

ABSTRACT

Title of Thesis: ESSAYS ON HEALTH CARE SATISFACTION,
HEALTH INSURANCE, AND CANCER
SCREENING AMONG VETERANS

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Objective: to determine differences in satisfaction of health care services among veterans based on insurance type/coverage and the impact of service utilization of cancer screening services among female veterans who have received health care services within past 12 months.

Methods: IPUMS National Health Interview Survey (NHIS) for the years 2013-2018 were used and logistic regressions applied. **Results:** veterans with VA-only coverage are significantly more dissatisfied with the services they receive compared to veterans who have any-private coverage.

Conclusion: there are differences between satisfaction of care among veterans based on insurance type, but differences do not impact cancer screening utilization among female veterans who utilized health care services within the past 12 months. **Future work:** findings could be utilized to determine ways to increase satisfaction of care received among veterans within the VA, or drive policy creation to allow veterans to access health care services at non-VA facilities.

ESSAYS ON HEALTH CARE SATISFACTION, HEALTH INSURANCE, AND CANCER

SCREENING AMONG VETERANS

By

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Table of Contents

Table of Contents	ii
List of Tables	iv
List of Figures	v
List of Abbreviations	vi
Chapter 1: Introduction	1
Background	1
Chapter 2: Literature Review	2
Department of Veterans Affairs	2
Physical and Mental Health Concerns	4
Cancer Risk	5
Health Care/Health Insurance Satisfaction	8
Chapter 3: Research Questions and Gap in Literature	11
Impact	11
Chapter 4: Data and Methods	12
Data Set	12
Aim 1	13
Measures	14
Methods	15
Results	15
Discussion	20
Aim 2	21
Measures	21
Methods	21
Results	21
Discussion	25
Aim 3	25
Measures	25
Methods	26
Results	26
Discussion	30
Chapter 5: Summary	31

Limitations	31
Conclusion	32
Future Work	33
Appendix	35
Bibliography	39

List of Tables

Table 1: Satisfaction of Health Care Among Veterans: Insurance Types	18
Table 2: Factors Associated with Patient Satisfaction of Care Among Veterans	19
Table 3: Cancer Screening Service Utilization Among Female Veterans: Any-Private vs. VA-Only	23
Table 4: Factors Associated with Cancer Screening Service Utilization Among Female Veterans	24
Table 5: Health Care Satisfaction Among Female Veterans: Satisfied vs. Dissatisfied	28
Table 6: Factors Associated with Cancer Screening Service Utilization Among Female Veterans	29
Table 1a: Satisfaction of Health Care Among Veterans: Insurance Types	36
Table 3a: Cancer Screening Service Utilization Among Female Veterans: Any-Private vs. VA-Only	37
Table 5a: Health Care Satisfaction Among Female Veterans: Satisfied vs. Dissatisfied	38

List of Figures

Figure 1: Variable Table

35

List of Abbreviations

CDC	Centers for Disease Control and Prevention
DoD	Department of Defense
EHR	Electronic Health Records
HPV	Human Papilloma Virus
NHIS	Nation Health Interview Survey
PAP Smear/test	Papanicolaou Smear/test
PTSD	Post-traumatic stress disorder
R&D	Research and Development
SUDs	Substance Use Disorders
VA	Department of Veterans Affairs
VHA	Veterans' Health Administration

Chapter 1: Introduction

The objective of the study is to determine if there are differences in satisfaction of health care services among veterans based on insurance type/coverage and do those differences impact service utilization of cancer screening services among female veterans. Aim 1 of the study is to examine health care satisfaction among veterans based on insurance type/coverage among veterans who have received health care services within the past 12 months. Aim 2 is to examine if there are differences in cancer screening service utilization among female veterans based on insurance type – any-private coverage compared to VA-Only coverage. Aim 3 is to examine if there are differences in cancer screening service utilization among female veterans based on satisfaction of health care services. I will start with the background and literature review to properly define the issues that need to be addressed and where the gap in the literature stands. Then, I will use the dataset IPUMS National Health Interview Survey (NHIS) for the years 2013-2018 to test associations between health insurance type/coverage, health care satisfaction, and cancer screening utilization among veterans as a means to fill the gap within the literature. Finally, I will draw conclusions from the analysis and form recommendations for future work as well as the limitations of the study.

Background

Defined by Title 38 of the Code of Federal Regulations, a veteran of the United States describes, “[any] person who served in the active military, naval, or air service and who was discharged or released under conditions other than dishonorable” (U.S. Department of Veterans Affairs [VA], 2020). The high-risk situations that servicemembers face during deployment are much different from the situations that civilian individuals face, leaving military personnel and veterans at increased risk of health conditions (Olenick, Flowers & Diaz, 2015). The possible

long-term health concerns of veterans can lead to significant adjustments within daily living as well as increasing the difficulty of readjusting out of the military and into civilian life; these difficulties can lead to negative coping mechanisms among veterans (Lan et al., 2015; VA, 2020; Wentling, 2018). The result of these unique and increased risks of health issues among servicemembers creates the need of specialized health care services for military personnel and veterans; luckily, most veterans are eligible for health care benefits designed specifically for military servicemembers and veterans through the Department of Veterans Affairs via the Veterans Health Administration (VHA) or TRICARE through the Department of Defense (DoD; “Veterans Affairs & TRICARE”, 2019).

Chapter 2: Literature Review

Department of Veterans Affairs

The VA currently provides free and reduced-cost health care services to eligible military veterans across the entire United States via the 1,700 VA medical centers and outpatient clinics nationwide (United States Government Accountability Office [GAO], 2016). In addition to the health care benefits that veterans receive through the VA, veteran benefits also consist of: educational assistance via the G.I. Bill, homeless assistance via partnership with the Department of Housing and Urban Development (HUD) and through access to home loans, life insurance policies, disability compensation for service-related injuries, and burial and memorial benefits for eligible veterans across 135 national veteran cemeteries nationwide; as of June 2020, the VA employs 412,892 people across all VA medical facilities, clinics, benefits offices, and cemeteries (VA, 2021). In addition to VA benefits, active duty military personnel as well as veterans who retire from the military (i.e., 20+ years of military service) are eligible to receive health care

services through TRICARE via the Department of Defense (DoD; Veterans Affairs & TRICARE, 2019).

In addition to the services that are available to veterans, the VA is largely invested in the research and development (R&D) sector of health care and health care technology to better meet the needs and improve the lives of veterans. The Office of Research and Development within the VA has been a major contributor to R&D for over 95 years and has seen major successes, including: three Nobel prizes, seven Lasker awards, as well as numerous other national and international awards (VA, 2021). The Office of R&D is separated into four Research Services: Biomedical Laboratory Research & Development Service, Clinical Science Research & Development Service – which includes the Cooperative Studies Program, Health Services Research & Development Service, and the Rehabilitation Research & Development Service; all four research services aim improve the health and well-being of veterans nationwide through the upholding of the mission of the Department of Veterans Affairs’ Office of Research and Development (VA, 2021). Unlike most health care systems, the VHA has a highly integrated health care and electronic-health-records (EHR) system that is accessible among all VHA medical facilities nationwide (VA, 2020). Despite being a leader in EHR technology, the VA’s Office of Electronic Health Record Modernization (OEHRM) is currently undergoing a ten-year long EHR transition to better improve the accessibility of medical information of veterans between VA medical facilities, the DoD, the United States Coast Guard, and other participating health care providers (VA, 2021). The goal of this ten-year transition, which is set to be completed by 2028, is to create a central location for complete the medical records of Veterans, allowing clinicians access to full medical histories and to be able to better treat their patients (VA, 2020; VA, 2021). The highly-integrated EHR system available within the VHA is seen as

the gold-standard in turnover from research to application in direct patient care, new or improved health programs for veterans, as well as the general health care system, allowing for streamlined timeliness between R&D and patient care (VA, 2020; VA, 2021).

Unlike other R&D institutions, the VA Office of Research and Development is unique in its focus on veterans and the health issues that affect veterans. Nationwide for fiscal year 2020, the VA had 103 active research sites; 3,616 actively funded principal investigators (PIs); 7,288 active funded research projects; \$750 million in total congressional appropriation for VA medical and prosthetic research; a \$1.99 billion total research budget; and 10,249 published research articles authored and co-authored by VA investigators (VA, 2021). Another uniqueness that separates the VA and the Office of Research and Development from other medical and research facilities is the way in which funding is received; the VA is an official federal agency and receives funding through congressional appropriations; an appropriation bill ‘appropriates’ funds to specific federal departments, agencies, and other federal programs to provide money for operational costs (Panangala, 2018; U.S. Senate Committee on Appropriations, 2021). The U.S. Senate Appropriations Subcommittee on Military Construction and Veterans Affairs is one subcommittee of the U.S. Senate Committee on Appropriations and is responsible for the Military Construction, Veterans Affairs, and Related Agencies (MILCON-VA) appropriations bill; the MILCON-VA bill is responsible for the funding of the VA, construction activities within the DoD, and other concerns related to the U.S. Court of Appeals for Veterans Claims (Leahy, 2020). Regarding R&D, the majority of funds for active R&D activities is received through the MILCON-VA appropriations bill; the remaining funding comes from non-VA sources such as the National Institute of Health (NIH; Leahy, 2020; VA, 2021).

Physical and Mental Health Concerns

Veterans are a unique population within American society for their service to the country and their enlistment into the military separates them from the civilian population. However, service within the military does not come without risks; due to the high-risk situations that veterans may face during deployment, veterans are at increased risk for numerous health conditions both physically and mentally (National Institute of Mental Health [NIMH], 2020; Reisman, 2016, VA, 2020). Servicemembers that are in active combat zones are at increased risk of encountering possible explosions that can result in injury to the brain or loss-of-limbs (Disabled American Veterans [DAV], 2021; VA, 2021; VA Office of Inspector General [VA-OIG], 2012). Among military personnel and veterans, the Defense and Veterans Brain Injury Center (DVBIC) identified approximately 414,000 TBIs among military personnel between 2000 and 2019 worldwide (VA, 2021). Additionally, while military servicemembers and veterans who receive traumatic amputations account for less than half of 1% of the entire veterans population according to data from the VA and DoD, the psychological and physical health effects are significant and lasting, including: post-traumatic stress disorder (PTSD), substance use disorders (SUDs), difficulty transitioning out of the military, long-term musculoskeletal and connective tissue disorders and diseases, as well as the psychological effects that accompany having to learn how to adapt to performing and relearning activities within daily living which can lead to suicide (DAV, 2021; Lan et al., 2015; Sahu, Sagar, Sarkar, & Sagar, 2016; VA, 2020; “Veterans Affairs & TRICARE”, 2019; VA-OIG, 2012; Wentling, 2018).

Cancer Risk

While veterans face numerous scenarios that can impact their mental and physical health, a less-prominent but increased health concern risk among veterans is cancer (OncoLink Team, 2020). Cancer can be diagnosed years after service and have lasting impacts that may not be

immediately be recognized as tied to service in the armed forces (OncoLink Team, 2020). One of the most notorious carcinogen exposures to happen to military troops in the United States is the exposure of Vietnam veterans to Agent Orange (VA, 2020). Agent Orange – a herbicide that was used by the U.S. military during the Vietnam War from 1961 to 1971 – exposed upwards of four million people throughout the conflict and has since been declared a known carcinogen that is linked to soft tissue sarcoma; non-Hodgkin lymphoma (NHL); Hodgkin disease; Chronic lymphocytic leukemia (CLL); including hairy cell leukemia and other chronic B-cell leukemias. Limited or suggested evidence of an association was linked with respiratory cancers (lung, bronchus, trachea, larynx); prostate cancer; multiple myeloma; and bladder cancer in exposed US military veterans as well as an increase in birth defects of children of military personnel exposed to Agent Orange (Nosrati, Han, Flores, Sood & Tholpady, 2014; VA, 2020). It was not until 1977 that veterans began filing claims to the VA for disability reimbursement for service-related injuries (VA, 2020). However, in order to qualify for service-related disability reimbursement, a veteran must prove the condition began when they were in the service or within one year of their discharge (Nosrati et al., 2014; VA, 2020). However, both the VA and federal government are very hesitant to claim fault for carcinogen exposure among military troops while deployed due to the financial liability as well as the media backlash; combined with the extended timeline that cancer takes to manifest, veterans suffering from the effects of Agent Orange or from wives having miscarriages or children born with birth defects had their disability claims denied (VA, 2020). In 1991, Congress enacted the Agent Orange Act, which allowed the VA to declare certain conditions "presumptive" to exposure to Agent Orange – qualifying Vietnam veterans to receive treatment and disability reimbursement for health concerns as a result of Agent Orange (US Congress, 1991). By April of 1993 – 32 years after the start of using Agent Orange in the

U.S. Military as chemical warfare and two years after the enactment of the Agent Orange Act, only 486 veterans out of 39,419 Agent Orange exposure claims had been awarded disability claims for exposure (Nosrati et al., 2014; VA, 2020).

However, despite the now known health risks of exposure to Agent Orange, this is not the only instance of likely carcinogen exposure in military troops. Veterans as recent as Operations Iraqi Freedom (OIF) or Enduring Freedom (OEF) were exposed to burn pits that are now being linked to lung issues (VA, 2016). Additionally, veterans of World War II were potentially exposed to radiation after the dropping of atomic bombs in Hiroshima and Nagasaki; Gulf War Veterans may have a higher risk of lung and brain cancers as a result of possible exposure to nerve gas, smoke from burning oil wells, and pesticides; and even veterans stationed in the United States at Marine Corps Base Camp Lejeune in North Carolina from the 1950s to 1980s that were exposed to contaminated drinking water that was found to be contaminated with benzene, industrial solvents, and other harmful chemicals (VA, 2020). Despite high-risk scenarios like burn pits – which were a common way to get rid of waste at military sites in Iraq and Afghanistan, they are still in use despite the increase outcry in support for compensation to military veterans that were exposed to burn pits and are now facing serious health issues like rare cancer (Ouriel, 2020; VA, 2020). Despite the risk of inhaling smoke from burn pits, the VA is very hesitant to link burn pits with increased cancer risks due to the financial burden that would be placed on them and per their website, “At this time, research does not show evidence of long-term health problems from exposure to burn pits,” (VA, 2020). However, when cancer can take years to manifest and if veterans are at an increased risk for cancer, veterans need to ensure they get proper cancer screening during routine physical checkups.

Among female veterans, women who were ever in the military have significantly higher rates of breast cancer compared to their civilian counterparts who were never in the military, possibly linked to service-related exposures that are unique to military personnel (e.g., burn pits, PTSD; Friedman et al., 2011; Garbutt Park, Keller, & Bidassie, 2018; Zhu et al., 2009). Among a 2009 study by Zhu and colleagues, data collected between 1990 to 2004 among individuals aged 20 to 59 from the Automated Central Tumor Registry (ACTUR) of the DoD and Surveillance, Epidemiology and End Results (SEER) of the National Cancer Institute identified significantly higher incidence rates of breast cancer among active-duty White and Black female veterans compared to the civilian population. While this study was conducted among active-duty military personnel, this does not mean that once an individual separates from the military, their risk of cancer diminishes. Due to the extended latent period that typically accompanies cancer diagnoses from exposures, female military veterans are still at increased risk of breast cancer after enlistment due to the possible exposures experienced (Friedman et al., 2011; Garbutt et al., 2018; Zhu et al., 2009). In addition to risk factors like Human Papilloma Virus (HPV), risk factors that increase risks for breast cancer may also increase risks of cervical cancer in female veterans (American Cancer Society [ACA], 2021; Centers for Disease Control and Prevention [CDC], 2021).

Health Care/Health Insurance Satisfaction

The increased health needs of veterans indicate that veterans need access to quality health care services to ensure that health issues can be addressed prior to serious negative consequences. While similar health care services are offered to military veterans through the VA or the DoD, the programs are still very different and the quality of care may be different among the programs; there also may be difference in quality of care for veterans who do not have health

insurance, private health insurance, or other-public health insurance such as Medicare or Medicaid ("TRICARE and VA Benefit Comparison", 2019). Despite the expansiveness of the VA health care delivery system, major complaints among VA patients include long wait times between appointments, lack of individualized care, and disjointed communication, which makes addressing health issues among veterans difficult and can result in patients not getting vital treatments they need in a timely fashion (Draper, 2017; GAO, 2016). In 2016, the VHA conducted multiple studies that revealed significant delays in the processing of veteran's enrollment applications into the VHA (VA-OIG, 2017). VHA enrollment applications can be processed at VHA's Health Equity Center (HEC; the main processing center) as well as at local VA medical centers (VAMC); for both HEC and VAMC, a normal timeline for streamlined application processing should be five business days (VA-OIG, 2017). However, a June (2016) VHA audit found that HEC staff did not process 143 of 253 applications reviewed (57 percent) within VHA's 5 business day timeline; with the increased enrollment into VHA due to increased demand by veterans returning home from service after OIF or OEF, as well as the aging veteran population (veterans enrolled in VHA rose from 7.9 million in fiscal year 2006 to almost 9 million in fiscal year 2016), the burden of enrollment and usage of benefits is expected to continue increasing (Draper, 2017; VA-OIG, 2017). In addition to delay of processing, an April 2016 audit found that HEC had a 12 percent error rate in application processing and enrollment staff incorrectly labeled 31 of the 253 randomly-selected applications; HEC enrollment staff also either incorrectly enrolled or rejected the health care benefit applications of veterans without/with sufficient documentation needed for enrollment (VA-OIG, 2017). In the same audit, VAMCs had a 27 percent error rate in application processing and enrollment staff incorrectly labeled 101 of the 381 randomly-selected applications which were either accepted or rejected

without/with proper proof of eligibility (VA-OIG, 2017). This processing delay is also compounded by the GAO's 2016 findings that a significant portion of newly-enrolled VHA veterans were not able to access primary care services from the VHA. In addition to inaccessibility to care, many newly-enrolled VHA patients had significant and highly varied length-of-time waited to be able to access care services (GAO, 2016). During an audit, sixty of 180 newly enrolled VHA patients (33 percent) had not been seen by a VHA providers at the time of the review and the other 120 patients had waited anywhere from 22 to 71 days for their appointments (GAO, 2016).

Regarding care received, Burnett-Zeigler and colleagues (2011) found that while veterans with psychiatric disorders perceived VA/VHA health care interactions positively, younger, nonwhite, lower socioeconomic (SES) individuals or those who suffered a service-connected disability, and had been diagnosed as having PTSD or a substance use disorder (SUD) were less likely to rate their interaction positively. Additionally, another study found that female veterans who had suffered military sexual assault/trauma reported more use of VHA services, but less satisfaction with care received, poorer satisfaction with VHA facilities and staff, and more problems with VHA services received compared to female veterans who had no history of military sexual assault/trauma (Kelly, Scheiderer, Ouimette, Daley, & Wolfe, 2008). Kelly and colleagues (2008) also found a relationship between combat exposure and higher problems with VHA staff and another study found that high-stigma patients who utilized VHA mental health services were less likely to prefer treatment than low-stigma patients who utilized VHA mental health services (Campbell et al., 2016). Those same high-stigma patients were also less likely to adhere to provider recommendations, including: adhering to taking medications for mood, consistent treatment by mental health specialists, consistent treatment for emotional concerns in

PC, and maintaining appropriate depression care (Campbell et al., 2016). While these statistics are very alarming, a major concern is that quality of care received and satisfaction of care can factor into high-risk behaviors among veterans as well as increase or decrease service utilization (Hone, Gurol-Urganci, Millett, Basara, Akdag, & Atun, 2017). If a veteran is not satisfied with health care, does not utilize health care services to their full extent, or refuses recommended follow-up tests, this can have significant impacts on both the veteran's life as well as the lives of his/her family.

Chapter 3: Research Questions and Gaps in Literature

Research Questions

There has been extensive research and data available on veteran health concerns (e.g., PTSD, suicide, substance use, etc.) as well as patient satisfaction and utilization of health care services in the general population. However, there has never been research looking specifically at patient satisfaction of care among veterans and utilization of health care services – specifically cancer screening and follow-up testing among female veterans. The purpose of this study is to estimate the variation of patient satisfaction by insurance status, and whether higher patient satisfaction can lead to the receipt of cancer screening service utilization among female veterans (e.g., Papanicolaou (PAP) Test/Smear). I have 3 specific aims of this study.

Aim 1 is to examine the variation of patient satisfaction of health care by self-identified health insurance type/coverage [referred to as health care/insurance coverage moving forward]. It is hypothesized that veterans with VA/VHA-only insurance will be less satisfied with care received compared to veterans that have any form of private health insurance.

Aim 2 is to examine the association between insurance types and a female veterans' likelihood of receiving cancer screening services. It is hypothesized that female veterans with

VA/VHA-only insurance will be less likely to utilize cancer screening services compared to female veterans with any form of private health insurance (private-only or dually-enrolled).

Aim number 3 is to examine the association between patient satisfaction and a female veterans' likelihood of receiving cancer screening services. It is hypothesized that female veterans who are more satisfied with their health care will be more likely to utilize health care services and access cancer screening compared to female veterans who are less satisfied with their received health care.

Impact

Despite having extensive data on the health concerns of veterans, more research needs to be done looking at health care satisfaction among veterans based on insurance type and the translation of satisfaction of care into health care service utilization. A study on health care reform in Turkey showed that reforms resulted in higher patient satisfaction and higher utilization of health care services compared to prior to a system-wide health care reform (Hone et al., 2017). If there are significant differences among satisfaction of health care services based on insurance type, veterans who are less satisfied with health care received may be less likely to utilize health care services and increase their risk of poor health outcomes. The findings of the study could be used as a basis for further research by veteran policy researchers or by veteran stakeholders to drive federal policy creation to increase satisfaction of health care services among veterans, improve the quality of care within VA/VHA facilities, or even to allow veterans to seek care outside of the VA as a way to better address the health concerns of veterans once discharged from the military.

Chapter 4: Data and Methods

Data Set

The study will use the IPUMS National Health Interview Survey (NHIS) for the years 2013-2018 (Aim 1). Given the data availability, years 2013/2015/2018 will be used for female veteran status and cancer screening – ever; years 2013-2017 will be used for cancer screening – within the past 12 months (Aim 2 and 3). Mammography testing will not be included in analysis due to the small sample size resulting in limited power.

NHIS is a national survey that collects health and health care data of the civilian, non-institutionalized population within the United States (IPUMS NHIS, 2020). The sample for the NHIS survey is limited to housing units that receive the Census and is conducted annually; the survey is weighted to adjust for oversampling of select groups of individuals to increase the reliability of underrepresented groups (CDC, 2019; IPUMS NHIS, 2020). Regarding the analysis of this paper, adjustment of sampling weights will be important when pooling multiple years of data to ensure consistency from year to year. The population of focus for this paper will be on military veterans, defined by any service in the Armed Forces regardless of discharge type. The statistical software that will be utilized for this study will be STATA IC 16.

The sample size of the NHIS survey is approximately 87,500 people selected across 35,000 households annually and results in a 70% response rate of all eligible households (CDC, 2019; IPUMS, 2020). The sample to be used for this study will be restricted to individuals who have any level of military service, regardless of discharge status and result in a sample of 35,599 individuals. The survey is conducted via computer-assisted personal interviewing (CAPI); for missing data, the variable frequency will be Not in Universe (NIU; Centers for Medicare and Medicaid Services [CMS], 2020; IPUMS NHIS, 2020).

Aim #1: To examine the variation of patient satisfaction of health care by self-identified health insurance type/coverage.

Hypothesis: Veterans with VA/VHA-only insurance will be less satisfied with care received compared to veterans that have any form of private health insurance.

Measures

The outcome variable of Aim 1 is patient satisfaction. It is defined as how content a patient is regarding received health care within the past 12 months, worded as: “In general, how satisfied are you with the health care you received in the past 12 months?” Respondents were aged 18 and above (IPUMS NHIS, 2020). I recoded the variable as a dichotomous measure which equals to 1 if Satisfied (which includes “very satisfied” and “somewhat satisfied”) and 0 Otherwise (which includes “dissatisfied” and “very dissatisfied”). Individuals who did not receive any health care services within the past 12 months were dropped.

The key independent variable of Aim 1 is health insurance coverage among veterans; the variable is recoded to include: no insurance, any-private health insurance (reference group), public-Medicare/Medicaid, VA-only, or TRICARE.

Other Covariates

Key demographic characteristics that were controlled for in the research hypotheses include: age, race/ethnicity, and gender to determine if in addition to health care satisfaction and utilization of services, are there any differences between veterans of different ages, race/ethnicity, or gender (Milner, Baker, Jeraj, & Butt, 2020). Race/ethnicity is coded as: non-Hispanic white, non-Hispanic black, non-Hispanic Other, and Hispanic; non-Hispanic Other pools individuals who identified as American Indian/Alaskan Native, Asian, or multiple race. Gender is coded as male or female; and age is coded as 18-25, 26-34, 35-49, 50-64, and 65+ (IPUMS NHIS, 2020). The weighting variables and variance estimation variable is STRATA (IPUMS NHIS, 2020; shown in Figure 1 in the appendix).

Demographic characteristics and insurance coverage/type were picked due to age, race/ethnicity, and gender being unchangeable predisposing factors that can increase a person's risk of development of disease and insurance is an important factor regarding access to and quality of received health care services that are important in a patient's perceived satisfaction of services received (CDC, 2021).

Method

The study first reports descriptive statistics of the study population. Logistic regressions then is used to determine the association between insurance type(s) and health care satisfaction among veterans. The weight used for the analysis is sample person weight (SAMPWEIGHT), the stratum used for variance estimation is STRATA, and the primary sampling unit for variance estimation is PSU (IPUMS NHIS, 2020). The complex sample design will be accounted for by using Taylor Series Linearization to estimate the standard error of the data (IPUMS NHIS, 2020). The unweighted sample includes 17,027 veterans and is limited to veterans aged 18+ who used any health care services within the past 12 months.

Results

Table 1

The first table reports statistics from the NHIS of the study population. The table reports health care satisfaction among veterans based on insurance type. Patient satisfaction is described in Table 1 in relation to a veteran's insurance coverage status, coded as: 'No Insurance', 'Any-Private Insurance' coverage, 'Medicare/Medicaid (i.e., individuals who have either Medicare, Medicaid, or are dually enrolled)', 'VA-Only' coverage, or 'TRICARE'; veterans can overlap among the categories: any-private insurance, Medicaid/Medicare, and TRICARE, but there is no overlap between veterans with VA-Only coverage and any other options. Regarding patient

satisfaction, veterans with no health insurance rated the lowest satisfaction of care (84.94%) and the highest dissatisfaction of care (15.06%) compared to any other insurance coverage. Among veterans with health insurance coverage, veterans with any-private and/or Medicare/Medicaid rated the highest patients satisfaction at 96.41% and 96.42%. The rate of reporting satisfaction was lowest among veterans with VA-Only coverage (91.04%) compared to veterans with any health insurance coverage (does not include veterans who identified as having no health insurance coverage). Veterans with Medicare/Medicaid and TRICARE also identified as having better patient satisfaction among care received compared to veterans with VA-only coverage; these findings could be due to the ability for individuals with Medicare/Medicaid or TRICARE to also select as having private insurance or Medicare/Medicaid or TRICARE.

The rates of reported health care satisfaction are highest among non-Hispanic white veterans (95.48%), with the second highest reported rate being non-Hispanic black veterans (95.95%), and non-Hispanic multiple race rated the lowest rates satisfaction of care (89.86%). Male veterans were also more likely to report being more satisfied with health care compared to female veterans (95.43% vs. 92.89%).

Table 2

Table 2 reports a logistic regression of factors associated with satisfaction with health care received among veterans based on self-selected insurance coverage. The regression table shows the unadjusted (Model 1) and adjusted model (Model 2) which controls for age, race/ethnicity, and gender; any-private insurance is the reference group. The unweighted sample includes 16,130 veterans aged 18-85. When controlled, significant findings include: veterans with no health insurance coverage have 0.20 times the odds of being satisfied with health care received, veterans with Medicare/Medicaid have 0.48 times the odds of being satisfied with

health care received, and veterans with VA-Only health care coverage have 0.28 times the odds of being dissatisfied with health care received compared to veterans with any form of private health insurance coverage ($p < 0.05$).

Table 1. Satisfaction of Health Care Among Veterans: No Insurance, Any-Private, Medicare/Medicaid, VA-only insurance, TRICARE, non-institutionalized populations, 2013-2018 NHIS.

	Veterans - Satisfied		Veterans - Dissatisfied	
	Estimates		Estimates	
	Rate	SE	Rate	SE
Insurance Coverage				
No insurance	84.94%	2.11%	15.06%	2.11%
Any-Private	96.41%	0.36%	3.59%	0.36%
Medicare/Medicaid**	96.42%	0.30%	3.58%	0.30%
VA-Only	91.04%	0.73%	8.96%	0.73%
TRICARE	95.98%	0.62%	4.02%	0.62%
Age				
18-25	93.91%	2.30%	6.09%	2.30%
26-34	90.91%	1.20%	9.07%	1.20%
35-49	94.22%	0.59%	5.78%	0.59%
50-64	94.00%	0.49%	6.00%	0.49%
65+	96.76%	0.22%	3.24%	0.22%
Race/Ethnicity				
Non-Hispanic White	95.48%	0.23%	4.52%	0.23%
Non-Hispanic Black/African American	94.95%	0.58%	5.05%	0.58%
Non-Hispanic Other	92.92%	1.36%	7.08%	1.36%
Hispanic	93.64%	0.98%	6.36%	0.98%
Gender				
Male	95.43%	0.21%	4.57%	0.21%
Female	92.89%	0.87%	7.11%	0.87%

Source: National Health Interview Survey (NHIS), 2013-2018 person files.

Note: **Medicare/Medicaid indicates individuals who have either Medicare, Medicaid, or are dually enrolled.

***Non-Hispanic Other pools individuals who identified as AI/AN or HI/PI, Asian, or multiple race. Standard errors (SE) are calculated using Taylor Series with Stata version 16. Un-weighted sample size is 16,130 and includes individuals 18-85.

Table 2. Factors Associated with Patient Satisfaction of Care Among Veterans (Logistic Regression), Non-Elderly Adults, 2013-2018 National Health Interview Survey

	OR	SE	P-Value
Model 1			
Insurance Type			
Any-Private	(REF)		
No Health Insurance in Past 12 Months	0.21	0.04	<0.001*
Medicare/Medicaid**	1.00	0.14	0.989
VA-Only	0.38	0.05	<0.001*
TRICARE	0.89	0.17	0.532
Model 2			
Insurance Type			
Any-Private	(REF)		
No Health Insurance in Past 12 Months	0.20	0.04	<0.001*
Medicare/Medicaid**	0.48	0.09	<0.001*
VA-Only	0.28	0.04	<0.001*
TRICARE	0.75	0.15	0.157
Age			
18-25	(REF)		
26-34	0.67	0.31	0.38
35-49	0.88	0.41	0.793
50-64	0.93	0.43	0.869
65+	2.25	1.02	0.073
Race/Ethnicity			
Non-Hispanic White	(REF)		
Non-Hispanic Black/African American	1.24	0.18	0.139
Non-Hispanic Other***	0.84	0.19	0.449
Hispanic	0.87	0.17	0.468
Gender			
Male	(REF)		
Female	0.81	0.13	0.165
Region			
Northeast	(REF)		
North Central/Midwest	1.11	0.19	0.528
South	0.89	0.13	0.445
West	0.76	0.12	0.091
Year			
2013	(REF)		
2014	0.90	0.16	0.544
2015	0.85	0.13	0.303
2016	0.77	0.12	0.095
2017	0.82	0.14	0.257
2018	0.91	0.16	0.577

Source: 2013-2018 National Health Interview Survey (NHIS)

Notes: The outcome is patient satisfaction of care. All results come from the same logistic regression and have been weighted to reflect the civilian non-institutional population. The analytic sample included 16,130 adults age 18-85. OR stands for odds ratio. REF indicates the reference group. SE stands for standard errors estimates using Taylor series linearization. P<.05 indicate significant findings and is marked by *. **Medicare/Medicaid indicates individuals who have either Medicare, Medicaid, or are dually enrolled. ***Non-Hispanic Other pools individuals who identified as AI/AN or HI/PI, Asian, or multiple race.

Discussion

Results of Aim 1 suggest that veterans with VA-Only coverage tend to be less satisfied with health care received compared to veterans that have any-private coverage, Medicare/Medicaid, or TRICARE. However, these findings were not found when comparing veterans with VA-only coverage to veterans who identified as having no health insurance coverage. Female veterans have historically identified as being more dissatisfied regarding health care received within the VA compared to male veterans and findings are similar regarding the study population of this study, though not significantly; female veterans were less likely to be satisfied with health care received compared to male veterans which could have implications for female veterans utilizing cancer screening services (Aim 3; Kressin et al., 1999). The study conducted by Hone and colleagues (2017) identified higher satisfaction and increased utilization of health care services among individuals in Turkey after a system-wide health care reform which could be a factor in the results of Aim 2 and Aim 3. If more veterans had access to health care coverage (e.g., veterans who identified as having no health insurance coverage), then overall satisfaction of care could improve and service utilization could increase.

The study limitations for Aim 1 include: data regarding insurance status is self-identified – individuals could misrepresent coverage by incorrectly identifying insurance coverage (e.g., mark as covered by Medicaid when Medicaid coverage was actually lost or have Medicaid coverage and identify as being uninsured) or only identify as having single-insurance coverage when individual has secondary insurance (Call, Davidson, Davern, Brown, Kincheloe, & Nelson, 2008). The sample size is also limited comparatively to the entire NHIS sample population and only includes individuals who visited the doctor within the past 12 months which may not be applicable to the larger population; access to health care services may be worse in the real world.

Aim #2: To examine the variation of cancer screening utilization by self-identified health insurance type/coverage.

Hypothesis: Female veterans who have any form of private insurance will be more likely to utilize cancer screening services compared to veterans who have VA/VHA-only insurance.

Measures

The outcome measures of Aim 2 are indicators of cancer screening: (1) PAP Smear screening in female veterans – ever received and (2) PAP Smear screening in female veterans within the past 12 months. Cancer screening service utilization includes: PAP smear – ever received and PAP smear – within the last 12 months.

The key independent variable and covariates of Aim 2 are the same as described in Aim 1.

Method

First, the study summarized the descriptive statistics from the NHIS sample among female veterans. Second, the study reported results using logistic regressions. The sample of individuals who have ever received a PAP smear includes 751 female veterans aged 18-65; the sample of individuals who have received a PAP smear in the past 12 months includes 672 female veterans aged 18-65 (CDC, 2021). Only female veterans who identified as having received health care within the past 12 months were included in the analysis and for health insurance coverage, any-private insurance is the reference group.

The weight used for the analysis is sample person weight (SAMPWEIGHT), the stratum used for variance estimation is STRATA, and the primary sampling unit for variance estimation is PSU (IPUMS NHIS, 2020).

Results

Table 3

Table 3 reports cancer screening service utilization among female veterans based on veterans who identified as having ‘Any-Private’ insurance coverage compared to veterans who identified as having ‘VA-Only’ coverage.

For PAP smear – ever received and within the last 12 months, veterans with VA-only rated higher for ever receiving a PAP smear compared to any-private (e.g., 97.96% any-private vs. 98.27% VA-only), but lower for PAP smears within the last 12 months (e.g., 52.9% vs. 50.94%). Table 3 does not include possible confounder variables or the population characteristics that could impact the reported results.

Table 4

Table 4 reports a logistic regression of factors associated with PAP smear cancer screening service utilization among female veterans based on insurance type/coverage. The regression table shows Model 1 (unadjusted) and Model 2 (adjusted model), controlling for age categories, race/ethnicity, Census region, and survey year.

PAP smear – ever received include: female veterans aged 50-64 have 82.34 times the odds and non-Hispanic Black/African American female veterans have 0.10 times the odds of ever receiving a PAP smear compared to female veterans aged 18-25 ($p < 0.05$). When controlled, significant findings for PAP smear within the past 12 months include non-Hispanic Black/African American female veterans having 2.92 times the odds of receiving a PAP smear within the past 12 months compared to white female veterans ($p < 0.05$).

Table 3. Cancer Screening Service Utilization Among Female Veterans: Any-Private vs. VA-Only insurance, non-institutionalized populations, 2013/2015/2018 NHIS.

	Veterans - Any-Private Health Insurance		Veterans - VA-Only Insurance	
	Estimates		Estimates	
	Rate	SE	Rate	SE
PAP Smear (Ever)				
No	2.04%	0.74%	1.73%	1.03%
Yes	97.96%	0.74%	98.27%	1.03%
PAP Smear (Last 12 Months)				
No	47.10%	2.64%	49.06%	4.48
Yes	52.90%	2.64%	50.94%	4.48%

Source: National Health Interview Survey (NHIS), 2013/2015/2018 person files.

Note: Standard errors (SE) are calculated using Taylor Series with Stata version 16. Un-weighted sample size: 755 and includes individuals aged 18-65

Table 4. Factors Associated with Cancer Screening Service Utilization Among Female Veterans (Logistic Regression), Non-Elderly Adults, 2013-2018 National Health Interview Survey

	PAP Smear - Ever			PAP Smear - Past 12 Months		
	OR	SE	P-Value	OR	SE	P-Value
Model 1						
Insurance Type						
Any-Private	(REF)			(REF)		
VA-Only	1.18	0.84	0.815	0.92	0.20	0.71
Model 2						
Insurance Type						
Any-Private	(REF)			(REF)		
VA-Only	0.44	0.24	0.127	0.84	0.20	0.454
Age						
18-25	(REF)			(REF)		
26-34	24.69	46.29	0.088	2.47	1.49	0.134
35-49	24.11	41.89	0.068	1.97	1.07	0.214
50-64	82.34	143.63	0.012*	1.26	0.69	0.669
Race/Ethnicity						
Non-Hispanic White	(REF)			(REF)		
Non-Hispanic Black/African American	0.10	0.09	0.01*	2.92	0.80	<0.001*
Non-Hispanic Other**	0.63	1.50	0.845	1.27	0.47	0.528
Hispanic	1.00	(empty)		1.30	0.70	0.627
Region						
Northeast	(REF)			(REF)		
North Central/Midwest	1.00	(empty)		1.12	0.41	0.764
South	2.79	2.98	0.337	1.22	0.45	0.596
West	0.42	0.47	0.442	1.30	0.49	0.479
Year						
2013	(REF)			(REF)		
2014		N/A		1.60	0.50	0.131
2015	1.00	(empty)		0.87	0.28	0.673
2016		N/A		0.65	0.21	0.175
2017		N/A		1.07	0.34	0.828
2018	1.20	1.12	0.841		N/A	

Source: 2013-2018 National Health Interview Survey (NHIS)

Notes: The outcome is cancer screening utilization among female veterans. All results come from the same logistic regression and have been weighted to reflect the civilian non-institutional population. The analytic sample includes 755 female veterans age 18-65. OR stands for odds ratio. REF indicates the reference group. SE stands for standard errors estimates using Taylor series linearization. * indicates significant findings of $P < .05$. **Non-Hispanic Other pools individuals who identified as AI/AN or HI/PI, Asian, or multiple race.

Discussion

The findings of Aim 2 do not suggest any relationship between health insurance type and cancer screening utilization among female veterans. The only significant findings among Aim 2 were among individuals who were older than the reference group(s) – with individuals aged 50-64 for PAP smear – ever, as well as non-Hispanic Black/African American female veterans ($p < 0.05$); there were no significant findings regarding insurance type. The lack of significant findings could indicate that cancer screening is important among female veterans. Alternatively, PAP smears are usually routinely done every three to five years starting at age 21 until the age of 65 and are a part of a normal gynecologic visit; since an individual does not need to go to a secondary facility to receive the test, individuals may be more likely to receive PAP smears (ACA, 2021; Women's Health, 2021).

A major study limitation of Aim 2 is the limited sample size of only 755 female veterans. The data within NHIS is also self-reported data which could result in measurement error. Additionally, cross-sectional analysis is used to examine association between the independent and dependent variables which cannot identify causality between variables.

Aim #3: To examine the variation of cancer screening utilization by patient satisfaction of care received.

Hypothesis: Female veterans with who are more satisfied with care received will be more likely to utilize cancer screening services compared to female veterans who are less satisfied with care received.

Measures

The outcome measures of Aim #3 are indicators of cancer screening: (1) PAP Smear screening in female veterans – ever received and (2) PAP Smear screening in female veterans

within the past 12 months. The sample size is 755 and is limited to female veterans aged 18-65 who indicated utilizing cancer screening services; both ‘ever received’ and ‘within the past 12 months’ are included to increase the sample size (CDC, 2021).

The key independent variable is patient satisfaction as described in Aim 1.

Method

Table 5 reports the descriptive statistics from the NHIS sample among female veterans. The table reports cancer screening service utilization among female veterans based satisfaction of care received. The reference group is individuals who identified as being ‘Dissatisfied’ with received health care. For PAP smear – ever received and within the last 12 months, veterans with VA-only rated higher for ever receiving a PAP smear compared to any-private (e.g., 97.96% any-private vs. 98.27% VA-only), but lower for PAP smears within the last 12 months (e.g., 52.9% vs. 50.94%). Table 3 does not include possible confounder variables or the population characteristics that could impact the reported results.

Results

Table 5

Table 5 reports the statistics from the NHIS sample among female veterans. The table reports cancer screening service utilization among female veterans based satisfaction of care received. Regarding ever receiving a PAP smear: 98.02% of female veterans who identified as being satisfied with health care received a PAP smear and 97.52% identified as dissatisfied. Regarding receiving a PAP smear within the past 12 months: 51.50% of female veterans who identified as being satisfied with health care received a PAP smear and 45.11% who identified as dissatisfied. Table 5 does not include possible confounder variables or the population

characteristics that could impact the reported results (e.g., for veterans with VA-only, does not determine previous insurance coverage when a test may have been performed).

Table 6

Table 6 reports a logistic regression of factors associated with cancer screening service utilization among female veterans based on satisfaction of care. The regression table shows Model 1 (unadjusted) and Model 2 (adjusted model), controlling for age, race/ethnicity, gender, Census region, and survey year; only female veterans who identified as having received health care within the past 12 months were included in the analysis and for health insurance coverage, any-private insurance is the reference group. The unweighted sample includes 755 veterans aged 18-65 (CDC, 2021).

When controlled, significant findings for PAP smear – ever include: female veterans aged 26-34 (17.61), 35-49 (9.48), 50-64 (16.69) times the odds of ever receiving a PAP smear compared to female veterans aged 18-25 and non-Hispanic black/African American female veterans have 0.23 times the odds of ever receiving a PAP smear compared to non-Hispanic white female veterans. When controlled, significant findings for PAP smear – past 12 months’ include non-Hispanic black/African American female veterans have 2.45 times the odds of receiving a PAP smear within the past 12 months compared to white female veterans.

Table 5. Health Care Satisfaction Among Female Veterans: Satisfied vs. Dissatisfied, non-institutionalized populations, 2013/2015/2018 NHIS.

	Veterans - Satisfied		Veterans - Dissatisfied	
	Estimates		Estimates	
	Rate	SE	Rate	SE
PAP Smear (Ever)				
No	1.98%	0.53%	2.48%	1.83%
Yes	98.02%	0.53%	97.52%	1.83%
PAP Smear (Last 12 Months)				
No	48.50%	1.87%	54.89%	6.56%
Yes	51.50%	1.87%	45.11%	6.56%

Source: National Health Interview Survey (NHIS), 2013/2015/2018 person files.

Note: Standard errors (SE) are calculated using Taylor Series with Stata version 16. Un-weighted sample size: 755 and includes individuals aged 18-65

Table 6. Factors Associated with Cancer Screening Service Utilization Among Female Veterans (Logistic Regression), Non-Elderly Adults, 2013-2018 National Health Interview Survey

	PAP Smear - Ever			PAP Smear - Past 12 Months		
	OR	SE	P-Value	OR	SE	P-Value
Model 1						
Health Care Satisfaction						
Dissatisfied	(REF)			(REF)		
Satisfied	1.26	1.02	0.775	1.29	0.36	0.356
Model 2						
Health Care Satisfaction						
Dissatisfied	(REF)			(REF)		
Satisfied	1.06	1.23	0.96	1.20	0.37	0.549
Age						
18-25	(REF)			(REF)		
26-34	17.61	20.57	0.014*	1.74	0.74	0.192
35-49	9.48	9.49	0.025*	1.17	0.46	0.695
50-64	16.69	14.60	0.001*	0.76	0.30	0.477
Race/Ethnicity						
Non-Hispanic White	(REF)			(REF)		
Non-Hispanic Black/African American	0.23	0.15	0.021*	2.45	0.51	<0.001*
Non-Hispanic Other**	1.03	1.55	0.985	1.49	0.49	0.231
Hispanic	3.25	3.77	0.31	1.29	0.50	0.52
Region						
Northeast	(REF)			(REF)		
North Central/Midwest	2.88	3.10	0.324	0.95	0.32	0.883
South	3.49	2.75	0.114	0.95	0.30	0.866
West	0.90	0.76	0.899	0.89	0.29	0.72
Year						
2013	(REF)			(REF)		
2014		N/A		1.19	0.27	0.456
2015	3.74	3.84	0.198	0.72	0.18	0.187
2016		N/A		0.61	0.16	0.055
2017		N/A		0.81	0.21	0.415
2018	1.28	0.90	0.727		N/A	

Source: 2013-2018 National Health Interview Survey (NHIS)

Notes: The outcome is cancer screening utilization among female veterans. All results come from the same logistic regression and have been weighted to reflect the civilian non-institutional population. The analytic sample includes 755 adults age 18-65. OR stands for odds ratio. REF indicates the reference group. SE stands for standard errors estimates using Taylor series linearization. * indicates significant findings of $P < .05$. **Non-Hispanic Other pools individuals who identified as AI/AN or HI/PI, Asian, or multiple race.

Discussion

The findings from Table 5 and Table 6 do not indicate a relationship between satisfaction of health care received and cancer screening utilization among female veterans. However, older female veterans are significantly more likely to have received a PAP smear ever or within the past 12 months compared to younger veterans. However, the significance of older individuals having higher odds of utilization of cancer screening for PAP smear testing is not surprising considering individuals usually receive their first PAP smear around age 21 and are routinely done every three to five years until the age of 65 (ACA, 2021; Women's Health, 2021). Additionally, as with Aim 2, since an individual does not need to go to a secondary facility to receive the test, individuals may be more likely to receive a PAP smear as a part of their gynecologic visit compared to other cancer screening services like mammography testing (which is usually completed at a radiology facility or hospital; CDC, 2021).

The study has several limitations, including: limited sample size which may not accurately reflect the larger population, self-reported measures within NHIS which could result in measurement error, and the study design is a cross-sectional analysis which can only examine the relationship between variables and cannot identify causality. Another limitation of the study is the inability of the analysis to measure endogeneity – patients who are more engaged in health care may be more positive with health care visits and be more likely to utilize cancer screening services like PAP smears; given the data limitations, I was not able to measure this unobserved factor. The sample is a selected sample and only includes people who have utilized health care services in the past year; these individuals have access to health care services and may be more likely to access cancer screening services like PAP smear testing compared to individuals who were not within the selected sample. Further research needs to be done among female veterans

who did not utilize health care services within the past year, which may identify different findings compared to the results of the study analysis (e.g., the population who did not utilize health care services may be a different demographic compared to those who did utilize health care services: may not need health care services, mistrust in the medical system, lack of health literacy, etc.).

A sensitivity analysis was completed using different cutoffs (1 if Very Satisfied and 2 if Other (somewhat satisfied, somewhat dissatisfied, and very dissatisfied)) to improve the level of satisfaction to a higher bar. Logistic regression analyses were run with similar results as using 1 if Satisfied (very satisfied or somewhat satisfied) and 0 if Other (somewhat dissatisfied and very satisfied). Significant findings of the sensitivity analyses include for Aim 1: All insurance types compared to any-private coverage, 65+ individuals compared to 18-25, non-Hispanic Other compared to non-Hispanic White, and survey year 2017 compared to survey year 2013 ($p<0.05$); for Aim 2: all age categories (26-34, 35-49, and 50-64) compared to individuals 18-25 years old, and non-Hispanic Black/African American compared to non-Hispanic Whites ($p<0.05$); for Aim 3: non-Hispanic Black/African American compared to non-Hispanic Whites ($p<0.05$). These preliminary findings suggest that study methods have robustness and should hold up to additional rigorous methodology. Full results are available upon request.

Chapter 5: Summary

Limitations

The limitations of this study include that the data cannot be controlled for types of health care services received; if types of services were controlled for, findings could suggest that these results are only significant for certain services and not others. Secondly, the cross-sectional study design only allows an association between the variables to be determined and not causality.

Another limitation of the study is the inability of the analysis to measure endogeneity (e.g., people may be more likely to utilize health care services if they are happy with the system compared to individuals who are not as happy with the system). The study is also not able to control for veteran deployment into combat zones and military personnel that endure active combat are at increased risk for loss-of-limbs, TBIs, and other health concerns that could increase their need for health care services compared to veterans that were never involved in combat (VA, 2021). The study is also limited in the detailedness of insurance type; the data source does not differentiate between insurance carrier among individuals who have private insurance – some individuals may have better coverage which could result in higher satisfaction of care and increased service utilization. There have also been significant changes in the health care field in the past two decades, especially concerning quality of care after the passage of the *Affordable Care Act of 2010* (ACA) and if older survey years had the necessary variables and were used as part of this study, would the findings be more significant than they were for this study? Has the ACA benefited all sectors of health care services, including individuals who only utilize the VA for all their health care services? Lastly, the data utilized in this paper constitutes a small sample size and may not accurately reflect or be applicable to the larger population.

Conclusion

Veterans of the United States military are a vulnerable population within society and have complex health care needs due to the high-risk situations they may face during service (VA, 2020). And while service members may have access to and receive quality care during their enlistment within the military, the health concerns that servicemembers face do not end with the separation from the military (NIMH, 2020; Reisman, 2016, VA, 2020). The increased health risks that veterans face after their time in the military reinforces the need for high quality care

tailored to the experiences that servicemembers face. While there is very little in the literature regarding patient satisfaction of health care services among veterans based on insurance type and despite complaints among veterans who receive health care within the VA/VHA of poor quality of care, the findings of this study suggest that the complaints among VA patients are true and veterans who have VA-only coverage for health care services are significantly more dissatisfied with the health care services they receive compared to veterans who have any-private insurance coverage. Even compared to veterans who report TRICARE and/or Medicare/Medicaid as part of their health insurance coverage, veterans who have VA-only report higher dissatisfaction of health care services received (even when the p-value is not significant). However, the dissatisfaction that veterans with VA-only coverage does not result in decreased cancer screening service utilization among female veterans.

Future Work

The findings from this study could be used as the basis for further research as well as policy creation. The VA/VHA could do further research among veterans within the VA to determine ways to address health care dissatisfaction among patients, as well as increasing access to health care services. Policymakers could also push for further legislation that would encourage the federal government to allow for veterans to receive services outside of the VA, possibly increasing health care satisfaction among veterans, decreasing barriers to care, and increasing service utilization. Another issue is the situations that servicemembers face that can possibly increase their risk of cancer years after service; if the VA and federal government is unwilling to admit fault for possible carcinogen exposure, then veterans may not have access to compensation via disability payments that are rightfully owed (OncoLink Team, 2020; VA, 2020). This could push for research to possibly link exposures during combat to increased-risk of

cancer. In doing this, it would ensure that all veterans who are eligible receive compensation for exposures during military service to prevent delayed care and diagnostics, while also holding the federal government responsible for exposure risks to military service members (OncoLink Team, 2020; VA, 2020).

Appendix

Figure 1. Variable Table			
Variable Type	Concept	Variable Name and Brief Definition	Recodes
Independent Variable	Health Insurance – hinone, hmprivate, himcaid, himcaire, himilva, himchampany	Name: insur This variable indicates insurance coverage	6 levels: Uninsured, Private, Medicaid, Medicare, VA, and TRICARE, Uninsured; DK/REF will be set to missing
Control Variable	Veteran Status – ARMFFC; Ever active-duty personnel on humanitarian or peacekeeping mission overseas	Name: vetstat This variable indicates veteran status	2 Levels: Yes or no; DK/REF set to missing
Independent Variable /Dependent Variable	Patient Satisfaction - HCSATIS	Name: satis Satisfaction with health care in past 12 months	5 levels: no health care in past 12 months, very satisfied, somewhat satisfied, somewhat dissatisfied, very dissatisfied
Dependent Variable	PAP Smear – Ever papev	Name: vetpap Veterans who have ever had a PAP	2 levels: Yes or no; DK/REF set to missing
Dependent Variable	PAP Smear – Past 12 months paphad1yr	Name: vetpap12 Veterans who have ever had a PAP in past 12 months	2 levels: Yes or no; DK/REF set to missing
Primary Control Variables	1. Race/Ethnicity 2. Gender/sex 3. Age	1. race_ethn 2. sex 3. agecat	Race/Ethnicity will be recoded into 6 levels; Sex into 2 levels; and age into 3 levels
Weighting variables, Variance estimation variables	Survey weight Sample stratification Sample clusters	SAMPWEIGHT STRATA PSU	N/A

Table 1a. Satisfaction of Health Care Among Veterans: No Insurance, Any-Private, Medicare/Medicaid, VA-only insurance, TRICARE, non-institutionalized populations, 2013-2018 NHIS.

	Veterans - Satisfied						Veterans - Dissatisfied					
	Estimates			Total Universe			Estimates			Total Universe		
	Rate	SE	Obs	Count	Obs	Count	Rate	SE	Obs	Count	Obs	Count
Insurance Coverage												
No insurance	84.94%	2.11%	407	2,762,200	17,027	117,486,246	15.06%	2.11%	76	489,689	17,027	117,486,246
Any-Private	96.41%	0.36%	3,916	32,177,476	17,027	117,486,246	3.59%	0.36%	146	1,197,001	17,027	117,486,246
Medicare/Medicaid**	96.42%	0.30%	6,394	40,888,083	17,027	117,486,246	3.58%	0.30%	254	1,518,245	17,027	117,486,246
VA-Only	91.04%	0.73%	2,397	14,265,565	17,027	117,486,246	8.96%	0.73%	224	1,403,215	17,027	117,486,246
TRICARE	95.98%	0.62%	2,236	15,915,903	17,027	117,486,246	4.02%	0.62%	80	667,336	17,027	117,486,246
Age												
18-25	93.91%	2.30%	212	1,974,019	16,487	113,924,736	6.09%	2.30%	13	127,980	840	5,712,445
26-34	90.91%	1.20%	876	7,043,253	16,487	113,924,736	9.07%	1.20%	86	702,649	840	5,712,445
35-49	94.22%	0.59%	2,043	17,096,525	16,487	113,924,736	5.78%	0.59%	142	1,047,956	840	5,712,445
50-64	94.00%	0.49%	3,972	29,436,282	16,487	113,924,736	6.00%	0.49%	273	1,880,194	840	5,712,445
65+	96.76%	0.22%	9,384	58,374,657	16,487	113,924,736	3.24%	0.22%	326	1,953,666	840	5,712,445
Race/Ethnicity												
Non-Hispanic White	95.48%	0.23%	12,922	89,937,081	16,462	113,833,018	4.52%	0.23%	604	4,256,999	840	5,720,903
Non-Hispanic Black/African American	94.95%	0.58%	1,956	13,103,734	16,462	113,833,018	5.05%	0.58%	113	697,585	840	5,720,903
Non-Hispanic Other***	92.92%	1.36%	715	4,064,983	16,462	113,833,018	7.08%	1.36%	58	309,668	840	5,720,903
Hispanic	93.64%	0.98%	869	6,727,220	16,462	113,833,018	6.36%	0.98%	65	456,651	840	5,720,903
Gender												
Male	95.43%	0.21%	15,033	104,782,455	16,490	113,942,533	4.57%	0.21%	733	5,020,073	841	5,721,556
Female	92.89%	0.87%	1,457	9,160,078	16,490	113,942,533	7.11%	0.87%	108	701,483	841	5,721,556

Source: National Health Interview Survey (NHIS), 2013-2018 person files.

Note: **Medicare/Medicaid indicates individuals who have either Medicare, Medicaid, or are dually enrolled. ***Non-Hispanic Other pools individuals who identified as AI/AN or HI/PI, Asian, or multiple race. Standard errors (SE) are calculated using Taylor Series with Stata version 16. Un-weighted sample size is 16,130 and includes individuals aged 18-85.

Table 3a. Cancer Screening Service Utilization Among Female Veterans: Any-Private vs. VA-Only insurance, non-institutionalized populations, 2013/2015/2018 NHIS.

	Veterans - Any-Private Health Insurance						Veterans - VA-Only Insurance					
	Estimates				Total Universe		Estimates				Total Universe	
	Rate	SE	Obs	Count	Obs	Count	Rate	SE	Obs	Count	Obs	Count
PAP Smear (Ever)												
No	2.04%	0.74%	10	44633	427	2861900	1.73%	1.03%	3	11680	427	2861900
Yes	97.96%	0.74%	305	2143644	427	2861900	98.27%	1.03%	109	661943	427	2861900
PAP Smear (Last 12 Months)												
No	47.10%	2.64%	297	1843498	802	5060743	49.06%	4.48	102	562514	802	5060743
Yes	52.90%	2.64%	297	2070657	802	5060743	50.94%	4.48%	106	584074	802	5060743

Source: National Health Interview Survey (NHIS), 2013/2015/2018 person files.

Note: Standard errors (SE) are calculated using Taylor Series with Stata version 16. Un-weighted sample size: 755 and includes individuals aged 18-65

Table 5a. Health Care Satisfaction Among Female Veterans: Satisfied vs. Dissatisfied, non-institutionalized populations, 2013/2015/2018 NHIS.

	Veterans - Satisfied						Veterans - Dissatisfied					
	Estimates				Total Universe		Estimates				Total Universe	
	Rate	SE	Obs	Count	Obs	Count	Rate	SE	Obs	Count	Obs	Count
PAP Smear (Ever)												
No	1.98%	0.53%	18	90,597	728	4,925,227	2.48%	1.83%	2	8,556	728	4,925,227
Yes	98.02%	0.53%	656	4,489,659	728	4,925,227	97.52%	1.83%	52	336,415	728	4,925,227
PAP Smear (Last 12 Months)												
No	48.50%	1.87%	625	3,604,715	1,337	7,954,960	54.89%	6.56%	47	286,964	1,337	7,954,960
Yes	51.50%	1.87%	625	3,827,455	1,337	7,954,960	45.11%	6.56%	40	235,826	1,337	7,954,960

Source: National Health Interview Survey (NHIS), 2013/2015/2018 person files.

Note: Standard errors (SE) are calculated using Taylor Series with Stata version 16. Un-weighted sample size: 755 and includes individuals aged 18-65.

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