHA responses. According to our definition, 25.3% (1,955/11,679) of ADSW with a contraception need were classified as having an unmet need for contraception by the MHS. Racial and ethnic composition varied with White individuals being more represented in the met need group. Conversely, Black/African American representation is higher in the unmet need group. A higher proportion of enlisted ADSW comprised the unmet contraception need groups while officers demonstrated a contrasting pattern, with their largest representations in the met contraception need group. ADSW who reported a pregnancy scare were nearly twice as likely in the unmet need group (12.2%) compared to the met need group (6.4%).

Results of univariate logistic regression show race, rank, occupation, perception of future deployment, and endorsement of binge drinking were associated with unmet need for contraception (*Table 2*). However, the association between future deployment status, binge drinking, and having an unmet contraceptive need was not significant after adjustment for the other four characteristics. ADSW identifying as White have a higher likelihood of having their contraceptive need met, compared to those identifying as non-White, adjusted for grade and occupation. Adjusted for race and occupation, low-ranking officers have a significantly higher likelihood of having their contraceptive needs met, compared to other ranks (*Table 3*).

We identified a total of 682 pregnancies in ADSW who endorsed a need for contraception on the annual PHA over 4,061,584 person-days at-risk. ADSW with an unmet need for contraception had a 2.45 times higher rate of unintended pregnancy (3.28 pregnancies vs. 1.34 pregnancies per 10,000 person-days) when compared to ADSW with a met need for

contraception. Pregnancy incidence rates were lowest in ADSW endorsing sterilization (0.22 per 10,000 person-days) and highest in ADSW endorsing the rhythm method (4.44 per 10,000 person-days) (*Table 4*).

Almost 3% (650/23,015) of ADSW expressed a desire for contraception services on their annual PHA. However, less than half (312/650) had a record of a subsequent contraception counseling event marked by a contraception ICD-10 code appearing in the EHR. Mean time from PHA to counseling onset was 114 days, with only 30% of ADSW receiving counseling within the MHS goal for referrals of 30 days.

Discussion:

Our study provides a comprehensive analysis of contraception needs and risks for unintended pregnancy among ADSW in the RA. Despite universal healthcare benefits and contraception access offered at no cost, 25.3% of ADSW with a need for contraception did not have this need met by the MHS. Our study found that these ADSWs with an unmet need for contraception service had a 2.45-fold higher risk of unintended pregnancy compared to those with a met need for contraception. This finding aligns with earlier research linking contraception access to unintended pregnancy risk (Grindlay & Grossman, 2015; Bellizzi et al., 2020).

Analysis of the 2018 Health Related Behaviors Survey found that 32% of ADSWs at risk of unintended pregnancy did not use contraception during most-recent vaginal sexual intercourse (Meadows et al., 2021), and 5.6% of Servicewomen reported unintended pregnancy (Hamrick et al. 2023).

Grindlay and Grossman (2020) identified socioeconomic barriers as a main factor inhibiting women from accessing contraception. Their analysis found that 41% of women

endorsed financial impediments, inability to access medical providers, or other access-related issues as obstacles to obtaining contraception. A U.S. military population theoretically should have lower economic and access-related barriers to contraception given the universal access to health insurance (Tricare), which provides all medical services and prescriptions at no cost. Additionally, our study cohort attended at least two PHA appointments, suggesting at least some accessibility to medical appointments. Despite this, our analysis found disparities in contraception access by race and military rank (a surrogate measure for socioeconomic status). This suggests that the MHS may have non-economic barriers to care access.

Our finding that just 48% of women who indicated a need for contraception counseling on their PHA form received this counseling, with an average wait time of 114 days, underscores the presence of systemic barriers to care access in the MHS. Work by Seymour et al. (2018), which involved interviewing ADSW who recently obtained an abortion, identified multiple barriers to contraception in the MHS. Specifically, inadequate counseling, structure and functioning of the MHS, and the demands of military service impeded care. Another barrier to accessing care is that ADSWs often report discomfort when seeking permission from their supervisors to obtain time off work to seek medical care (Thomson & Nielsen, 2006). Utilizing the PHA—a mandatory annual health screening tool for all Service Members—to improve contraception access would address many of these barriers to care. Changes in regulations that mandate military providers to counsel and provide access to contraception during the PHA appointment may increase contraception adoption and decrease unintended pregnancy rates in the ADSW population.

This research is significant as it is the first use of the DoD's mandatory PHA as an instrument to measure contraception needs and usage in ADSW. The strength of this approach is

that it incorporates a large sample size and represents all members of the U.S. Army. The sample size of over 10,000 participants gives this study the power to detect small differences in pregnancy rates between groups. The primary limitation of this study is that PHA data used to classify contraception status are self-reported, which may be subject to response and recall biases. Additionally, women who seek contraception care outside of the MHS may not be captured by our methodology, which could potentially lead to either misclassification of contraception status (i.e., underestimate of met need) or outcome (i.e., missed pregnancy event). Abortion services are limited in the MHS due to federal law banning federal funding for abortion services (Hyde Amendment, 1976), which means the incidence of pregnancy among women is likely an underestimate in both exposure groups. We attempted to address potential exposure misclassification by validating PHA responses with contraception medication recorded in the EHR. However, only a third of responses were able to be validated, with about half of respondents who endorsed having a met need with evidence of a current prescription identified in their EHR. Also, as an annual questionnaire, the PHA does not account for the nuanced nature of contraception and fertility desires which are dynamic and may change between PHA responses.

This study provides important empirical evidence of women's reproductive health access in the U.S. military. Unintended pregnancies among ADSW have implications not only for individual soldiers' health but also for military readiness. Given that abortion services are no longer federally available, future research should investigate heterogeneity by geography, given the state-by-state limitations to abortion access and no access to the MHS. Optimizing contraception access by ensuring providers address annual PHAs provides a method to remove barriers to contraception access.

Conclusion:

ADSW with unmet contraception need experienced a 2.45 times greater risk of unintended pregnancy compared to ADSW with met need. Despite the presence of universal healthcare, factors such as race, rank, and occupation are significantly associated with disparities in contraception care in the MHS. Optimizing contraception access through the military's annual PHA is a current tool to address potential barriers to equal access to contraception care and reduce unintended pregnancies in the Military population.

Reference:

- Bahk, J., Yun, S.C., Kim, Ym. *et al.* Impact of unintended pregnancy on maternal mental health: a causal analysis using follow up data of the Panel Study on Korean Children (PSKC). *BMC Pregnancy Childbirth* **15**, 85 (2015). <https://doi.org/10.1186/s12884-015-0505-4>
- Bellizzi, S., Mannava, P., Nagai, M., & Sobel, H. L. (2020). Reasons for discontinuation of contraception among women with a current unintended pregnancy in 36 low and middle-income countries. *Contraception*, *101*(1), 26–33. <https://doi.org/10.1016/j.contraception.2019.09.006>
- DD Form 3024, Annual Periodic Health Assessment 13–13 (2021). Washington, DC; Department of Defense. Retrieved September 11, 2022, from <https://www.esd.whs.mil/Portals/54/Documents/DD/forms/dd/dd3024.pdf>
- DD Form 2975, Pre-Deployment Health Assessment (2015). Washington, DC; Department of Defense. Retrieved September 11, 2022, from <https://www.esd.whs.mil/Portals/54/Documents/DD/forms/dd/dd2795.pdf>
- DD Form 2976, Post-Deployment Health Assessment (2015). Washington, DC; Department of Defense. Retrieved September 11, 2022, from: <https://www.esd.whs.mil/Portals/54/Documents/DD/forms/dd/dd2796.pdf>
- Department of Defense. (2023, December 14). Department of Defense releases annual demographics report — Upward trend in number of women serving continues. Retrieved from <https://www.defense.gov/News/Releases/Release/Article/3246268/department-of-defense-releases-annual-demographics-report-upward-trend-in-numbe/>
- Defense Manpower Data Center. (2021). Active duty military personnel by service branch, rank/grade, gender, and component [Data file]. Retrieved from https://www.dmdc.osd.mil/appj/dwp/dwp_reports.jsp
- Grindlay, K., & Grossman, D. (2015). Unintended pregnancy among active-duty women in the United States Military, 2011. *Contraception*, *92*(6), 589–595. <https://doi.org/10.1016/j.contraception.2015.07.015>
- Hamrick, J. E., Ahmed, A. E., Witkop, C. T., Manetz, K. E., & Mancuso, J. D. (2023). Unintended pregnancy among U.S. military active duty servicemembers: Estimates for 2018 and trends since 2005. *Contraception*, *119*, 109894. <https://doi.org/10.1016/j.contraception.2022.09.132>
- Hyde Amendment, Pub. L. No. 94-439, 90 Stat. 1434 (1976).
- Ibis Reproductive Health. (2017, February 21). Sexual and reproductive health of women in the US military Issue brief 4: The impact of unintended pregnancy on servicewomen and the military Retrieved from https://www.ibisreproductivehealth.org/sites/default/files/files/publications/Military%20Brief%204%202017-02-21_0.pdf

Meadows, S. O., Engel, C. C., Collins, R. L., Beckman, R. L., Breslau, J., Bloom, E. L., Dunbar, M. S., Gilbert, M., Grant, D., Hawes-Dawson, J., Holliday, S. B., MacCarthy, S., Pedersen, E. R., Robbins, M. W., Rose, A. J., Ryan, J., Schell, T. L., & Simmons, M. M. (2021, April 28). *2018 health related behaviors survey: Sexual behavior and health among the active component*. RAND Corporation. Retrieved September 15, 2022, from https://www.rand.org/pubs/research_briefs/RB10116z6.html

Office of the Under Secretary of Defense for Personnel and Readiness, *DOD Instruction 6400 PERIODIC HEALTH ASSESSMENT (PHA) PROGRAM* (2016.). Retrieved September 11, 2022, from <https://www.esd.whs.mil/Portals/54/Documents/DD/issuances/dodi/640009p.pdf>

PROCEDURAL INSTRUCTION: NUMBER 6200.02 Comprehensive Contraceptive Counseling and Access to the Full Range of Methods of Contraception7–9 (2019). Falls Church, VA; Defense Health Agency

Seymour, J. W., Fix, L., Grossman, D., & Grindlay, K. (2018). Facilitators and barriers to contraceptive use among U.S. servicewomen who had an abortion. *Military Medicine*, *184*(5-6). <https://doi.org/10.1093/milmed/usy340>

Stahlman, S., Witkop, C. T., Clark, L. L., & Taubman, S. B. (2017). Pregnancies and live births, active component service women, U.S. Armed Forces, 2012-2016. *MSMR*, *24*(11), 2–9.

Thomson, B. A., & Nielsen, P. E. (2006). Women's health care in operation Iraqi freedom: A survey of camps with echelon I or II facilities. *Military Medicine*, *171*(3), 216–219. <https://doi.org/10.7205/milmed.171.3.216>

WHO. Unmet need for family planning (%). The Global Health Observatory: Indicator Metadata Registry List. (2022). <https://www.who.int/data/gho/indicator-metadata-registry/imr-details/3414>

Witkop, C. T., Webber, B. J., Chu, K. M., & Clark, L. L. (2017). Contraceptive prescriptions for US Servicewomen, 2008–2013. *Contraception*. <https://doi.org/10.1016/j.contraception.2017.05.006>

Wolf, M. (2022, March 10). A year of gains for women veterans. The American Legion. Retrieved from <https://www.legion.org/legislative/255177/year-gains-women-veterans>

Tables and Figures

Total (n)	Total (N=23,015)	No Need (N=12,336)	Met Need (N=8,724)	Unmet Need (N=1,955)
Age (Mean years (SD))	27.48 (6.51)	27.24 (6.27)	27.73 (6.71)	27.92 (6.98)
Average follow-up ((Mean days (SD))	360.66 (100.45)	343.95 (120.80)	383.09 (59.14)	366.03 (84.07)
Race/Ethnicity n (%)				
White	8797 (38.2)	4128 (33.5)	4030 (46.2)	639 (32.7)
Black/African American	6595 (28.7)	3987 (32.3)	1943 (22.3)	665 (34.0)
Hispanic	4781 (20.8)	2622 (21.3)	1753 (20.1)	406 (20.8)
American Indian/Alaska Native	29 (0.1)	17 (0.1)	9 (0.1)	2 (0.2)
Asian/Pacific Islander	1716 (7.5)	984 (8.0)	589 (6.8)	143 (7.3)
Other	1016 (4.4)	555 (4.5)	372 (4.3)	89 (4.6)
Unknown	81 (0.4)	43 (0.3)	28 (0.3)	10 (0.5)
Rank/grade n (%)				
Junior Enlisted (E1-E4)	9903 (43.0)	5569 (45.1)	3419 (39.2)	915 (46.8)
Mid-level Enlisted (E5-E6)	5970 (25.9)	3506 (28.4)	1955 (22.4)	509 (26.0)
Senior Enlisted (E7-E9)	1540 (6.7)	777 (6.3)	592 (6.8)	171 (8.7)
Junior Officer (O1-O3, W1-CW2)	4324 (18.8)	1955 (15.8)	2131 (24.4)	238 (12.2)
Senior Officer (O4-O6+, CW3-CW5)	1278 (5.6)	529 (4.3)	627 (7.2)	122 (6.2)
Birth Control n (%)^s				
Sterilization	1274 (5.5)	231 (1.9)	1043 (12.0)	0 (0.0)
IUD/Implant	4319 (18.8)	1111 (9.0)	3208 (36.8)	0 (0.0)
Injectable	517 (2.2)	163 (1.3)	354 (4.1)	0 (0.0)
Birth Control Patch	441 (1.9)	122 (1.0)	319 (3.7)	0 (0.0)
Oral Birth Control	3161 (13.7)	945 (7.7)	2216 (25.4)	0 (0.0)
Condoms	3682 (16.0)	821 (6.7)	2861 (32.8)	0 (0.0)
Diaphragm	12 (0.1)	1 (0.0)	11 (0.1)	0 (0.0)
Emergency Contraception	816 (3.5)	208 (1.7)	422 (4.8)	186 (9.5)
Withdrawal method	3140 (13.6)	964 (7.8)	1338 (15.3)	838 (42.9)
Rhythm method	297 (1.3)	97 (0.8)	106 (1.2)	94 (4.8)
Occupation n (%)				
Communications /intelligence	6976 (30.3)	3837 (31.1)	2459 (28.2)	680 (34.8)
Healthcare	6136 (26.7)	2912 (23.6)	2776 (31.8)	448 (22.9)
Infantry/artillery/armor/combat engineer	1497 (6.5)	822 (6.7)	554 (6.4)	121 (6.2)
Motor transport	806 (3.5)	496 (4.0)	236 (2.7)	74 (3.8)
Other	4040 (17.6)	2328 (18.9)	1368 (15.7)	344 (17.6)
Pilot/aircrew	230 (1.0)	93 (0.8)	128 (1.5)	9 (0.5)
Repair/engineer	3330 (14.5)	1848 (15.0)	1203 (13.8)	279 (14.3)
Past Deployment n (%)				
Yes	5128 (22.3)	2831 (23.0)	1861 (21.3)	436 (22.3)
Future Deployment n (%)				
Yes	1453 (6.3)	770 (6.2)	537 (6.2)	146 (7.5)
Alcohol use n (%)				
No Alcohol	8542 (37.1)	5290 (42.9)	2604 (29.8)	648 (33.2)
Once a week or less	13186 (57.3)	6503 (52.7)	5516 (63.2)	1167 (59.9)
Greater than once a week	1280 (5.6)	542 (4.4)	604 (6.9)	134 (6.9)
Binge Drinking[^] n (%)				
Yes	3679 (25.4)	1803 (25.6)	1502 (24.5)	374 (28.7)
Pregnancy Scare[#] n (%)				
Yes	1635 (7.1)	842 (6.8)	558 (6.4)	235 (12.2)

Table 1: Demographic and Behavioral Characteristics of the PHA Cohort by Contraception Need Status

[^]Binge drinking was defined as drinking “six or more drinks on one occasion?”

[#]Pregnancy Scare defined as answering yes to PHA question “*You or your partner had a pregnancy scare, where you were not trying to get pregnant but were worried enough to use a home pregnancy test*”

Characteristic	Odds Ratio	95% CI	F Stat	P Value
Grade			35.99	< 0.001
E1-E4	Ref	Ref	Ref	Ref
E5-E6	1.03	0.91–1.16	0.20	0.68
E7-E9	0.93	0.77–1.15	0.65	0.41
O1-O3, W1-CW2	2.40	2.06–2.80	126.04	< 0.001
O4-O6+, CW3-CW5	1.38	1.12–1.60	9.09	< 0.001
Race/Ethnicity			1869.37	< 0.001
White	Ref	Ref	Ref	Ref
Black	0.46	0.41–0.52	154.41	< 0.001
American Indian/Alaska Native	0.65	0.13–1.76	1.24	0.27
Asian /Pacific Islander	0.65	0.53–0.80	17.27	< 0.001
Hispanic	0.68	0.60–0.85	10.75	< 0.001
Other	0.44	0.21–0.92	4.79	0.001
Unknown	0.47	0.22–0.99	3.92	0.029
Occupation			879.59	< 0.001
Communication / intelligence	Ref	Ref	Ref	Ref
Healthcare	1.71	1.50 –1.95	64.85	< 0.001
Infantry/artillery/armor/combat engineer	1.27	1.02–1.57	4.66	0.031
Motor transport	0.88	0.67–1.16	0.80	0.37
Other	1.10	0.95–1.27	1.64	0.20
Pilot/aircrew	3.93	1.99 –7.78	15.51	< 0.001
Repair/ engineer	1.19	1.02–1.39	4.92	0.027
Future Deployment				
Yes	0.81	0.672 -0.98	4.62	0.316
Binge Drinking				
Yes	0.81	0.71- 0.92	9.82	0.002

Table 2 Odds Ratio from univariant logistics regression

Characteristic	Odds Ratio	95% CI	P Value
Intercept	7.166	5.40 - 9.53	
Age			
Year	0.98	0.97- 0.99	< 0.001
Grade			< 0.001
E1-E4	Ref	Ref	Ref
E5-E6	1.19	1.03 - 1.37	0.018
E7-E9	1.28	1.01 - 1.64	0.045
O1-O3, W1-CW2	2.24	1.89 - 2.64	< 0.001
O4-O6+, CW3-CW5	1.52	1.15 - 2.01	0.003
Race/Ethnicity			< 0.001
White	Ref	Ref	Ref
Black	0.57	0.50 - 0.65	< 0.001
American Indian/Alaska Native	0.59	0.15 – 2.29	0.444
Asian /Pacific Islander	0.67	0.52 – 0.86	0.008
Hispanic	0.83	0.72 - 0.96	0.009
Other	0.49	0.23 - 1.02	< 0.001
Unknown	0.47	0.22 - 0.99	0.056
Occupation			< 0.01
Communication / intelligence	Ref	Ref	Ref
Healthcare	1.38	1.20 - 1.58	< 0.001
Infantry/artillery/armor/combat engineer	0.93	0.74 - 1.16	0.516
Motor transport	0.86	0.65 - 1.14	0.308
Other	0.98	0.85 - 1.14	0.836
Pilot/aircrew	1.86	0.93 - 3.71	0.078
Repair/ engineer	1.01	0.86 - 1.18	0.884

Table 3 Odds Ratio from multivariant logistics model: $logit(p) = \beta_0 + \beta_1xRank/Grade + \beta_2xRace/Ethnicity + \beta_3xOccupation$, where P is the probability of having met need for contraception, either 0 or 1.

Contraceptive	Number of Women (n)	Pregnancy Events (n)	Time at risk (days)	Pregnancy incidence rate 10,000 person days
Met Need for Contraception				
All Women	8724	447	3,342,067	1.34
Pharmacologic Contraception	5835	273	2,242,948	1.22
Barrier Contraception	1846	165	692,258	2.38
Sterilization	1043	9	406,861	0.22
Individual Birth control methods				
IUD/Implant	2646	91	1,027,039	0.89
Injectable	276	15	104,870	1.43
Patch	222	15	83,897	1.78
OCP	1620	101	615,806	1.64
Unmet for Contraception				
All Women	1955	235	715,588	3.28
No method	998	111	366,613	3.03
Withdrawal	683	93	247,943	3.75
Rhythm	39	6	13,488	4.45
Emergency Contraception	79	9	29,298	3.01

Table 4 Comparison of Pregnancy Incidence Rates Among ADSW Based on Contraception Need Fulfillment and Method

Appendix 1

Question	No need for contraception*	Need for contraception	Met-need [^]	Unmet need	Demand
PHA (DD 3024) Section VII question 22: “I am not actively taking steps to prevent pregnancy”					
I am, or my partner is currently pregnant	1	0	0	0	NA
My partner(s) or I intend to get pregnant in the next year	1	0	0	0	NA
I have a same sex partner	1	0	0	0	NA
I am not sexually active	1	0	0	0	NA
My partner(s) or I do not use any contraception	0	0 or 1	0	0 or 1	NA
PHA (DD 3024) Section VII question 22: “I am actively taking steps to prevent pregnancy.”					
Sterilization (example vasectomy, tubal sterilization, trans-cervical sterilization hysterectomy),	NA	1	1	0	NA
Long Term-IUD (including copper or progesterone or implant),	NA	1	1	0	NA
Injectable-Every 3 months	NA	1	1	0	NA
Daily –Birth control pills.	NA	1	1	0	NA
Monthly- Contraception patch/vaginal ring,	NA	1	1	0	NA
Emergency contraception (Such as plan B)	NA	1	0	0 or 1	NA
PHA (DD 3024) Section VII question 22: “With intercourse”					
Condoms	NA	1	1	0	NA
Withdrawal	NA	1	0	0 or 1	NA
Rhythm by calendar Temperature cervical mucus test	NA	1	0	0 or 1	NA
Cervical cap/Diaphragm	NA	1	1	0	NA
PHA (DD 3024) Section VIII question 1: “Do you wish to receive contraception counseling”					
Yes	NA	NA	NA	NA	1
No	NA	NA	NA	NA	0
PHA (DD 3024) Section VIII question 3: “Have you had a total hysterectomy (uterus and cervix removed)?”					
Yes	0	NA	1	0	NA
No	0	NA	NA	NA	NA
PHA (DD 3024) Section VIII question 4: “Are you postmenopausal and no longer experience menstrual cycles?”					
Yes	1	0	0	0	NA
No	0	1	1	1	NA
EMR Medication list of contraception					
Injectable Birth control dispensed in last 90 days	NA	1	1	0	NA
OCP’s dispensed in last 90 days	NA	1	1	0	NA
Intradermal birth control 90 days	NA	1	1	0	NA

Table A Determining contraception demand status exposure at each PHA

*No Need for contraception only needs to respond with a single affirmative question to Section VII question 22:

[^] Met need only needs to respond with a single affirmative question to Section VII question 22:

Contraception validation	
1	Appearance of contraception dispensed during PHA-PHA period will place a 1 in variable.
	Appearance of contraception dispensed (full list in appendix 2) during PHA-PHA period will place a 1 in variable.
2	Type of contraception dispensed:
	First appearance of the contraception dispensed (full list in appendix 2) during PHA-PHA period will place a date in format (dd/mmm/yyyy) in variable.
3	Contraception dispensed date:
	First appearance of the contraception dispensed (full list in appendix 2) during PHA-PHA period will place a date in format (dd/mmm/yyyy) in variable.
	Number of units of medication dispensed:

Table B shown below summarized how we will validate contraception during different PHA to PHA intervals.

Possible Events	
1	Pregnancy EHR event: First appearance of the following ICD-10 codes during PHA-PHA period will place a 1 in variable. <ul style="list-style-type: none"> • O09.520- 29 (Advanced Maternal age) • O09.891- O09.899 (High-risk pregnancy) • Z34.0 -Z34.93 (Normal Pregnancy) • Z36 (Antenatal screening/First-trimester screening/Ultrasound) • Z39.2 (Routine Postpartum Follow-up) • O13 (Gestational hypertension) • O14 (Mild Preeclampsia) • O24 (Gestational diabetes) • O26.20-23 (Habitual Aborter with current pregnancy) • O26.851-59 (Spotting complications) • O30.001-009 (Twin pregnancy) • O36.0120-O36.019 (Rh incompatibility) • O36.591-599 (Poor fetal growth) • O36.60X-63X (Excessive fetal growth) • O44.00-.03 (Placenta Previa) • O44.10-.3 (Hemorrhage from Placenta Previa) • O48.0 (Post-term Pregnancy) • O99.345 (Postpartum Depression) • O00.1 (Tubal Pregnancy) • O00.9 (Ectopic Pregnancy) • O1.9 (Hydatidiform Mole) • O02.0 Blighted (Ovum/Molar pregnancy) • O02.1 (Missed Abortion) • O20.0 (Threatened Abortion) • O36.4XX0 (Intrauterine Death) • Z33.2 (Abortion)
2	Pregnancy EHR event date: First appearance of the ICD-10 codes listed above during PHA-PHA period will place a date in format (dd/mmm/yyyy) in variable.

Table C shown below summarized how we will identify different pregnancy outcome that occur in-between PHA to PHA intervals.