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Reassessment of Occupational Health Among U.S. Air Force Remotely Piloted Aircraft (Drone) Operators

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for June 2016 to April 2017

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14. ABSTRACT

MQ-1 Predator and MQ-9 Reaper remotely piloted aircraft (RPA; "drones") operators participate in a diverse range of intelligence, surveillance, and reconnaissance missions, as well as weapon strike missions for close air support to ground troops and aerial sniper missions of enemy combatants. Such operators are required to sustain around-the-clock operations to meet the demand from military leadership requesting weaponized RPAs to support a wide range of global missions. As a result, the health and wellness of the airmen operating such aircraft are paramount to sustaining performance and readiness. As a result, the U.S. Air Force (USAF) School of Aerospace Medicine was requested to conduct a field survey to assess for general areas of health-related behaviors (i.e., sleep and exercise; alcohol, tobacco, and caffeine use; common reasons for seeking medical care and mental health support services; and reasons for increased prescription and over-the-counter medication usage). The purpose of this study was to reevaluate for changes in behavioral health habits among this critical group of military personnel following an earlier study conducted by the USAF School of Aerospace Medicine in 2012. A total of 1161 MQ-1 Predator/MQ-9 Reaper drone operators (pilots, sensor operators, and mission intelligence coordinators) from three USAF major commands within the continental United States completed the web-based survey, resulting in an estimated 40% response rate. Statistical analyses were performed to assess for between-group major command differences to quantitative and qualitative items assessing (a) the amount of sleep obtained before work and the frequency of engaging in structured physical exercise throughout the week; (b) the amount, frequency, and increase regarding consumption of alcohol, tobacco, and caffeine (to include the use of traditional and designer energy drinks) and the reasons for increased consumption; (c) medical conditions worsened by current unit assignment and occupational stress; (d) changes in healthcare utilization (such as medical care, mental health, and alternative health provider services) since being assigned to Predator/Reaper drone operations and the reasons for these changes; and finally (e) increases in medication utilization (i.e., prescription and over-the-counter) since being assigned to Predator/Reaper operations and the reasons for such increases. The results of the study provide empirically based data for shaping line and medical leadership force management strategies geared toward optimizing the health and performance of RPA operators.

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TABLE OF CONTENTS

Section **Page**

TABLE OF CONTENTS (concluded)

Section **Page**

LIST OF TABLES

Page

LIST OF TABLES (concluded)

Page

1.0 SUMMARY

MQ-1 Predator and MQ-9 Reaper remotely piloted aircraft (RPA; commonly referred to in the civilian population as drones) operators participate in a diverse range of intelligence, surveillance, and reconnaissance missions, as well as weapon strike missions for close air support to ground troops and aerial sniper missions of enemy combatants. Such operators are required to sustain around-the-clock operations to meet the demand from military leadership requesting weaponized RPAs to support a wide range of global missions. As a result, the health and wellness of the airmen operating such aircraft are paramount to sustaining performance and readiness. As a result, the U.S. Air Force (USAF) School of Aerospace Medicine was requested by USAF line operator and medical leadership to conduct a field survey to assess for general areas of health-related behaviors (i.e., sleep and exercise; alcohol, tobacco, and caffeine use; common reasons for seeking medical care and mental health support services; and reasons for increased prescription and over-the-counter medication usage). The purpose of this study was to reevaluate for changes in behavioral health habits among this critical group of military personnel following an earlier study conducted by the USAF School of Aerospace Medicine in 2012. Participation in this reexamination was solicited via e-mail invitations sent out to USAF RPA operators. The survey was anonymous, voluntary, and self-report. A total of 1161 MQ-1 Predator/MQ-9 Reaper drone operators (pilots, sensor operators, and mission intelligence coordinators) from three USAF major commands (Air Combat Command, Air Force Special Operations Command, and the Air National Guard) within the continental United States completed the web-based survey, resulting in an estimated 40% response rate. Statistical analyses were performed to assess for between-group major command differences to quantitative and qualitative items assessing (a) the amount of sleep obtained before work and the frequency of engaging in structured physical exercise throughout the week; (b) the amount, frequency, and increase regarding consumption of alcohol, tobacco, and caffeine (to include the use of traditional and designer energy drinks) and the reasons for increased consumption; (c) medical conditions worsened by current unit assignment and occupational stress; (d) changes in healthcare utilization (such as medical care, mental health, and alternative health provider services) since being assigned to Predator/Reaper drone operations and the reasons for these changes; and finally (e) increases in medication utilization (i.e., prescription and over-the-counter) since being assigned to Predator/Reaper operations and the reasons for such increases. The results of the study provide empirically based data for shaping line and medical leadership force management strategies geared toward optimizing the health and performance of RPA operators.

2.0 INTRODUCTION

Over the past 20 years, weaponized military remotely piloted aircraft (RPA) have evolved from an abandoned surveillance platform struggling to find its place in doctrine and strategy to a strategically central and tactically essential part of modern warfare [1]. Although there is a diverse inventory of RPAs utilized by civilian and military agencies, there are only a few military RPAs with weapon-bearing capabilities. The MQ-1 Predator and MQ-9 Reaper have emerged as the primary and most utilized military weapon-bearing RPAs across the globe. Such aircraft have emerged at the forefront among the wide range of RPAs within the U.S. military by performing a variety of around-the-clock, real-time combat-related functions ranging

from intelligence, surveillance, and reconnaissance missions to delivering weapons on targets for close air support and a wide range of precision strike operations [2-4].

Both the MQ-1 Predator and MQ-9 Reaper are medium-size aircraft (e.g., 27-36 feet in length, wingspan of 48-666 feet, 7-12 feet in height) flying at low to high altitudes, with typical speeds between 100-200 mph, with an endurance time of 14-24 hours before needing to be refueled. Although the MQ-1 Predator typically carries two Hellfire missiles, the MQ-9 Reaper may carry up to eight missiles of varying types. Both aircraft are also configured with sensitive cameras that enable a high level of visibility of the terrain, as well as for identification and surveillance of specific targets within the terrain.

As is true with all weapon systems, the efficacy and utility of RPA technology are dependent upon the operators who govern them. Recent research has suggested that the operational demands of the RPA environment may be impacting operators' short-term health behaviors, medical utilization, and emotional well-being [5-9]. Marked by long work hours, rotating shift work schedules, ergonomically taxing workstations, geographically remote assignment locations, and exposure to real-time, graphic images of destruction and death, the Predator/Reaper environment has been shown to be associated with elevated levels of emotional exhaustion, cynicism, and psychological distress in RPA operators [7]. Additionally, the primary factors leading to elevated levels of stress have been shown to be more related to organizational factors (i.e., long work hours, rotating shift work, lack of an adequate number of personnel to carry out missions) than to participation in or exposure to the visual images of war [5,8]. These initial reports suggest that sustaining continuous operations with high workloads, long shifts, and limited manpower may be more detrimental to Predator/Reaper drone operators than their exposure to combat-related images and destruction.

The first large-scale survey of RPA operators' health habits and medical utilization took place in 2012 [6]. Predator/Reaper operators from the thre U.S. Air Force (USAF) major commands (MAJCOMs) with Predator/Reaper missions (Air Combat Command [ACC], Air Force Special Operations Command [AFSOC], and Air National Guard [ANG]) completed an intensive occupational health survey. The results suggested that occupational stress and operational demands of the Predator/Reaper environment appear to be impacting operators' short-term health behaviors and utilization of medical services. The affected health behaviors included inadequate sleep prior to shifts, suboptimal exercise habits, increasing use of alcohol and tobacco, and negative changes in overall health (including using more medication and seeking more medical services) since being assigned to RPA duties [6]. Additionally, the survey suggested that not all RPA environments are created equally and that the different MAJCOMs presented unique cultural, geographic, and operational challenges to their RPA operators.

Following release of the results and recommendations from the large-scale USAF studies assessing the psychological health and behavioral health habits of RPA operators across the MAJCOMs, USAF line and medical leadership embarked on efforts to improve the delivery of warrior- and mission-centric healthcare. This involved embedding medical and mental health providers and technicians, as well as chaplains, within these operational units. The goal was to improve access to consultative support to address the physical, psychological, and spiritual issues affecting health and performance of operators. Team members were proximally located within units with the appropriate security clearances to review, discuss, and respond to classified missions that may affect the health and well-being of operators. Although these teams had a diverse set of duties, one of the goals of these embedded teams included outreach efforts (individual and group consultations with commanders and operators) to address problematic behavioral health habits (i.e., elevated caffeine, energy beverage, and alcohol use, as well as insufficient sleep and exercise habits). The embedded teams were exclusive to most (but not all)

active duty units spread across AFSOC and ACC, and there was no standardized, methodological strategy to draw from for organizing team efforts at a specific location or across the various units. The activities and efforts each of the teams embarked on were based on what team members at each location considered to be more relevant. However, ANG units do not have any embedded teams. The leadership for ANG chose to utilize social workers (titled "Directors of Psychological Health") spread across ANG installations for servicing military personnel including RPA units, as well as the host of other military communities. This involved one social worker per each installation (with or without necessary security clearance) to direct resources for improving and sustaining health of the diverse sets of military personnel communities at the installation.

However, it remains largely unknown if such integrated operational support endeavors have had an impact on improving the behavioral health of such operators across the different MAJCOMs. There is no clear strategy synergizing or directing the efforts of embedded teams or directors of psychological health. The activities and areas for improving the health of operators are at the individual discretionary judgment, experience, and interests of each team or person. As a result, there appears to be no coherent integrated operational support strategy, and the metrics by which such personnel draw from to demonstrate improvements remain largely based on anecdotal quotes or verbal reports from the teams themselves or those solicited from line commander or operators with whom they had interacted. Although integrated operational support endeavors are widely perceived as "needed" and "effective," studies are needed to fully assess the impact at improving health, increasing access to care and healthcare utilization, as well as reducing the prevalence of problematic, maladaptive behavioral health habits for coping with the rigors of the RPA operational environment.

The current study represents an ongoing effort to assess the general health habits of RPA operators (e.g., physical exercise, sleep habits, alcohol, caffeine and tobacco use, and utilization of medical services) to identify factors potentially impacting their health and well-being. As a follow-up survey to the one administered in 2012 [6], these data will also provide feedback to line commanders and medical leadership regarding their efforts to understand and respond to the unique demands of the RPA environment.

The purpose of this study is to reassess behavioral health habits that serve as compensatory strategies for managing occupational stress, as well as assess for differences among ACC, ANG, and AFSOC RPA operators on the following:

(a) Demographic (e.g., age, gender) and occupational (rank, duty position, shift schedule, time on stations, etc.) variables
(b) Health behavior patterns (e.g., the amount of sleep obtained before work and the frequency of physical exercise)
(c) The amount, frequency, and increase in consumption of alcohol, tobacco, and caffeine
(d) Medical conditions made worse by current duty assignment and occupational stress
(e) Changes in healthcare utilization (such as medical care and alternative health provider services) since being assigned to RPA operations
(f) Increases in medication utilization (i.e. prescription and over-the-counter [OTC]) since being assigned to RPA operations

The results from these RPA groups will be discussed in the contexts of U.S. national averages and government recommendations, data collected from a USAF comparison group (support and logistics personnel; see Appendix), as well as the results from the 2012 occupational stress survey of RPA personnel [6]. Investigating the health behaviors and

healthcare utilization trends in the RPA community will provide USAF line and medical leadership with data and trends that will help them better understand the health-related consequences associated with Predator/Reaper operations. This information will aid in the development of strategies for optimizing health and performance and will assist in the development of policies that will maximize the capabilities of RPA operators across and within USAF MAJCOMs.

3.0 METHODS

3.1 Participants

A total of 1,161 MQ-1 Predator/MQ-9 Reaper operators (pilots, sensor operators, and mission intelligence coordinators) participated in the study; 732 (63.05%) were from ACC units, 321 (27.65%) were from ANG units, and 108 (9.30%) were assigned to AFSOC. The total number of airmen assigned to each unit within AFSOC, ANG, and ACC MAJCOMs was obtained from USAF operational leadership. This number was then compared with the number of airmen who participated in the study to obtain an overall response rate for each MAJCOM. The response rate was 43% for ACC, 28% for ANG, and 20% for AFSOC.

3.2 Questionnaire

3.2.1 Demographics Items. The first part of the survey included demographic items that assessed respondents' gender, age range, marital status, and whether or not he/she had dependents at home (children, elderly parents, etc.). This section also contained operational items that assessed unit of assignment, duty position, rank range, length of time serving as a Predator/Reaper operator, average number of hours worked in a typical week, and current work schedule. To maintain anonymity for the respondents, no identifiable personal information was obtained in this section of the questionnaire. This was done to encourage genuine self-disclosure in a community where there may be strong cultural stigmas (and concerns for negative career implications) regarding medical issues.

3.2.2 Health Behavior Items. The second part of the survey consisted of questions designed to assess sleep and physical exercise health behaviors; alcohol, tobacco, and caffeinated beverage use; medical conditions created or made worse by current unit assignment; medical, mental support, and alternative healthcare utilization; and prescription and OTC medication utilization. A list of the items and response options are shown in Table 1.

Table 1. Questions Assessing Health-Related Behaviors and Utilization of Medical Services

Question	Response
Sleep	
On an average calendar day, how many hours of restful sleep do you obtain before reporting for duty and performing the mission?	4 hours or less 5-6 hours 7-8 hours* 9-10 hours* 11 hours or more*
On an average calendar day for which you are scheduled to be off duty, how many hours of restful sleep do you obtain?	4 hours or less 5-6 hours 7-8 hours* 9-10 hours* 11 hours or more*
Have you ever had difficulty commuting to/from work because you thought you might fall asleep at the wheel?	Yes No
If yes, how many times has this occurred in the past month?	*Open response*
Does your operational location have on-site facilities, other than base lodging, to allow for rest, in the event you are too tired to safely commute home after completing an operational shift?	Yes No I don't know
Have you sought a physician's prescription for medication to aid in sleep?	Yes No
If yes, what medication was prescribed?	*Open response*
Have you sought over-the-counter (OTC) medication to aid in sleep?	Yes No
If yes, what OTC medication are you using?	*Open response*
If you take sleep medication of any kind, have you been educated by a physician or pharmacist as to the proper timing of medication as it relates to driving, optimal performing of your work duties and/or operating of heavy or hazardous equipment?	Yes No Not Applicable
Physical Exercise	
How often do you engage in moderate to vigorous, aerobic, physical activity each week (20-30 mins of jogging/running, fast cycling, etc…?	0 days per week 1-2 days per week 3-4 days per week 5-6 days per week* Daily*
How often do you engage in moderate to vigorous strength training (weight lifting or cross-training for at least 20 minutes per exercise session?)	0 days per week 1-2 days per week 3-4 days per week 5-6 days per week* Daily*

Table 1. Questions Assessing Health-Related Behaviors and Utilization of Medical Services (continued)

Question	Response
Do you feel your work schedule allows you to meet your fitness requirements?	Yes No I'm not sure
Alcohol Use	
How often do you have a drink containing alcohol? *(Audit C - Item #1)*	Never Monthly or less 2-4 times a month (once a week or less) 2-3 times a week 4 or more times a week
How many standard drinks containing alcohol do you have on a typical day (standard alcohol serving sizes = 12 oz of beer, or 5 oz of wine, or 1.5 oz of liquor)? *(Audit C - Item #2)*	0; 1; 2; 3; 4; 5; 6; 7; 8; 9; 10+ *Recoded: 0; 1-2; 3-4, 5+*
How often do you have 6+ drinks (containing alcohol) on one occasion? *(Audit C - Item #3)*	Never Less than monthly Monthly Weekly* Daily or Almost Daily*
Since your assignment to this unit, has your use of alcohol changed?	Yes No Not Applicable (Do Not Drink)
If yes, how has it changed?	Do not drink alcohol anymore Alcohol use has decreased Alcohol use has increased *Recoded-Increase: Yes/No*
If your alcohol use changed, to what do you attribute the change?	*Open response*
Tobacco Use	
Do you currently use any kind of nicotine/tobacco product?	Yes No
If yes, what types of nicotine/tobacco products do you use? List all that apply. If you use a product that is not listed, please annotate in the other/comment field. *(multiple check list)*	Smoking tobacco Smokeless tobacco Nicotine alternatives *other*
If you currently smoke tobacco, how frequently do you do so?	Daily Less than daily I don't know Not at all
On average, how many days does one packet of smoking tobacco usually last?	Less than 1 day; 1 day; 2 days; 3 days; 4 days; 5 days; 6 days; 7 days; More than a week

Table 1. Questions Assessing Health-Related Behaviors and Utilization of Medical Services (continued)

Question	Response
Since your assignment to this unit, has your use of smoking tobacco changed?	Yes No Not applicable (do not use tobacco)
If yes, how has it changed?	Do not smoke tobacco anymore Smoking has decreased Smoking has increased *Recoded-Increase: Yes/No*
If you currently use smokeless tobacco, how frequently do you do so?	Daily Less than daily I don't know Not at all
On average, how many days does one packet of smokeless tobacco usually last?	Less than 1 day; 1 day; 2 days; 3 days; 4 days; 5 days; 6 days; 7 days; More than a week
Since your assignment to this unit, has your use of smokeless tobacco changed?	Yes No Not applicable (do not use smokeless tobacco)
If yes, how has it changed?	Do not use smokeless tobacco anymore Use of smokeless tobacco has decreased Use of smokeless tobacco has increased *Recoded-Increase: Yes/No*
If your smokeless tobacco habits have changed, to what you do attribute the change?	*Open response*
If you currently use alternative nicotine products (e-cigarettes, nicotine gum, etc.), how frequently do you do so?	Daily Less than daily I don't know Not at all
On average, how many days does one packet of alternative nicotine product usually last?	Less than 1 day; 1 day; 2 days; 3 days; 4 days; 5 days; 6 days; 7 days; More than a week
Since your assignment to this unit, has your use of alternative nicotine products changed?	Yes No Not applicable (do not use)

Table 1. Questions Assessing Health-Related Behaviors and Utilization of Medical Services (continued)

Question	Response
If yes, how has it changed?	Do not use alternative nicotine products anymore; Use of alternative nicotine products has decreased; Use of alternative nicotine products has increased *Recoded-Increase: Yes/No*
If your use of alternative nicotine products has changed, to what do you attribute the change?	*Open response*
Caffeinated Beverage Use	
Do you consume caffeinated beverages, energy drinks or other types of energy supplements?	Yes No
What caffeinated or energy beverages do you typically drink? From the chart below, please select the number of portions and portion size of each beverage type that you consume on an average day. *(multiple check list)* *(Traditional Caffeine):* Tea; coffee (standard brew); designer coffee (espresso and espresso based drinks like Starbucks); decaf coffee/tea; standard soda (Coke, Pepsi, Diet Coke); high caffeine soda (Dr. Pepper, Mt Dew) *(Designer Caffeine):* Designer energy drink (Monster, Red Bull, Rock Star, etc.); shot-sized energy drink (5-Hour Energy, etc.)	1 portion; 2 portions; 3 portions; 4 portions; 5+ portions *Recoded: 0; 1-2; 3-4; 5+* 6 oz; 8 oz; 10 oz; 12 oz; 16 oz; 24 oz
Do you use other caffeine or energy supplements (ie, NoDoze, Alert, Vivarin, Rip Fuel, etc.)?	Yes No
If yes, which supplements do you use?	*Open response*
How frequently do you use these caffeine/energy supplements?	Occasionally (a few times per month) Frequently (a few times per week) Daily/Almost daily* More than once a day*
Since your assignment to this unit, has your use of caffeinated/energy drinks or stimulants changed?	Yes, it has increased Yes, it has decreased No, it has not changed Not applicable *Recoded-Increase: Yes/No*
If yes, to what do you attribute the change?	*Open response*

Table 1. Questions Assessing Health-Related Behaviors and Utilization of Medical Services (continued)

Question	Response
Have you ever consulted with a physician for medical assistance in maintaining alertness?	Yes No N/A
If yes, what recommendations or medications were prescribed by the physician?	*Open response*
Medical Conditions	
Please list any medical conditions you have that you believe have been created by or made worse by your current duties or occupational stress: (*multiple check list*)	sleep issues; nausea; bowel issues; *Recoded-combined categories:* Headaches; eye strain / vision problems; *Recoded-combined categories:* neck pain; back pain; chest pain; *Recoded-combined categories:* heart palpitations; high blood pressure; heartburn; *Recoded-combined categories:* depression; anxiety; *other (open response)*
Medical Services Utilization	
In general, since your current assignment, has your use of medical services changed?	Yes No
If yes, how has it changed?	Do not use medical services Use of medical services has decreased Use of medical services has increased *Recoded-Increase: Yes/No*
If your use of medical support services has changed, to what do you attribute the change?	*Open response*
Alternative Health Services Utilization	
Have you sought treatment from an alternative health provider (e.g. chiropractor, massage therapist, acupuncturist) for the medical condition(s) listed above while in your current assignment?	Yes No
If yes, has the frequency of treatment changed since your current assignment?	It has increased It has decreased *Recoded-Increase: Yes/No*
To what do you attribute the change?	*Open response*

Table 1. Questions Assessing Health-Related Behaviors and Utilization of Medical Services (concluded)

Question	Response
Prescription Medication Utilization	
Has your usage of prescription medication(s) changed since arrival at your current assignment?	Yes No
If yes, how has it changed?	It has increased It has decreased *Recoded-Increase: Yes/No*
To what do you attribute the change?	*Open response*
Over-The-Counter Medication Utilization	
Has your usage of over-the-counter medication (OTC) changed since arrival at your current assignment?	Yes No
If yes, how has it changed?	It has increased It has decreased *Recoded-Increase: Yes/No*
To what do you attribute the change?	*Open response*

Note: * indicates response categories that were combined for analyses for current paper.

3.3 Procedure

Participation was advocated by line leadership (group, squadron, and flight commanders from USAF active duty, ANG, and Reserve units) across MAJCOMs via e-mail to RPA operators through their USAF e-mail accounts. The e-mail invitation to participate informed airmen that participation was voluntary and anonymous. Line leadership participation invitations stated the purpose of the survey was to gain a better understanding of the health habits and behaviors of RPA operators to identify ways to improve health and morale.

The group e-mail invitation to participate contained an internet link to the USAF School of Aerospace Medicine web-based survey. The introductory text stated that the study was conducted by independent researchers and participation was voluntary and anonymous. The introductory page also gave the purpose of and instructions for the study and informed participants that operational leadership would not have access to individual responses and results would be presented in a summarized format at the squadron level. It was also communicated to participants that they could withdraw at any time without negative repercussions. The web page also had a list of flight medicine physicians and aeromedical psychologists as points of contact for each MAJCOM if an operator had questions or concerns related to his or her health and well-being. Participants were encouraged to contact the point of contact at their respective MAJCOM if they were interested in discussing their health, especially if any items on the survey raised personal concerns.

Before participants could begin the electronic survey, they were asked if they understood the nature, purpose, and instructions of the survey and were voluntarily consenting to participate. Those who endorsed “yes” were then allowed to proceed and take the survey. Those who endorsed “no” were not given the survey and were redirected to another web page that instructed them how to contact the independent researchers of the study for additional information. Seventeen individuals declined participation after reading the informed consent section of the introductory web page for the survey.

The survey was distributed electronically via a Department of Defense-approved electronic survey tool. Respondents completed the survey online at their work site. In general, it took respondents 25 to 30 minutes to complete the survey. After completing the survey, they were given instructions regarding when and how to obtain the general results of the study.

3.4 Data Analysis

3.4.1 Quantitative Analyses. Group frequencies and proportion comparisons among MAJCOMs and between MAJCOMs and the support and logistics comparison group were calculated for the following items:

- Demographics (gender, age range, marital status, and children dependents at home)
- Occupational variables (rank range, time on station, shift schedule, shift rotation frequency, and hours worked per week)
- Health behaviors relating to sleep (average number of hours of sleep before work, difficulty commuting to/from work, access to on-site facilities for rest, sought prescription/OTC medication to aid in sleep, and receiving education for timing of medication) and exercise (average number of days engaged in moderate physical exercise/strength training per week and schedule allowances for fitness requirements)
- Poor health habits (alcohol use-frequency, number of drinks per occasion, and Audit C results; tobacco use and frequency for smoking tobacco, smokeless tobacco, and alternative nicotine; as well as caffeine and energy beverage use and portions per day) and increases in poor health habits
- Medical conditions perceived to be created or worsened by unit assignment or occupational stress
- Increased or decreased healthcare utilization (medical and alternative health services)
- Increased medication utilization (prescription and OTC)

Independent proportion sample size assumptions were violated in instances where $n < 5$ (see annotation *a* in tables). One multinomial logistic regression and three sets of binary logistic regressions were run for each variable of interest. The multinomial logistic regression compared each MAJCOM to the support and logistics comparison group. For the binary logistic regressions, one analysis compared ACC to ANG and predicted for ACC group membership. The next analysis compared AFSOC to ANG and predicted for AFSOC group membership. The last analysis compared AFSOC to ACC and predicted for AFSOC group membership. Logistic regressions were not run in instances where sample size assumptions were not met for the outcome variable. The MAJCOM groups were required to have $n \geq 30$, and the individual categories for each predictor required $n \geq 5$ to be included in the logistic regression analysis. A statistical significance level of $p < 0.05$ was established a priori. In instances of significant chi-squares where the predicted category has a lower odds ratio (OR) than the comparison category, the inverse of the odds ratio and 95% confidence interval (CI) is noted in the table notes.

The comparison category is indicated for each categorical predictor by "a" in each of the tables. Comparison categories were chosen based upon a series of factors. The first consideration for comparison category coding was to maintain consistency with the 2012 methodology. For health behaviors, comparison categories were chosen based on healthy levels recommended by national standards and/or the scientific literature (e.g., 7-8 hours of sleep per night, 3-4 days of moderate exercise per week). For all other variables included in the logistic regression analyses,

the comparison category was assigned to be the baseline category response (e.g., no increase in alcohol use, no tobacco use, etc.).

3.4.2 Qualitative Analyses. A behavioral science researcher performed qualitative analyses on textual responses to the open-ended, write-in response items in Table 1. The semantics of participants' textual responses were analyzed and coded into a list of categories. The frequency of coded responses for each semantic category was computed and the top three to five responses are reported.

3.4.3 Additional Analyses. Potentially hazardous alcohol consumption was assessed using the Alcohol Use Disorders Identification Test (AUDIT-C) and its recommended thresholds for men and women [10]. The AUDIT-C is a three-item alcohol screening tool that identifies individuals who are hazardous drinkers or may have active alcohol use disorders. Each of the three items is scored on a scale of 0-4, and the total AUDIT-C score is on a scale of 0-12 [10]. The score thresholds for hazardous drinking are defined as 4 or higher for males and 3 or higher for females [11]. At these thresholds, sensitivities for identification of risky drinking behavior and/or an alcohol use disorder have been shown to be between 0.79-0.86 for men and between 0.48-0.67 for women. Specificities have been shown to be between 0.72-0.89 for men and 0.91-0.94 for women [11]. Because the AUDIT-C is intended as a brief screening tool, an additional threshold has been recommended, accounting for the removal of individuals who met the threshold based solely on their response to item 1 ("How often do you have a drink containing alcohol?") and is based upon the AUDIT-C guidelines from the Substance Abuse and Mental Health Services Administration [11]. Individual who consume one drink containing alcohol per day would technically meet the AUDIT-C threshold for hazardous drinking although they would also fall within the limits of moderate drinking established by the U.S. Department of Health and Human Services (DHHS) Dietary Guidelines for Americans [12]. Therefore, both thresholds were used for both men and women in this study.

In some instances, categories from the items in Table 1 were combined to increase sample size. These response categories are indicated with an asterisk (*) in the table. Other instances required recoding the variable. These instances are noted in *italics* in the table.

A series of items in the survey addressed utilization of mental health resources. However, a technical issue in the computer coding logic resulted in missing data for more than 70% of respondents for this series of questions. Therefore, data regarding increased mental healthcare utilization are not included in this report.

In similar healthcare utilization item sequences, the first item addresses usage, a second question asks if there is a change in usage, a third item asks the direction of change (increase/decrease), and a fourth item asks for a reason or attribution for the change. The number of responses for the fourth item in the sequence (the attribution item) is therefore smaller than the number of responses to the first item. For this reason, percentages for increased poor health habits, increased and decreased healthcare utilization, and increased medication utilization were computed using the overall group n for each MAJCOM.

4.0 RESULTS

4.1 Demographics

The final dataset of RPA operators included 732 ACC, 321 ANG, and 108 AFSOC respondents. The support and logistics comparison group included 115 respondents from ACC, ANG, and AFSOC (results showing comparisons with the support and logistics group are presented in the Appendix). Demographics for RPA operators overall, as well as for ACC, ANG, and AFSOC separately, are shown in Table 2 along with group proportion comparison results. A summary of significant results is listed below:

Table 2. Demographics by MAJCOM and RPA Operators Overall and Proportion Comparisons

Demographics and Occupational Variables	Total		ACC		ANG		AFSOC		% ACC/ANG *p*	% AFSOC/ANG *p*	% AFSOC/ACC *p*
	n	%	n	%	n	%	n	%			
Gender											
Male	1016	88.12	637	87.86	293	91.56	86	79.63	.08	.00	.02
Female	137	11.88	88	12.14	27	8.44	22	20.37	.08	.00	.02
Age Range (yr)											
18-25	205	17.75	157	21.57	23	7.21	25	23.15	.00	.00	.71
26-30	328	28.40	243	33.38	51	15.99	34	31.48	.00	.00	.70
31-35	302	26.15	208	28.57	76	23.82	18	16.67	.11	.12	.01
36-40	182	15.76	76	10.44	82	25.71	24	22.22	.00	.47	.00
41+	138	11.95	44	6.04	87	27.27	7	6.48	.00	.00	.86
Marital Status											
Single	408	35.20	274	37.48	90	28.04	44	41.12	.00	.01	.47
Married	751	64.80	457	62.52	231	71.96	63	58.88	.00	.01	.47
Dependents at Home											
Yes	605	52.11	356	48.63	205	63.86	44	40.74	.00	.00	.13
No	556	47.89	376	51.37	116	36.14	64	59.26	.00	.00	.13
Rank Range											
Enlisted	573	49.74	345	47.46	175	54.86	53	50.00	.03	.38	.62
Officer	579	50.26	382	52.54	144	45.14	53	50.00	.03	.38	.62
Time on Station (mo)											
≤ 24	595	51.38	426	58.36	96	29.91	73	68.22	.00	.00	.05
> 24	563	48.62	304	41.64	225	70.09	34	31.78	.00	.00	.05
Shift Schedule											
Standard Day	233	20.16	141	19.32	80	25.08	12	11.21	.04	.00	.04
Shift Work	923	79.84	589	80.68	239	74.92	95	88.79	.04	.00	.04
Shift Rotation Frequency (days)											
≤ 30*	284	24.70	91	12.48	143	45.54	50	46.73	.00	.83	.00
31-60	495	43.04	454	62.28	25	7.96	16	14.95	.00	.04	.00
61+	68	5.91	13	1.78	37	11.78	18	16.82	.00	.18	.00
Variable*	31	2.70	1	0.14	24	7.64	6	5.61	*a*	.48	*a*
Permanent	27	2.35	5	0.69	19	6.05	3	2.80	*a*	.19	*a*
N/A	245	21.30	165	22.63	66	21.02	14	13.08	.56	.07	.02
Hours Worked per Week											
40-50	707	60.90	399	54.51	258	80.37	50	46.30	.00	.00	.11
51+	454	39.10	333	45.49	63	19.63	58	53.70	.00	.00	.11

Note: N/A = does not rotate shifts. *a* indicates sample size assumption (n ≥ 5) was not met for proportions analysis.
*Categories combined in logistic regression analyses.

- A larger proportion of ACC respondents (compared to ANG) were ages 18-30, officers, single, had no dependents at home, 24 months or less in their current unit, work shift work, rotate shifts every 31-60 days, and work over 50 hours per week.

- A larger proportion of AFSOC respondents (compared to ANG) were female, ages 18-30, single, had no dependents at home, 24 months or less in their current unit, work shift work, rotate shifts every 31-60 days, and work over 50 hours per week.
- A larger proportion of AFSOC respondents (compared to ACC) were female, ages 36-40, 24 months or less in their current unit, work shift work, rotate shifts every 30 days or less, and rotate shifts every 61 days or more.
- A larger proportion of ANG respondents (compared to ACC) were ages 36 or older, enlisted, married, have dependents at home, 25 months or more in their current unit, work standard days, rotate every 30 days or less, rotate shifts every 61 days or more, and work 30-50 hours per week.
- A larger proportion of ANG respondents (compared to AFSOC) were male, ages 41+, married, have dependents at home, 25 months or more in their current unit, work standard days, and work 30-50 hours per week.
- A larger proportion of ACC respondents (compared to AFSOC) were male, ages 31-35, 25 months or more in their current unit, standard days (and do not rotate shifts), and rotate shifts every 31-60 days.

Results for logistic regressions predicting ACC group membership compared to ANG, AFSOC group membership compared to ANG, and AFSOC group membership compared to ACC are shown in Table 3.

4.2 Sleep and Physical Exercise Health Behaviors

Comparisons of group proportions for each response category are shown in Table 4. A summary of significant results is listed below:

- A larger proportion of AFSOC respondents reported *No* or *I Don't Know* to having access to on-site facilities for rest when compared to both ACC and ANG. In addition, a larger proportion of ANG reported *No* to having access when compared to ACC.
- A larger proportion of both ANG and AFSOC reported seeking prescription medication to aid in sleep when compared to ACC.
- A larger proportion of ANG reported receiving proper education on timing medication for aid in sleep when compared to ACC.
- A larger proportion of both AFSOC and ACC reported strength training 5-6 days a week when compared to ANG.

The open-ended, follow-up write-in response item to difficulty commuting to/from work because you thought you might fall asleep at the wheel, asking "if yes, how many times has this occurred in the past month?," was recoded into a numerical variable whenever the open response provided enough information for a numerical value. Responses for ACC ranged from 0-15 days, with mean = 2.30 days (standard deviation (SD) = 2.44), median = 2 days, and mode = 0 days. Responses for ANG ranged from 0-20 days, with mean = 2.63 days (SD = 3.66), median = 2 days, and mode = 0 days. Responses for AFSOC ranged from 0-10 days, with mean = 2.33 days (SD = 2.77), median = 1 day, and mode = 0 days.

Table 3. Logistic Regression Results for MAJCOM Demographics

Demographics and Occupational Variables	ACC / ANG			AFSOC / ANG			AFSOC / ACC		
	OR [95% CI]	Omnibus $\chi^2(df)$	*p*	OR [95% CI]	Omnibus $\chi^2(df)$	*p*	OR [95% CI]	Omnibus $\chi^2(df)$	*p*
Gender									
Male[a]		3.24(1)	.07		10.20(1)	< .01		4.99(1)	.03
Female	1.50 [0.95, 2.36]			2.78* [1.51, 5.12]			1.85* [1.10, 3.11]		
Age Range									
18-25[a]		162.54(4)	< .01		47.05(4)	< .01		14.89(4)	< .01
26-30	0.70 [0.41, 1.19]			0.61 [0.30, 1.25]			0.88 [0.51, 1.53]		
31-35	0.40*[b] [0.24, 0.67]			0.22*[c] [0.10, 0.47]			0.54 [0.29, 1.03]		
36-40	0.14*[d] [0.08, 0.23]			0.27*[e] [0.13, 0.56]			1.98* [1.06, 3.70]		
41+	0.07*[f] [0.04, 0.13]			0.07*[g] [0.03, 0.19]			0.99 [0.41, 2.46]		
Marital Status									
Single[a]		8.66(1)	< .01		5.79(1)	.02		0.47(1)	.50
Married	0.65*[h] [0.49, 0.87]			0.57*[i] [0.36, 0.90]			0.87 [0.57, 1.32]		
Dependents at Home									
Yes[a]		21.02(1)	< .01		17.58(1)	< .01		2.37(1)	.12
No	1.87* [1.43, 2.45]			2.57* [1.65, 4.02]			1.38 [0.91, 2.08]		
Rank Range									
Enlisted[a]		4.87(1)	.03		0.75(1)	.39		0.24(1)	.62
Officer	1.35* [1.03, 1.75]			1.22 [0.78, 1.89]			0.90 [0.60, 1.36]		
Time on Station (mo)									
≤ 24	3.28* [2.48, 4.35]			5.03* [3.14, 8.07]			1.53* [0.99, 2.36]		
> 24[a]		73.77(1)	< .01		48.82(1)	< .01		3.87(1)	.05
Shift Schedule									
Standard Day[a]		4.33(1)	.04		10.10(1)	< .01		4.55(1)	.03
Shift Work	1.40* [1.02, 1.91]			2.65* [1.38, 5.08]			1.90* [1.01, 3.55]		
Shift Rotation Frequency (days)									
≤ 30 or as needed	0.22*[j] [0.15, 0.32]			1.58 [0.82, 3.03]			7.17* [3.77, 13.59]		
31-60	7.26* [4.43, 11.90]			3.02* [1.29, 7.08]			0.42*[k] [0.20, 0.87]		
61+	0.14*[l] [0.07, 0.28]			2.29* [1.02, 5.14]			16.32* [6.65, 40.06]		
Permanent	0.11*[m] [0.04, 0.29]			0.74 [0.19, 2.86]			7.07 [1.53, 32.72]		
N/A[a]		384.52(4)	< .01		9.83(4)	.04		152.70(4)	< .01
Hours Worked per Week									
30-50[a]		67.69(1)	< .01		43.38(1)	< .01		2.54(1)	.11
51+	3.42* [2.50, 4.67]			4.75* [2.98, 7.59]			1.39 [0.93, 2.08]		

Note: * indicates significant chi-square ($p < .05$) and OR.
[a]Indicates comparison category for predictor.
[b]Inverse OR = 2.49, 95% CI [1.50, 4.16].
[c]Inverse OR = 4.59, 95% CI [2.14, 9.86].
[d]Inverse OR = 7.36, 95% CI [4.30, 12.61].
[e]Inverse OR = 3.71, 95% CI [1.80, 7.68].
[f]Inverse OR = 13.50, 95% CI [7.65, 23.83].
[g]Inverse OR = 13.51, 95% CI [5.19, 35.14].
[h]Inverse OR = 1.53, 95% CI [1.15, 2.04].
[i]Inverse OR = 1.76, 95% CI [1.12, 2.79].
[j]Inverse OR = 4.54, 95% CI [3.10, 6.65].
[k]Inverse OR = 2.41, 95% CI [1.15, 5.04].
[l]Inverse OR = 7.12, 95% CI [3.56, 14.23].
[m]Inverse OR = 9.50, 95% CI [3.41, 26.49].

Table 4. Health Behaviors by MAJCOM and RPA Operators Overall and Proportion Comparisons

Health Behaviors	Total		ACC		ANG		AFSOC		% ACC/ANG *p*	% AFSOC/ANG *p*	% AFSOC/ACC *p*
	n	%	n	%	n	%	n	%			
Hours of Sleep before Work											
4 or less	92	7.93	58	7.93	26	8.10	8	7.41	.93	.82	.85
5-6	690	59.48	447	61.15	177	55.14	66	61.11	.07	.28	.99
7-8	370	31.90	221	30.23	116	36.14	33	30.56	.06	.29	.95
9 or more	8	0.69	5	0.68	2	0.62	1	0.93	*a*	*a*	*a*
Hours of Sleep Off Duty											
4 or less	20	1.72	11	1.50	6	1.86	3	2.78	.67	*a*	*a*
5-6	196	16.87	111	15.16	65	20.19	20	18.52	.04	.71	.37
7-8	651	56.02	396	54.10	203	63.04	52	48.15	.01	.01	.25
9 or more	295	25.39	214	29.23	48	14.91	33	30.56	.00	.00	.78
Difficulty Commuting to/from Work											
Yes	621	53.53	402	54.99	166	51.71	53	49.07	.33	.64	.25
No	539	46.47	329	45.01	155	48.29	55	50.93	.33	.64	.25
On-Site Facilities for Rest											
Yes	751	64.80	516	70.59	205	63.86	30	28.04	.03	.00	.00
No	307	26.49	159	21.75	95	29.60	53	49.53	.01	.00	.00
I don't know	101	8.71	56	7.66	21	6.54	24	22.43	.52	.00	.00
Sought RX to Aid in Sleep											
Yes	177	15.27	83	11.37	72	22.43	22	20.37	.00	.65	.01
No	982	84.73	647	88.63	249	77.57	86	79.63	.00	.65	.01
Sought OTC to Aid in Sleep											
Yes	269	23.19	172	23.53	74	23.05	23	21.30	.87	.71	.61
No	891	76.81	559	76.47	247	76.95	85	78.70	.87	.71	.61
Received Timing of Medication Education											
Yes	214	18.66	107	14.76	85	26.81	22	20.95	.00	.23	.10
No	224	19.53	140	19.31	61	19.24	23	21.90	.98	.55	.53
N/A	709	61.81	478	65.93	171	53.94	60	57.14	.00	.57	.08
Aerobic Exercise per Week											
None	63	5.43	42	5.74	16	5.00	5	4.63	.63	.88	.64
1-2 times	400	34.48	250	34.15	111	34.69	39	36.11	.87	.79	.69
3-4 times	508	43.79	321	43.85	142	44.38	45	41.67	.88	.62	.67
5-6 times	141	12.16	89	12.16	36	11.25	16	14.81	.68	.33	.44
Daily	48	4.14	30	4.10	15	4.69	3	2.78	.66	*a*	*a*
Strength Training per Week											
None	192	16.55	125	17.10	52	16.20	15	13.89	.72	.57	.40
1-2 times	457	39.40	279	38.17	140	43.61	38	35.19	.10	.12	.55
3-4 times	335	28.88	204	27.91	97	30.22	34	31.48	.45	.81	.44
5-6 times	137	11.81	96	13.13	22	6.85	19	17.59	.00	.00	.21
Daily	39	3.36	27	3.69	10	3.12	2	1.85	.64	*a*	*a*
Schedule Allows for Fitness Requirements											
Yes	531	45.82	282	38.63	196	61.06	53	49.07	.00	.03	.04
No	544	46.94	394	53.97	100	31.15	50	46.30	.00	.00	.14
I'm not sure	84	7.25	54	7.40	25	7.79	5	4.63	.82	.27	.29

Note: a indicates sample size assumption ($n \geq 5$) was not met for proportions analysis.

Logistic regression results predicting ACC group membership compared to ANG, AFSOC group membership compared to ANG, and AFSOC group membership compared to ACC are shown in Table 5.

The results of qualitative analyses of participants' textual responses to the open-ended, write-in response item revealed the most frequently cited prescription (RX) medication to aid in sleep was *Ambien* across the three MAJCOMs; however, many responses indicated that Ambien was not prescribed due to Air Force regulations. The most frequently cited OTC medications to aid in sleep were *melatonin*, *ZZZQuil*, *Advil PM*, *Benadryl*, and *Tylenol PM*.

Table 5. Logistic Regression Results for MAJCOM Health Behaviors

Sleep and Exercise	ACC / ANG			AFSOC / ANG			AFSOC / ACC		
	OR [95% CI]	Omnibus $\chi^2(df)$	*p*	OR [95% CI]	Omnibus $\chi^2(df)$	*p*	OR [95% CI]	Omnibus $\chi^2(df)$	*p*
Hours of Sleep before Work									
4 or less	1.17 [0.70, 1.95]			1.07 [0.44, 2.57]			0.92 [0.40, 2.09]		
5-6	1.32 [0.99, 1.75]			1.29 [0.81, 2.08]			0.98 [0.63, 1.53]		
7 or more[a]		3.66(2)	.16		1.20(2)	.55		0.04(2)	.98
Hours of Sleep Off-Duty									
4 or less	0.75 [0.28, 2.06]			1.48 [0.36, 6.03]			1.96 [0.54, 7.16]		
5-6	0.70 [0.50, 0.99]			0.91 [0.52, 1.59]			1.29 [0.76, 2.19]		
7 or more[a]		4.24(2)	.12		0.43(2)	.81		1.68(2)	.43
Difficulty Commuting to/from Work									
Yes	1.14 [0.88, 1.48]			0.90 [0.58, 1.39]			0.79 [0.53, 1.18]		
No[a]		0.97(1)	.33		0.23(1)	.64		1.32(1)	.25
On-Site Facilities for Rest									
Yes[a]		7.36(2)	.03		46.59(2)	.00		71.59(2)	.00
No	0.67*[b] [0.49, 0.90]			3.81* [2.29, 6.35]			5.73* [3.54, 9.28]		
I don't know	1.06 [0.63, 1.79]			7.81* [3.88, 15.72]			7.37* [4.03, 13.48]		
Sought RX to Aid in Sleep									
Yes	0.44*[c] [0.31, 0.63]			0.89 [0.52, 1.51]			1.99* [1.18, 3.36]		
No[a]		20.45(1)	< .01		0.20(1)	.65		6.15(1)	.01
Sought OTC to Aid in Sleep									
Yes	1.03 [0.75, 1.40]			0.90 [0.53, 1.53]			0.88 [0.54, 1.44]		
No[a]		0.03(1)	.87		0.14(1)	.70		0.27(1)	.61
Received Timing of Medication Education									
Yes[a]		21.51(2)	< .01		1.54(2)	.46		3.51(2)	.17
No	1.82* [1.21, 2.76]			1.46 [0.75, 2.85]			0.80 [0.42, 1.51]		
N/A	2.22*[1.59, 3.10]			1.36 [0.78, 2.36]			0.61 [0.36, 1.04]		
Aerobic Exercise per Week									
None	1.16 [0.63, 2.13]			0.99 [0.34, 2.84]			0.85 [0.32, 2.26]		
1-2 times	1.00 [0.74, 1.34]			1.11 [0.68, 1.82]			1.11 [0.70, 1.76]		
3-4 times[a]		0.27(3)	.97		0.34(3)	.95		0.53(3)	.91
5-6 times, daily	1.03 [0.70, 1.51]			1.18 [0.63, 2.20]			1.14 [0.64, 2.03]		
Strength Training per Week									
None	1.14 [0.76, 1.71]			0.82 [0.41, 1.65]			0.72 [0.38, 1.38]		
1-2 times	0.95 [0.69, 1.30]			0.77 [0.46, 1.32]			0.82 [0.50, 1.34]		
3-4 times[a]		9.82(3)	.02		7.08(3)	.07		1.61(3)	.66
5-6 times, daily	1.83 [1.16, 2.89]			1.87 [0.95, 3.68]			1.02 [0.57, 1.85]		
Schedule Allows for Fitness Requirements									
Yes[a]		49.59(2)	.00		8.09(2)	.02		4.69(2)	.10
No	2.72* [2.05, 3.61]			1.83* [1.16, 2.89]			0.67 [0.45, 1.02]		
I'm not sure	1.50 [0.90, 2.50]			0.74 [0.27, 2.03]			0.49 [0.19, 1.29]		

Note: No analyses were significant at $p < .05$.
[a]Indicates comparison category for predictor.
[b]Inverse OR = 1.50, 95% CI [1.11, 2.03].
[c]Inverse OR = 2.25, 95% CI [1.59, 3.19].

4.3 Poor Health Habits (Alcohol, Tobacco, Caffeine Use)

4.3.1 Alcohol Use. Comparisons of group proportions for each response category, split by age ranges 18-25 and 26+ years, are shown in Table 6. A summary of significant results is listed below:

- A larger proportion of ACC respondents ages 26+ years reported alcohol consumption 4+ times a week when compared to ACC respondents 18-25 years.
- A larger proportion of male ACC respondents ages 26+ years reported consuming 1-2 alcoholic drinks per day when compared to male ACC respondents ages 18-25 years, with a larger proportion reporting consuming 0 alcoholic drinks per day.
- A larger proportion of female AFSOC respondents ages 18-25 years reported consuming 1-2 alcohol drinks per day when compared to female AFSOC respondents ages 26+.
- A larger proportion of ACC respondents ages 26+ years reported *Never* consuming 6+ drinks on one occasion when compared to ACC respondents ages 18-25.

18-25 years MAJCOM comparisons:

- No significant comparisons

26+ years MAJCOM comparisons:

- A larger proportion of ACC respondents reported *Never* drinking compared to ANG.
- A larger proportion of ANG respondents reported alcohol consumption 2-4 times a month when compared to ACC.
- A larger proportion of AFSOC respondents reported monthly consumption of 6+ alcoholic drinks on one occasion when compared to ANG or ACC.
- A larger proportion of AFSOC respondents reported an increase in alcohol consumption when compared to ACC respondents.

A summary of logistic regression results predicting ACC group membership compared to ANG, AFSOC group membership compared to ANG, and AFSOC group membership compared to ACC, split by age group (18-25 years and 26+ years), is shown in Table 7.

The results of qualitative analyses of participants' textual responses to the open-ended, write-in response item revealed the most frequently cited reasons for an increase in alcohol use included *occupational and personal stress* and *shift work* across the three MAJCOMs. In addition, ANG and ACC reported *social climate and squadron events promoting alcohol usage*.

Table 6. Alcohol Use, Elevated Use, Increased Use by Age Range, RPA Operators Overall, and by MAJCOM and Proportion Comparisons

Alcohol Use	18-25 years								26+ years							
	Total		ACC		ANG		AFSOC		Total		ACC		ANG		AFSOC	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Alcohol Frequency																
Never	39	18.93	32	20.38	4	16.67	3	12.00	128	13.47	85	14.89[a]	30	10.14[a]	13	15.66
Monthly or less	52	25.24	36	22.93	8	33.33	8	32.00	269	28.32	166	29.07	81	27.36	22	26.51
2-4x a month	73	35.44	54	34.39	11	45.83	8	32.00	307	32.32	172	30.12[a]	109	36.82[a]	26	31.33
2-3x a week	37	17.96	30	19.11	1	4.17	6	24.00	172	18.11	103	18.04	54	18.24	15	18.07
4+ x a week	5	2.43	5	3.18*	0	0.00	0	0.00	74	7.79	45	7.88*	22	7.43	7	8.43
Drinks Per Day Males																
0	93	49.47	69	47.59*	15	57.69	9	52.94	352	35.06	188	32.92*	141	38.95	23	32.39
1-2	68	36.17	53	36.55*	9	34.62	6	35.29	507	50.50	297	52.01*	175	48.34	35	49.30
3-4	26	13.83	22	15.17	2	7.69	2	11.76	125	12.45	75	13.13	40	11.05	10	14.08
5+	1	0.53	1	0.69	0	0.00	0	0.00	20	19.92	11	1.93	6	1.66	3	4.23
Drinks Per Day Females																
0	28	49.12	21	51.22	4	66.67	3	30.00	49	41.53	31	44.29	13	38.24	5	35.71
1-2	24	42.11	15	36.59	2	33.33	7	70.00*	62	52.54	36	51.43	19	55.88	7	50.00*
3-4	5	8.77	5	12.20	0	0.00	0	0.00	7	5.93	3	4.29	2	5.88	2	14.29
5+	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Drinks Per Day Threshold Males (3+)																
0-2	161	85.64	122	84.14	24	92.31	15	88.24	859	85.56	485	84.94	316	87.29	58	81.69
3+	27	14.36	23	15.86	2	7.69	2	11.76	145	14.44	86	15.06	46	12.71	13	18.31
Drinks Per Day Threshold Females (2+)																
0-1	45	78.95	32	78.05	5	83.33	8	80.00	84	71.19	50	71.43	24	70.59	10	71.43
2+	12	21.05	9	21.95	1	16.67	2	20.00	34	28.81	20	28.57	10	29.41	4	28.57
6+ drinks per Occasion																
Never	115	55.83	86	54.78*	14	58.33	15	60.00	592	62.32	368	64.45*	175	59.12	49	59.04
Less than Monthly	74	35.92	57	36.31	8	33.33	9	36.00	289	30.42	167	29.25	99	33.45	23	27.71
Monthly	15	7.28	13	8.28	2	8.33	0	0.00	56	5.89	27	4.73[b]	18	6.08[c]	11	13.25[b,c]
Weekly/Daily	2	0.97	1	0.64	0	0.00	1	4.00	13	1.37	9	1.58	4	1.35	0	0.00
AUDIT-C Threshold Males																
Above	43	27.04	33	26.61	5	26.32	5	31.25	219	25.80	127	24.95	69	25.46	23	33.33
Below	116	72.96	91	73.39	14	73.68	11	68.75	630	74.20	382	75.05	202	74.54	46	66.67
AUDIT-C Secondary Threshold Males																
Above	43	27.04	33	26.61	5	26.32	5	31.25	203	23.91	119	23.38	64	23.62	20	28.99
Below	116	72.96	91	73.39	14	73.68	11	68.75	646	76.09	390	76.62	207	76.38	49	71.01
AUDIC-C Threshold Females																
Above	11	23.91	10	31.25	0	0.00	1	11.11	26	28.26	15	26.79	7	30.43	4	30.77
Below	35	76.09	22	68.75	5	100.00	8	88.89	66	71.74	41	76.21	16	69.57	9	69.23
AUDIT-C Secondary Threshold Females																
Above	10	21.74	9	28.13	0	0.00	1	11.11	15	16.30	7	12.50	5	21.74	3	23.08
Below	36	78.26	23	71.88	5	100.00	8	88.89	77	83.70	49	87.50	18	78.26	10	76.92
Alcohol Increase																
Yes	33	16.02	26	16.56	4	16.67	3	12.00	131	13.77	71	12.41[b]	42	14.19	18	21.69[b]
No	173	83.98	131	83.44	20	83.33	22	88.00	820	86.23	501	87.59	254	85.81	65	78.31

Note: Significant proportion comparisons: * between the age range groups per MAJCOM. In instances where sample size assumptions ($n \geq 5$) were not met for proportions analysis, the analysis was not run.
[a]ACC vs. ANG, per age range.
[b]ACC vs. AFSOC, per age range.
[c]ANG vs. AFSOC, per age range.

Table 7. Summary of Significant Odds Ratios for Alcohol Variables

Alcohol Use	26+ years AFSOC / ACC		
	OR [95% CI]	Omnibus $\chi^2(df)$	*p*
6+ Drinks Per Occasion			
Never		9.86(3)	.02
Less than Monthly	1.03 [0.66, 2.44]		
Monthly	3.06* [1.43, 6.55]		
Alcohol Increase			
Yes	1.95* [1.10, 3.48]		
No[a]		4.73(1)	.03

Note: * indicates significant chi-square ($p < .05$) and OR. No significant results for ages 18-25 for alcohol-related logistic regressions. No significant results for ages 26+ years logistic regressions for ACC/ANG or AFSOC/ANG.

4.3.2 Tobacco Use. Comparisons of group proportions for each response category, split by age ranges 18-25 and 26+ years, are shown are shown in Table 8. A summary of significant results is listed below:

- A larger proportion of ANG respondents ages 18-25 reported any tobacco use when compared to ANG respondents ages 26+.
- A larger proportion of ANG respondents ages 18-25 reported smokeless tobacco use when compared to ANG respondents ages 26+.
- A larger proportion of ACC respondents ages 18-25 reported smokeless tobacco use increase when compared to ACC respondents ages 26+.

18-25 years MAJCOM comparisons:

- A larger proportion of ANG respondents reported smokeless tobacco use when compared to ACC respondents.

26+ years MAJCOM comparisons:

- A larger proportion of AFSOC respondents reported an increase in smoking tobacco use when compared to ACC respondents.
- A larger proportion of ANG respondents reported smokeless tobacco use when compared to ACC respondents.

A summary of logistic regression results predicting ACC group membership compared to ANG, AFSOC group membership compared to ANG, and AFSOC group membership compared to ACC, split by age group (18-25 years and 26+ years), is shown in Table 9. Logistic regressions were not run on the frequency of smoking, smokeless tobacco use, or alternative nicotine use items because of the small n's in the response categories. The survey did not include an open-ended, write-in response item for reasons for increased smoking tobacco use. While

open-ended items were included for reasons for increased smokeless tobacco and nicotine alternative use, there were minimal responses to these items ($n < 5$ for the highest category).

Table 8. Tobacco Use by Age Range, MAJCOM, and RPA Operators Overall and Proportion Comparisons

Tobacco Use	18-25 years								26+ years							
	Total		ACC		ANG		AFSOC		Total		ACC		ANG		AFSOC	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Any Current Use																
Yes	45	21.84	32	20.38	9	37.50*	4	16.00	150	15.77	81	14.16	54	18.24*	15	18.07
No	161	78.16	125	79.62	15	62.50	21	84.00	801	84.23	491	85.84	242	81.76	68	81.93
Smoking Tobacco Use																
Yes	18	8.74	16	10.19	0	0.00	2	8.00	69	7.26	40	6.99	21	7.09	8	9.64
No	188	91.26	141	89.81	24	100.00	23	92.00	882	92.74	532	93.01	275	92.91	75	90.36
Smoking Frequency Use																
Daily	9	50.00	8	50.00	0	0.00	1	50.00	32	46.38	19	47.50	8	38.10	5	62.50
Less than daily	8	44.44	7	43.75	0	0.00	1	50.00	33	47.83	17	42.50	13	61.90	3	37.50
I don't know	1	5.56	1	6.25	0	0.00	0	0.00	4	5.80	4	10.00	0	0.00	0	0.00
Smoking Tobacco Increase																
Yes	6	2.91	6	3.82	0	0.00	0	0.00	22	2.31	11	1.92[b]	6	2.03	5	6.02[b]
No	200	97.09	151	96.18	24	100.00	25	100.00	929	97.69	561	98.08	290	97.97	78	93.98
Smokeless Tobacco Use																
Yes	29	14.08	18	11.46[a]	9	37.50*[a]	2	8.00	79	8.31	41	7.17[a]	33	11.15*[a]	5	6.02
No	177	85.92	139	88.54	15	62.50	23	92.00	872	91.69	531	92.83	263	88.85	78	93.98
Smokeless Frequency Use																
Daily	16	55.17	11	61.11	2	22.22	2	100.00	36	45.56	18	43.90	16	48.48	2	40.00
Less than daily	4	13.79	3	16.67	1	11.11	0	0.00	7	8.89	3	7.32	2	6.06	2	40.00
No Response	9	31.03	4	22.22	6	66.67	0	0.00	36	45.56	20	48.78	15	45.45	1	10.00
Smokeless Tobacco Increase																
Yes	15	7.28	12	7.64*	2	8.33	1	4.00	25	2.63	13	2.27*	10	3.38	2	2.41
No	191	92.72	145	92.36	22	91.67	24	96.00	926	97.37	559	97.73	286	96.62	81	97.59
Alternative Nicotine Use																
Yes	2	0.97	2	1.27	0	0.00	0	0.00	17	1.79	10	1.75	3	1.01	4	4.82
No	204	99.03	155	98.73	24	100.00	25	100.00	934	98.21	562	98.25	293	98.99	79	95.18
Alternative Nicotine Frequency Use																
Daily	1	50.00	1	50.00	0	0.00	0	0.00	12	70.59	8	80.00	1	33.33	3	75.00
Less than daily	1	50.00	1	50.00	0	0.00	0	0.00	5	29.41	2	20.00	2	66.67	1	25.00
Alternative Nicotine Increase																
Yes	2	0.97	2	1.28	0	0.00	0	0.00	11	1.16	9	1.57	0	0.00	2	2.41
No	204	99.03	155	98.73	24	100.00	25	100.00	940	98.84	563	98.43	296	100.00	81	97.59

Note: Significant proportion comparisons: * between the age range groups per MAJCOM. In instances where sample size assumptions ($n \geq 5$) were not met for proportions analysis, the analysis was not run.
[a]ACC vs. ANG, per age range.
[b]ACC vs. AFSOC, per age range.

Table 9. Summary of Significant Odds Ratios for Tobacco Variables

Tobacco Use	Logistic Regressions								
	ACC / ANG			AFSOC / ANG			AFSOC / ACC		
	OR [95% CI]	Omnibus $\chi^2(df)$	*p*	OR [95% CI]	Omnibus $\chi^2(df)$	*p*	OR [95% CI]	Omnibus $\chi^2(df)$	*p*
Smoking Tobacco Increase									
Yes							3.27* [1.11, 9.66]		
No[a]								3.89(1)	.05
Smokeless Tobacco Use									
Yes	0.62*[a] [0.38, 0.99]								
No[a]		3.82(1)	.05						
Alternative Nicotine Use									
Yes					4.17(1)	.04			
No[a]				4.95* [1.08, 22.55]					

Note: * indicates significant chi-square ($p < .05$) and OR. No significant results for ages 18-25 for tobacco related logistic regressions.
[a]Inverse OR = 1.63 [1.00, 2.63].

4.3.3 Caffeine and Energy Beverage Use. Comparisons of group proportions for each response category, split by age ranges 18-25 and 26+ years, are shown in Table 10. A summary of significant results is listed below:

- A larger proportion of ACC ages 26+ reported consuming caffeinated beverages when compared to ACC respondents ages 18-25 years.
- A larger proportion of AFSOC ages 18-25 reported consuming 1-2 designer energy drinks daily when compared to AFSOC respondents ages 26+ (a larger proportion of ages 26+ reported consuming zero designer energy drinks daily when compared to AFSOC respondents ages 18-25).
- A larger proportion of AFSOC ages 18-25 reported consuming both traditional and designer drinks when compared to AFSOC ages 26+.
- A larger proportion of ACC ages 26+ reported consulting with a physician for maintaining alertness when compared to ACC respondents ages 18-25.

18-25 years MAJCOM comparisons:

- A larger proportion of AFSOC respondents reported consuming 1-2 designer energy drinks daily when compared to ACC respondents.

26+ years MAJCOM comparisons:

- A larger proportion of ACC respondents reported consuming no traditional caffeinated drinks per day compared to ANG respondents.
- A larger proportion of ANG respondents reported consuming 5+ traditional caffeinated drinks per day compared to ACC respondents.
- A larger proportion of ACC respondents reported consuming 1-2 designer energy drinks daily when compared to ANG respondents (a larger proportion of ANG respondents reported consuming zero designer energy drinks daily when compared to ACC respondents).
- A larger proportion of ACC respondents reported an increase in caffeine consumption when compared to ANG respondents.

A summary of logistic regression results predicting ACC group membership compared to ANG, AFSOC group membership compared to ANG, and AFSOC group membership compared to ACC, split by age group (18-25 years and 26+ years), is shown in Table 11. The results of qualitative analyses of participants' textual responses to the open-ended, write-in response item revealed the most frequently cited types of caffeine included *coffee*, *tea*, *soda* and *high caffeine soda*, all traditional sources of caffeine. The most cited caffeine/supplements used were *Advocare Spark*, *pre-workout or weight loss supplements*, and *5-Hour Energy*. The most cited reasons for an increase in caffeine use included *shift work – especially when changing shifts, long shift hours and high workload*, and *staying alert for family or personal commitments* across the three MAJCOMs. The most frequently cited recommendations or medications prescribed by a physician included: *getting more sleep*, *regular exercise, stress relief techniques*, and *Ambien (Ambien responses from ANG only).*

Table 10. Caffeine Use by Age Range, MAJCOM, and RPA Operators Overall and Proportion Comparisons

Caffeine Use	18-25 years								26+ years							
	Total		ACC		ANG		AFSOC		Total		ACC		ANG		AFSOC	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Caffeine Use in Past Month																
Yes	160	77.67	122	77.71*	18	75.00	20	80.00	794	83.49	482	84.27*	241	81.42	71	85.54
No	46	22.33	35	22.29	6	25.00	5	20.00	157	16.51	90	15.73	55	18.58	12	14.46
Caffeine Portions Per Day																
0	38	18.45	32	20.38	4	16.67	2	8.00	165	17.35	108	18.88	44	14.86	13	15.66
1-2	63	30.58	47	29.94	9	37.50	7	28.00	301	31.65	182	31.82	95	32.09	24	28.92
3-4	61	29.61	45	28.66	8	33.33	8	32.00	274	28.81	165	28.85	86	29.05	23	27.71
5+	44	21.36	33	21.02	3	12.50	8	32.00	211	22.19	117	20.45	71	23.99	23	27.71
Traditional Caffeine Portions Per Day																
0	45	21.84	38	24.20	4	16.67	3	12.00	192	20.19	130	22.73[a]	48	16.22[a]	14	16.87
1-2	73	35.44	54	34.39	10	41.67	9	36.00	317	33.33	190	33.22	103	34.80	24	28.92
3-4	57	27.67	42	26.75	8	33.33	7	28.00	276	29.02	165	28.85	84	28.38	27	32.53
5+	31	15.05	23	14.65	2	8.33	6	24.00	166	17.46	87	15.21[a]	61	20.61[a]	18	21.69
Designer Energy Portions Per Day																
0	141	68.45	110	70.06	18	75.00	13	52.00*	746	78.44	433	75.70[a]	247	83.45[a]	66	79.52*
1-2	54	26.21	38	24.20[b]	5	20.83	11	44.00*[b]	180	18.93	123	21.50[a]	40	13.51[a]	17	20.48*
3-4	7	3.40	7	4.46	0	0.00	0	0.00	20	2.10	13	2.27	7	2.36	0	0.00
5+	4	1.94	2	1.27	1	4.17	1	4.00	5	0.53	3	0.52	2	0.68	0	0.00
Consume Traditional & Designer Energy Drinks																
Yes	58	28.16	41	26.11	6	25.00	11	44.00*	178	18.72	117	20.45	45	15.20	16	19.28*
No	148	71.84	116	73.89	18	75.00	14	56.00	733	81.28	455	79.55	251	84.80	67	80.72
Caffeine or Energy Supplement Use																
Yes	15	7.32	10	6.41	3	12.50	2	8.00	60	6.32	37	6.48	17	5.76	6	7.23
No	190	92.68	146	93.59	21	87.50	23	92.00	889	93.68	534	93.52	278	94.24	77	92.77
Frequency of Caffeine/ Energy Supplements Use																
Occasionally	2	13.33	1	10.00	1	33.33	0	0.00	20	33.90	11	30.56	7	41.18	2	33.33
Frequently	3	20.00	2	20.00	1	33.33	0	0.00	12	20.34	7	19.44	3	17.65	2	33.33
Daily	10	66.67	7	70.00	1	33.33	2	100.00	27	45.76	18	50.00	7	41.18	2	33.33
Caffeine Increase																
Yes	106	51.46	81	51.59	11	45.83	14	56.00	473	49.74	298	52.40[a]	132	44.59[a]	43	51.81
No	100	48.54	76	48.41	13	54.17	11	44.00	478	50.26	274	47.90	164	55.41	40	48.19
Consulted with Physician for Maintaining Alertness																
Yes	5	2.46	5	3.25*	0	0.00	0	0.00	82	8.70	51	9.01*	24	8.16	7	8.54
No or N/A	198	97.54	149	96.75	24	100.00	25	100.00	860	91.30	515	90.99	270	91.84	75	91.46

Note: Significant proportion comparisons: * between the age range groups per MAJCOM. In instances where sample size assumptions ($n \geq 5$) were not met for proportions analysis, the analysis was not run.
[a]ACC vs. ANG, per age range.
[b]ACC vs. AFSOC, per age range.

Table 11. Summary of Significant Odds Ratios for Caffeine Use

Caffeine Use	Logistic Regressions 26+ years ACC / ANG		
	OR [95% CI]	Omnibus $\chi^2(df)$	*p*
Traditional Caffeine Portions Per Day			
0[a]		7.59(3)	.05
1-2	0.66 [0.45, 1.03]		
3-4	0.73 [0.48, 1.11]		
5+	0.53*[a] [0.33, 0.84]		
Designer Caffeine Portions Per Day			
0[a]		8.57(3)	.04
1-2	1.75* [1.19, 2.59]		
3-4	1.06 [0.42, 2.69]		
5+	0.86 [0.14, 5.16]		
Consume Both Traditional & Designer Caffeinated Drinks			
Yes	1.43* [1.00, 2.10]		
No[a]		3.64(1)	.05
Caffeine Increase			
Yes	1.35* [1.02, 1.79]		
No[a]		4.40(1)	.04

Note: * indicates significant chi-square ($p < .05$) and OR. No significant results for ages 18-25 for caffeine-related logistic regressions. No significant results for ages 26+ years logistic regressions for ACC/AFSOC or AFSOC/ANG.
[a]Inverse OR = 1.89 [1.19, 3.03].

4.4 Medical Conditions Created by or Made Worse by Assignment

Medical conditions or symptoms believed to be caused or made worse by current duties/assignment or occupational stress were combined into one item in the 2015 survey (in the 2012 survey these current duties/assignment and occupational stress were separate items) with multiple check list options. In addition, an *other* category was provided, for open-ended text responses. Open responses were incorporated into existing categories, when applicable. Some of the survey categories were then combined into larger categories for analysis (see Table 1). Comparisons of group proportions for each combined category are shown in Table 12.

Table 12. Most Frequency Cited Conditions Perceived to be Created or Worsened by their Unit Assignment or Occupational Stress and Proportion Comparisons

Medical Condition	Total		ACC[a]		ANG[b]		AFSOC[c]		% ACC/ANG *p*	% AFSOC/ANG *p*	% AFSOC/ACC *p*
	n	%	n	%	n	%	n	%			
Headaches, eye strain/vision problems	604	52.02	390	53.28	163	50.78	51	47.22	.45	.52	.24
Sleep problems (e.g., insufficient sleep)	500	43.07	315	43.03	132	41.12	53	49.07	.56	.15	.24
Musculoskeletal injury/pain (e.g., back, neck, joint pain)	434	37.38	276	37.70	124	38.63	34	31.48	.78	.18	.21

[a]Denominator n = 732.
[b]Denominator n = 321.
[c]Denominator n = 108.

4.5 Changes in Healthcare Utilization Since Current Unit Assignment

4.5.1 Medical Services. Comparisons of group proportions for each response category are shown in Table 13. No comparisons were significant.

Logistic regression results predicting ACC group membership compared to ANG, AFSOC group membership compared to ANG, and AFSOC group membership compared to ACC are shown in Table 14.

Across the MAJCOMs, the results of qualitative analyses of participants' responses to the open-ended, write-in response item revealed the most frequently cited reasons for an increase in medical care utilization included *shift work* and *occupational stress* (e.g., stress due to long hours, shift work, coworker/supervisor conflict).

Written responses describing reasons for decreases in medical care utilization revealed several factors. The most frequently cited reasons for a decrease in medical care utilization given by ACC included *distance to services* (e.g., having to drive 45+ miles for medical services) and *scheduling issues at the clinic.* ANG also cited *scheduling issues at the clinic.* There were no patterns in responses for AFSOC.

Table 13. Healthcare Utilization by MAJCOM and RPA Operators Overall and Proportion Comparisons

Healthcare Utilization	Total		ACC		ANG		AFSOC		% ACC/ANG *p*	% AFSOC/ANG *p*	% AFSOC/ACC *p*
	n	%	n	%	n	%	n	%			
Medical Care Change											
Increase	197	16.94	116	15.83	58	18.01	23	21.30	.38	.45	.15
Decrease	56	4.82	46	6.28	7	2.17	3	2.78	.00	*a*	*a*
No Change	910	78.25	571	77.90	257	79.81	82	75.93	.49	.39	.65
Alternative Health Provider Change											
Increase	225	19.35	132	18.01	79	24.53	14	12.96	.01	.01	.20
Decrease	25	2.15	15	2.05	6	1.86	4	3.70	.84	*a*	*a*
No Change	913	78.50	586	79.95	237	73.60	90	83.33	.02	.04	.41

Note: a indicates sample size assumption ($n \geq 5$) was not met for proportions analysis.

4.5.2 Alternative Health Services. Comparisons of group proportions for each response category are shown in Table 13. A summary of significant results is listed below:

- A larger proportion of ACC reported decreased utilization of medical care compared to ANG.
- A larger proportion of ANG reported increased utilization of alternative health providers compared to both ACC and AFSOC.

Logistic regression results predicting ACC group membership compared to ANG, AFSOC group membership compared to ANG, and AFSOC group membership compared to ACC are shown in Table 14.

The results of qualitative analyses of participants' textual responses to the open-ended, write-in response item revealed the most frequently cited reasons for increasing alternative healthcare utilization included two categories: *musculoskeletal injury/pain* (e.g., seeking chiropractic care, acupuncture, massage therapy for back, neck pain) and *occupational stress* (e.g., seeking massage therapy to reduce muscle tension from work) across MAJCOMs. Written responses describing reasons for decreasing utilization revealed several factors including *lack of time or availability*, *scheduling issues*, and *services not being covered by TRICARE*.

Table 14. Logistic Regression Results for MAJCOM Healthcare Utilization

Healthcare Utilization	Logistic Regressions								
	ACC / ANG			AFSOC / ANG			AFSOC / ACC		
	OR [95% CI]	Omnibus $\chi^2(df)$	*p*	OR [95% CI]	Omnibus $\chi^2(df)$	*p*	OR [95% CI]	Omnibus $\chi^2(df)$	*p*
Medical Care Increase									
Yes	0.85 [0.60, 1.20]			1.23 [0.71, 2.11]			1.45 [0.88, 2.40]		
No[a]		0.89(1)	.35		0.54(1)	.46		2.01(1)	.16
Alternative Health Provider Increase									
Yes	0.67*[b] [0.49, 0.93]			0.46*,[c] [0.25, 0.85]			0.68 [0.37, 1.22]		
No[a]		5.86(1)	.02		7.01(1)	<.01		1.80(1)	.18

Note. * indicates significant chi-square ($p < .05$) and OR.
[a]Indicates comparison category for predictor.
[b]Inverse OR = 1.48 [1.08, 2.04].
[c]Inverse OR = 2.19 [1.18, 4.06].

4.6 Changes in Prescription and OTC Medication Use

Comparisons of group proportions for each response category are shown in Table 15. A summary of significant results is listed below:

- A larger proportion of both ANG and AFSOC reported an increase in prescription medication usage when compared to ACC.

Logistic regression results predicting ACC group membership compared to ANG, AFSOC group membership compared to ANG, and AFSOC group membership compared to ACC are shown in Table 16.

The results of qualitative analyses of participants' textual responses to the open-ended, write-in response item revealed the most frequently cited reasons for an increase in prescription

medication usage included *sleep* (e.g., insufficient sleep, obstructive sleep apnea), *respiratory issues* (e.g., asthma, allergies), and *shift work* across MAJCOMs.

The results of qualitative analyses of participants' textual responses to the open-ended, write-in response revealed most frequently cited reasons for an increase in OTC medication usage included *sleep* (e.g., insufficient sleep, obstructive sleep apnea), *shift work,* and *pain management* across MAJCOMs.

Table 15. Medication Use by MAJCOM and RPA Operators Overall and Proportion Comparisons

Medication Use	Total		ACC		ANG		AFSOC		% ACC/ANG *p*	% AFSOC/ANG *p*	% AFSOC/ACC *p*
	n	%	n	%	n	%	n	%			
Prescription Use Change											
Increase	108	9.29	52	7.09	39	12.11	17	15.74	.01	.34	.00
Decrease	11	0.95	8	1.09	3	0.93	0	0.00	*a*	*a*	*a*
No	1044	89.77	673	91.81	280	86.96	91	84.26	.01	.34	.00
OTC Use Change											
Increase	201	17.28	132	18.01	54	16.77	15	13.89	.64	.47	.29
Decrease	9	0.77	6	0.82	3	0.93	0	0.00	*a*	*a*	*a*
No	953	81.94	595	81.17	265	82.30	93	86.11	.64	.47	.29

Note: a indicates sample size assumption ($n \geq 5$) was not met for proportions analysis.

Table 16. Logistic Regression Results for MAJCOM Medication Use

Medication Utilization	Logistic Regressions								
	ACC / ANG			AFSOC / ANG			AFSOC / ACC		
	OR [95% CI]	Omnibus $\chi^2(df)$	*p*	OR [95% CI]	Omnibus $\chi^2(df)$	*p*	OR [95% CI]	Omnibus $\chi^2(df)$	*p*
Prescription Increase									
Yes	0.55*[b] [0.36, 0.86]			1.35 [0.73, 2.50]			2.44* [1.36, 4.41]		
No[a]		6.81(1)	< .01		0.89(1)	.35		7.79(1)	< .01
OTC Increase									
Yes	1.09 [0.77, 1.54]			0.80 [0.43, 1.48]			0.73 [0.41, 1.31]		
No[a]		0.23(1)	.63		0.53(1)	.47		1.18(1)	.28

Note: * indicates significant chi-square ($p < .05$) and OR.
[a]Indicates comparison category for predictor.
[b]Inverse OR = 1.81, 95% CI [1.17, 2.80].

5.0 DISCUSSION

The current study represents an anonymous and voluntary survey assessment of health behaviors within the USAF RPA Predator/Reaper operator population. It is a follow-up to occupational health survey data collected from the same operational groups in 2012 [5]. Previous research has documented the high-demand, high-risk nature of the Predator/Reaper career field, reporting higher than expected levels of exhaustion and psychological distress within this unique group of military personnel [5,7,8]. Self-reported attributions have identified the operational stressors of low manning, long hours, and frequent rotations in shift work and problematic work-rest cycles, which are driven by the need to sustain around-the-clock missions in support of battlefield operations. The current and 2012 surveys represent comprehensive efforts to understand the general health habits (e.g., compensatory behavioral health strategies for managing stress) among such operators who are required to sustain an around-the-clock, deployed in-garrison lifestyle. Each of the health behaviors assessed by the current survey will

be discussed in comparison to the 2012 data, as well as in comparison to an Air Force control group (support and logistics personnel) and available data within the general U.S. civilian population.

5.1 Demographics

The current RPA sample overall was largely male (88.12%), young (72.3% were ≤ 35 years old), married (64.8%) working shift work (79.84%) 50 hours a week or less (60.9%), and reported one or more dependents living at home (52.11%). The sample was almost equally divided between officer and enlisted ranks (50.26% officer; 49.74% enlisted) and looks very similar to the respondents to the 2012 RPA health behaviors survey in terms of gender, rank, marital status, and hours worked per week [5]. The data suggest a slight shift toward operators being older (current sample: 54% >30 years old; 2012 sample: 46% >30 years old) and being more likely to have dependents living at home (52.11% of the current sample vs. 42.11% of the 2012 sample).

Although the 2012 and current samples had similar proportions endorsing shift work overall (82.08% 2012; 79.84% current), 24.7% of the current sample endorsed shift schedule rotations every 30 days or less as compared to 41.34% of the 2012 sample. Although there is on-going debate about the single best design for shift work scheduling [13-16], this change in rotation schedules suggests a move in RPA operations toward more slowly rotating schedules, which means fewer transitions in workers' schedules and circadian rhythms and more predictability in sleep and wake times [17]. This longer term predictability also allows workers to better plan their outside-of-work social activities, helping to avoid the "social disynchrony" and isolation commonly reported by shift workers [18].

The proportion of RPA respondents to the current survey reporting 51+ hour work weeks was almost identical to the 2012 respondents, in spite of the fact that working long work hours has been consistently endorsed as a source of occupational stress and has been shown to be associated with the facets of occupational burnout and high levels of distress in RPA operators [5,7]. Additionally, RPA operators, overall, were more than four times as likely to endorse a 51+ hour work week than their support/logistics counterparts. This finding suggests that RPA operators continue to face long operational work hours as a significant stressor, likely perpetuated by various factors (e.g., insufficient number of personnel for maintaining the required number of around-the-clock missions, increasing administrative requirements on top of existing operational duties, etc.).

Within the current sample, some demographic differences across MAJCOMs were observed. Similar to the 2012 sample, ANG respondents were older, more likely to be married, and more likely to have dependents living at home than both AFSOC and ACC respondents. Operationally, ANG respondents were more likely to endorse 24 months or more time on station and more likely to endorse working less than 50 hours per week than both AFSOC and ACC respondents. This finding suggests ANG operators have more experienced personnel. Although they are less likely to work less than 50 hours per week, some of the ANG units surveyed had not fully transitioned to conducting around-the-clock operational missions. As these units transition to such missions, there will likely be an increasing portion of ANG respondents working greater than 50 hours a week.

AFSOC respondents were more likely to be female (20.37%) than both ACC (12.14%) and ANG (8.44%) respondents and were more likely to endorse shift work (88.79%) than both

ACC (80.68%) and ANG (74.92%) respondents. These differences will be discussed further in light of sleep issues and substance behaviors differentially endorsed by RPA operators between the different MAJCOMs.

The current RPA operator sample also looked similar to the support and logistics personnel comparison group in terms of age, marital status, and dependents living at home. However, support and logistics personnel were significantly more likely to be enlisted, to work a standard, fixed day shift schedule, and to work less than 50 hours per week than RPA operators in the sample. Again, these demographic differences between RPA and support/logistics respondents will be discussed in greater detail as they relate to differentially endorsed health behaviors that serve as common compensatory strategies for managing occupational stress.

5.2 Sleep and Sleep-Related Behaviors

Similar to the results from the 2012 survey [6], a significant proportion of RPA operators are falling short of national recommendations for sleep. According to the National Sleep Foundation and the American Academy of Sleep Medicine, the average, healthy adult needs 7 to 9 hours of sleep to function at his/her peak [19,20]. Although recent population data have yielded slightly differing results, it is estimated that between 59-65% of American adults report receiving the recommended amount of sleep [21,22]. According to the most recent Gallup statistics, the estimation decreases slightly to 54-56% when considering only American adults between the ages of 18-49, which is a more similar age comparison to the current respondents [21]. Less than one-third (32.6%) of RPA operators indicated they receive 7 or more hours of sleep before a typical shift, and this number is slightly lower than the 39.6% of RPA operators who reported 7+ hours of sleep prior to each shift in 2012. When asked about sleep prior to a nonduty day, 81.4% of RPA operators endorsed 7+ hours of sleep, suggesting many RPA operators are attempting to "catch up" on their sleep during time off.

The National Sleep Foundation states that less than 6 hours per night is specifically contraindicated for adults ages 18-64 [19]. An alarming 67.41% of RPA operators indicated average sleep prior to a work shift in this range. This is particularly concerning considering only 44-46% of American adults ages 18-49 report 6 hours or less of sleep per night [21].

Individual differences exist in the amount of sleep necessary for optimal functioning [23], and the definition of sleep deprivation is often deemed dependent on an established impairment in functioning [24], which was not assessed in the current survey, making it difficult to make an unequivocal statement about RPA operators in this study being objectively "sleep deprived." However, self-reported sleepiness and physiological measurements of sleep deprivation have been shown to be highly correlated [25,26]. One question from the survey tapped into self-reported sleepiness ("Have you ever had difficulty commuting to/from work because you thought you might fall asleep at the wheel?"), and 53.53% of the RPA operators in the current study endorsed this item, suggesting that more than half endorsed being sleep deprived at some point.

Getting less than the optimal amount of sleep has been associated with a wide range of impairments and illnesses that could impact an RPA operator's health and job performance [23,27-31]. In addition to increasing risk for hypertension, diabetes, heart disease, and obesity, insufficient sleep can result in increased reaction times, decreased attention and concentration (especially for monotonous tasks), and decreases in work effectiveness and efficiency, especially when performing "long, difficult, compulsory, monotonous sitting activities in an unchanging

environment with limited lighting…" [24], all of which frequently describe the RPA environment.

It is important to acknowledge that examination of RPA operator sleep habits as compared to support and logistics personnel suggests that less than optimal sleep quantity may not be unique to RPA operators within USAF personnel. No significant differences were identified between support and logistics personnel and RPA operators on hours of sleep reported before work or prior to an off-duty day [see Appendix]. However, RPA operators were significantly more likely to endorse difficulty commuting due to sleepiness and seeking a prescription for assistance with sleep than support and logistics personnel, which suggests that RPA operators may be coping with more sleep-related consequences. Because RPA operators were over twice as likely to be working a shift schedule when compared to support and logistics personnel, sleep *quality* issues associated with shift work schedules could account for the lack of observed difference in sleep *quantity* between RPA operators and support/logistics personnel. Disturbed sleep patterns, poor sleep quality, and fatigue (in shift workers in general and in RPA operators working shift work specifically) have been well documented in prior research [32-37]. RPA operators in the current study endorsed more sleep-related consequences and compensatory behaviors than support and logistics personnel. In addition to the already mentioned proportion of RPA operators who endorsed difficulty commuting to or from work due to fear of falling asleep (support/logistics: 32.46%; RPA: 53.53%), RPA operators were nearly twice as likely to have sought a prescription to help with sleep than their support and logistics counterparts (15.27% vs. 8.77%). The nature of shift work and of RPA duties, particularly the limited opportunities for managing alertness while on a mission and the requirement for sustained vigilance with low levels of stimulation, could make RPA operators more susceptible to the consequences of insufficient sleep.

Use of sleep aids has become an area of interest within the American population in general, and recent data indicate that 4% of American adults (ages 20 and older) used prescription sleep aids in the past month [38,39]. Although the current survey did not inquire as to a timeframe for prescription sleep aid use, which prevents a direct comparison, more than 15% of RPA operators reported having sought a prescription to aid in sleep. Additionally, RPA operators in the current survey were almost twice as likely as support/logistics personnel to have reported seeking prescriptions for sleep problems, and in the general American population, the demographics most likely to use prescription sleep aids are older adults (50+ years old) and women [38], both of which are underrepresented in the RPA operator demographic. All of these factors taken together suggest that RPA operators may be using sleep aids at an elevated rate as compared to their counterparts in the USAF and in the American adult population, potentially as an attempt to manage the consequences of inadequate sleep quantity and/or quality.

Research investigating the prevalence of OTC medication use for sleep in the general adult population is scarce. Literature searches utilizing "Medline" and "PsychInfo" only yielded one peer-reviewed study on the topic: a 1994 investigation of OTC sleep aid use in college students, which indicated 11.4% of women and 6.4% of men who endorsed sleep problems 1 day per month or more used OTC medications to help with sleep [40], proportions that are significantly lower than the 23.2% of RPA operators who endorsed OTC sleep aid use in the current survey. Taken as a whole, these data may indicate a trend toward sleep-related issues and compensatory behaviors in the RPA operator population. The self-reported fatigue, use of sleep aids, and less than adequate amount of sleep durations prior to work could put RPA operators at

elevated risk for accidents and illnesses. Continued monitoring of these data is necessary to elucidate potential sleep trends and consequences in this population.

5.3 Physical Exercise

Self-reported exercise behavior in the current study suggests a significant proportion of RPA operators are falling below the exercise frequency and intensity that are recommended by the Centers for Disease Control and Prevention and the DHHS. The current DHHS Physical Activity Guidelines for Americans recommends at least 150 minutes a week of moderate-intensity or 75 minutes a week of vigorous-intensity aerobic physical activity for maximum health benefits [41]. In addition to the above recommended aerobic activity, the current World Health Organization physical activity guidelines recommend muscle-strengthening activities 2 or more days per week [42].

The survey for this report inquired about the frequency of moderate- to vigorous-intensity exercise, 20-30 minutes per occasion. Given this format, the most liberal estimate is that 60.1% of RPA operators are meeting or exceeding the exercise recommendations for maximum health benefits. This proportion is very similar to the current estimates for adults in America (in 2015, 55.5% of American adults exercised 3 or more days per week) [43]. This proportion is also similar to the proportion of the support/logistics sample meeting the current recommendations (58.3%) and is slightly lower than the 2012 RPA health behaviors survey results in which 65.84% of RPA operators reported exercising 3 or more days per week [6].

Although comparisons between RPA operators and the support and logistics sample did not yield any statistically significant differences in exercise frequency, RPA operators were three times as likely to respond “no” to the question “Do you feel your work schedule allows you to meet your fitness requirements?” (46.9% of RPA respondents and 23.5% of support/logistics personnel responded “no” to this question). The fact that RPA operators were twice as likely to report working shift work and were three times as likely to believe their work schedule does not allow them to meet their fitness requirements would suggest a lower exercise frequency in RPA operators [44], but that difference was not observed between the two samples. Demographic differences between the samples might provide a possible explanation for this lack of finding. Male gender, higher education level, and higher household income have been shown to be positively correlated with exercise behavior [43,45], and in the current samples, RPA respondents were twice as likely to be male and support/logistics respondents were more than 21 times as likely to be enlisted. Although no definitive causal links can be established from the collected data, the increase in exercise frequency one would expect to see based on RPA operator demographics is potentially abated by their challenging work schedules, yielding essentially equal exercise frequency between RPA operators and their USAF counterparts. More information on the relationship among work schedules, sociodemographic factors, and exercise behaviors needs to be collected in future surveys to better understand these findings.

5.4 Alcohol Usage

To more accurately assess alcohol consumption patterns and to allow for more meaningful comparisons with the available general population data, the current survey questions addressing alcohol were modified from the 2012 survey. The current survey included a standardized alcohol screening tool (AUDIT-C), revised categories for drinking frequency and

drinks per day, and a specific question assessing binge drinking behavior (consuming more than 6 drinks on one occasion). As a result, comparisons to 2012 results [6] regarding alcohol consumption will be limited.

A total of 85.5% of RPA operators endorsed alcohol consumption at a frequency greater than "*Never*": 81.1% of those between ages 18-25 and 86.5% of those ages 26 and older. Although this means only 14.5% of RPA operators responding to this survey indicated abstinence from alcohol, more than a third (36.2%) indicated their consumption on a typical day to be "0" and 42.2% reported using alcohol on a monthly basis or less. This pattern of responding suggests that 42.2% of the current RPA sample either abstains or drinks infrequently and that the remaining 57.8% consume alcohol more frequently than monthly.

The division of our sample between "more than monthly" and "monthly or less" is relevant because the National Survey on Drug Use and Health (NSDUH) defines a current alcohol user as someone who has consumed alcohol in the previous 30 days [46]. Based upon this definition and upon the latest NSDUH results, 56.9% of American adults are current alcohol users [47]. This is very similar to the proportion of RPA operators who indicated an alcohol consumption frequency greater than monthly (57.8%), suggesting the proportion of RPA operators consuming alcohol is likely comparable to the proportion of adults in the general population currently consuming alcohol.

Comparisons between RPA operators and support/logistics personnel yielded a few differences in the alcohol consumption patterns of these two groups. In regard to prevalence of consumption, 43.5% of support and logistics personnel indicated a consumption frequency greater than monthly (compared to 57.8% of RPA operators), suggesting RPA operators are more likely to be current consumers of alcohol than support/logistics personnel. Examination of the quantities in which alcohol is being consumed by these two groups revealed the most frequently endorsed "drinks per day" range for RPA operators was 1-2 standard drinks (50.3%), while the most frequently endorsed "drinks per day" category for support/logistics personnel was 0 (51.3%). The results of the study indicated that RPA operators were twice as likely to endorse drinking 1-2 drinks per day as compared to support/logistics personnel.

Given the fact that demographic differences between RPA operators and support/logistics personnel could explain different proportions of current alcohol users in these samples (e.g., education and income level have been shown to be positively correlated with the likelihood of being a current alcohol user [47,48]), and given that up to 1 drink per day for women and 2 drinks per day for men is considered moderate—and even potentially health-promoting—alcohol consumption, the frequency of excessive alcohol use is likely more relevant to the health and wellness of this population than the proportion of current alcohol consumers alone. One indicator of excessive alcohol use is consuming above gender-specific daily alcohol consumption recommendations. Although the current results suggest RPA operators consume more alcohol per day than support/logistics personnel, male RPA operators do not appear to be more likely to consume at above the recommended level of 2 drinks per day.

A trend was observed for female RPA operators, however, that warrants noting. More than a quarter of all female RPA operators endorsed consuming alcohol above the recommended level of 1 drink per day. When considering only female RPA operators 26 years old and older, the percentage increases to 28.1% consuming above the recommended level. The small number of female support/logistics respondents makes meaningful comparisons difficult and precluded most statistical analyses. However, proportional analysis indicated that a significantly higher proportion of support/logistics females ages 26 and older consume alcohol at or below

recommended levels as compared to female RPA operators in this age range. These data do suggest that additional monitoring and investigation into female RPA operator alcohol consumption are important to identify potentially health-impacting trends.

Binge drinking, the most common form of excessive alcohol consumption, has been estimated to account for more than half of alcohol-related fatalities and three-quarters of the economic costs associated with excessive alcohol use [49]. The current results indicate that 38.9% of RPA operators endorsed binge drinking frequency other than "*Never*," and 7.5% endorsing binge drinking on at least a monthly basis. No statistically significant differences were observed for binge drinking frequency between RPA operators and support/logistics personnel.

The most recent NSDUH suggests that almost one-quarter of American adults reported binge drinking in the past month. However, this number represents all adults over the age of 18. When looking at national data broken down by age and gender, among young adults aged 18 to 25, 44.4% of males and 31.4% of females reported binge drinking in 2013, and among persons aged 26 or older, the rate of binge drinking for males was approximately twice the rate for females (30.7 vs. 14.7%) [46]. Because the current survey didn't specifically inquire as to the timeframe of respondents' most recent binge drinking episode, direct comparisons with available population data are not possible.

Alcohol misuse, which includes a range of issues from drinking over recommended limits (acutely or chronically) to meeting criteria for alcohol dependence, was assessed in the current survey using the AUDIT-C. For the current RPA operator sample, 24.4% of males and 18.25% of females had AUDIT-C scores indicative of alcohol misuse. Male support/logistics respondents had a similar proportion of scores indicative of alcohol misuse (21.4%). However, only 8% of female support/logistics personnel scored in this range. The small number of females represented in both the RPA and support/logistics sample precluded logistic regression analyses and makes definitive statements regarding the two populations of questionable utility.

The most recent, published, population-based data for the AUDIT-C are from a year-long, cross-sectional study of over 1300 adults presenting to a civilian family medicine clinic. In this sample from the general adult population, the observed rates of above-threshold AUDIT-C scores were similar to the observed rates in the current RPA sample for both men and women (26.6% of males; 14.1% of females) [49].

Although alcohol consumption patterns do not appear to differ substantially between support/logistics personnel and RPA operators, RPA operators were 2.5 times more likely to report they had increased their alcohol consumption since being assigned to their current duties. This doesn't appear to be an artifact of respondents' ages (i.e., turning 21 since being assigned to current duties), as the youngest two RPA MAJCOMs (AFSOC and ACC) were no more likely to report an increase in alcohol use than the oldest RPA MAJCOM (ANG), and the overall proportion of RPA respondents in the 18-25 age group did not differ from the proportion of support and logistics respondents in the 18-25 age group. The results of qualitative analyses of participants' textual responses to the open-ended, write-in response item revealed the most frequently cited reasons for an increase in alcohol use included *occupational and personal stress* and *shift work* across the three MAJCOMs.

5.5 Tobacco Usage

The current results indicate that RPA operators consume tobacco/nicotine products at a significantly lower rate than the general population and in quantities and frequencies similar to support/logistics personnel.

SAMHSA data from 2014 indicate that 27.1% of the American adult population consumes tobacco/nicotine in some form, with young adults (18-25 years old) consuming at a higher rate (35%) than adults 26 years of age and older (25.8%) [50]. Approximately, 16.8% of RPA operators endorsed use of tobacco/nicotine products, and while RPA operators appear to consume at a lower rate than the general population, the RPA consumption pattern follows the general population trend of young adults consuming at a higher rate than adults 26 years and older (21.8% and 15.8%, respectively). This proportion is similar to and even slightly less than the proportion of support/logistics personnel endorsing tobacco/nicotine use with 16.7% of those ages 18-25 and 20.0% of those 26 years and older), although the differences are not a statistically significant. It is also slightly lower than the proportion of RPA operators endorsing use in 2012 (18.8%) [6]. Because the current survey inquired much more specifically about tobacco use patterns than the 2012 RPA health behavior survey, this is the only available comparison with 2012 data.

New to this survey were questions regarding different types of tobacco/nicotine products. Data on smoking tobacco use indicate about 7.5% of RPA operators endorse smoking tobacco products in some form. For smoking tobacco, the proportion of young adult RPA operators does not appear to be different from those operators 26 and older, and about half of those who smoke tobacco indicate doing so on a daily basis. General population data include both the 2014 National Health Interview Survey (NHIS) and 2014 NSDUH results [50-53]. These surveys assess cigarette use separate from other types of smoking tobacco, whereas the current survey combines all types of smoking tobacco. NHIS results indicate 16.9% of American adults currently smoke cigarettes, whereas NSDUH data suggest the number to be closer to 25% (25.2% of Americans ages 12 and up smoke cigarettes with those 18-25 consuming at a higher rate than those 26 and older) [49,50]. Regardless of which numbers are used, comparisons to general population data suggest that RPA operators smoke tobacco much less frequently than the general population. A similar trend was observed for support/logistics personnel, with 8.7% reporting use of smoking tobacco. When asked if their consumption of smoking tobacco had increased since being assigned their current duties, only 2.4% of RPA operators said yes, a similar proportion to the percent of support/logistics personnel who endorsed the same (3.5%).

For smokeless tobacco (e.g., chew, dip, snuff, etc.), 9.3% of RPA operators overall (14.1% of those ages 18-25 and 8.3% of those 26 and older) endorsed using these products, with 48.1% of those who use endorsing daily use. Although RPA operators' smokeless tobacco use is very consistent with the smokeless tobacco use endorsed by support/logistics personnel, both Air Force samples appear to be using these products at higher rates than the general population. The most recent data indicate that only 3.3% of the American adult population consumes smokeless tobacco products [50], with 5.6% of those 18-25 and 3.0% of those 26 and older reporting use of these products. Regardless of the form, smokeless tobacco has serious health consequences and efforts to reduce use may help prevent tobacco-related illnesses.

The last type of tobacco/nicotine products that were assessed in the current survey were "alternative nicotine" products, which include e-cigarettes, nicotine gum, and nicotine patches. The current results indicate that very few RPA operators endorse the use of these products,

including e-cigarettes (1.6% overall; 1.0% of those ages 18-25 and 1.8% of 26 and older). Older support/logistics personnel (age 26 and older) were almost four times as likely to consume these products as older RPA operators. According to the 2014 NHIS survey, 3.7% of adults in the general American population use e-cigarettes [51-53]. These data indicate that RPA operators consume alternative sources of nicotine less than their USAF counterparts and the general population.

Overall, the tobacco/nicotine data suggest RPA operators are consuming at a rate that is much lower than both the support/logistics sample and the general population. The exception to this trend is with smokeless tobacco use. Additional data identifying the factors associated with this elevated consumption will help to better target this risky health behavior.

5.6 Caffeine and Energy Beverage Usage

Approximately 82.4% of RPA operators (77.7% of those age 18-25 and 83.5% of those 26 and older) endorsed caffeine consumption in the past month. These proportions are consistent with the proportions reported by support/logistics personnel (82.0% overall; 77.8% ages 18-25 and 83% of those 26 and older) and slightly less than the most recent estimates from the general adult population which indicate 89% of American adults consume caffeine [54]. However, approximately 43% of RPA operators consume 3+ traditional caffeinated beverages on a daily basis. Such usage suggests RPA operators regularly use caffeine as a compensatory strategy for maintaining readiness and performance. When examining caffeine consumption patterns, RPA operators were 1.7 times more likely to endorse an increase in caffeine consumption since being assigned to their current duties when compared with support and logistics personnel. In addition, 32% of RPA operators consume 1+ designer energy beverages on a daily basis. Approximately, 31.7% of those ages 18-25 and 21.6% of those 26 and older endorsed consuming 1+ designer energy drinks per day. This is similar to the proportion of support/logistics personnel consuming these beverages (24.3% overall).

Although these RPA operators and support/logistics personnel do not appear to be significantly different from each other in terms of their caffeine consumption patterns, there were some important differences between them and the general adult population. In 2015, an estimated 4.3% of the American population consumed energy drinks (10% of those age 18-24), and caffeine intake from these drinks represented less than 2% of total daily mean values of caffeine [55]. Recent research on comparable populations suggests designer energy drink use may be on the rise in younger populations and the military. However, it is difficult to determine if the data collected in the study among RPA operators represent a significant increase in caffeine intake or merely a shift to a different source of caffeine.

Between 42-51% of college-aged students are estimated to consume energy drinks in a given month [56,57], and in a study of active duty Army personnel, 39% of those surveyed consumed energy drinks on a daily basis [58].

Although an exact assessment of the milligrams consumed on a daily basis regarding caffeinated and designer energy beverages is difficult to obtain, the health consequences of excessive usage may negatively affect performance and readiness [59,60]. The results of the study revealed that approximately 28% of RPA operators consume both traditional caffeine and designer energy beverages on a daily basis. However, ingredients within designer energy beverages may accentuate the effects of traditional caffeine, have a negative impact on medication usage to control for certain health conditions (e.g., blood pressure), as well as

exacerbate existing medical conditions (e.g., headaches, gastrointestinal difficulties, etc.). Additional investigation into the usage of designer energy consumption is also recommended given the increasing popularity and availability of such beverages and their use as a compensatory strategy for managing fatigue. The results of the study revealed approximately 5% of RPA operators consume 5+ designer energy beverages on a daily basis, which may put them at particular risk for health-related consequences.

5.7 Self-Reported Changes in Medical Symptoms and Conditions

Overall, a significant portion of operators reported negative changes in their health status and health behaviors since being assigned to Predator/Reaper duties. Approximately 52% of RPA operators self-reported headaches, eye strain, or vision problems, 43% endorsed sleep problems, and 37% endorsed musculoskeletal issues. Although these issues were also frequently endorsed by support/logistics personnel, significantly greater proportions of RPA operators identified these issues than their USAF counterparts (see Table A-9 in the Appendix).

The items from the 2012 survey addressing medical conditions made worse by assignment were altered for the current survey, making comparisons regarding the frequency with which these symptoms were endorsed across the two surveys tenuous at best. However, musculoskeletal pain/injury and sleep problems have surfaced in the most frequently endorsed list for RPA operators for both surveys.

Endorsing medical conditions at a higher rate than the support and logistics respondents would suggest a concomitant increase in medical services utilization, but this was not the observed pattern for RPA operators. Overall, it appears that RPA operators were more likely than their support and logistics counterparts to endorse medical symptoms, and they were more likely to report an increase in OTC medication use, but they were not more likely to report an increase in medical care utilization (traditional or alternative healthcare). Although RPA operators have a higher incident rate of occupational related-health problems, they are less likely to report seeking medical care for such conditions. It is possible that access to medical care is a contributing factor. Due to the nature of shift work, over half or more of RPA operators do not have regular access to care, unlike their support/logistics personnel counterparts.

The percentages of RPA operators endorsing an increase in traditional and alternative healthcare services since being assigned to RPA duties was similar to the 2012 results in which 14.9% of operators endorsed an increase in utilization of traditional medical services and 15.2% endorsed an increase in alternative health service utilization since being assigned to their current duties [6].

Responses to items assessing an increase in prescription medication usage also looked similar to the 2012 survey results, with 9.3% of current respondents endorsing an increase in prescription medication utilization. RPA operators were no more likely than support/logistics personnel to endorse an increase in prescription medication utilization, but for operators whose jobs require meeting strict medical standards, this lack of statistical difference might be an operationally significant pattern.

More than 17% of current RPA operators endorsed an increase in OTC medication utilization since being assigned to their current duties. The most commonly reported reasons for their increase were directly related to the medical conditions they reported: sleep problems, shift work stress, and pain management. Considering the fact that RPA operators from the current survey were 2.5 times more likely to endorse such an increase than their support/logistics

counterparts and that only 12% of responders to the 2012 survey endorsed a similar change, OTC medication use appears to be on the rise in these operators. Additionally, without the expected increase in medical services utilization, the likelihood that medical personnel responsible for managing operators' flight statuses are aware of how and when these OTC medications are being used is low. Potential problems and concerns with self-medication are well documented [61].

5.8 Important Differences Across MAJCOMs

Within the current sample, some demographic differences across MAJCOMs were observed. Because of these differences, as well as differences in number of respondents across the MAJCOMs and cultural, geographic, and occupational (e.g., work scheduling) variances, it is important to address MAJCOM-specific findings from the current survey. Similar to the 2012 sample, respondents were examined by MAJCOMs in terms of their demographics (i.e., age and gender), their personal responsibilities (i.e., marital status and dependent status), and their occupational demands (i.e., rank, time on station, shift schedule, shift rotation frequency, and hours worked per week) to help understand health behavior trends that may be related to all RPA duties regardless of MAJCOM and those that may be related to other MAJCOM-specific factors. ANG respondents were older, more likely to be married, and more likely to have dependents living at home than both AFSOC and ACC respondents.

5.8.1 Air Combat Command. Similar to the 2012 ACC sample, ACC respondents were comparable to AFSOC respondents in the categories of rank, marital status, and dependents living at home (Table 2), but the proportions of ACC respondents were proportionally more likely to endorse having 2 years time on station, working a standard day schedule, and (for those working shift work) having to rotate 31-60 days (vs. 30 days or less). Compared to ANG, ACC personnel were more likely to be young, single, without dependents, and an officer than ANG respondents. The majority of ACC respondents were young (≤ 30 years old), married, without dependents living at home, and with less than 2 years time on station.

A significant trend for exercise-related questions was that ACC respondents were proportionally less likely to say that their work schedule allows them to meet their fitness requirements than both ANG and AFSOC. However, in spite of believing their work schedule does not allow them to meet fitness requirements, there were no meaningful differences in exercise frequency reported between ACC and AFSOC or ACC and ANG. Although no definitive causal conclusions can be drawn from these data, having a work schedule that allows one to meet fitness requirements might be differentially important based on demographic factors. ACC respondents were less likely than ANG members to be married with dependents living at home (suggestive of less outside-of-work responsibilities). As a result, a work schedule that does not allow for fitness requirements may have been less likely to impact their exercise behaviors.

ACC personnel were proportionally more likely to endorse a decrease in medical utilization (6.3%) than ANG personnel (2.2%). This finding is similar to the 2012 survey in which 3.97% of ACC personnel endorsed a decrease in medical services utilization [6]. Attributions for this change indicate *distance to services* and *scheduling issues at the clinic* as being the primary reasons for a decrease in medical utilization. Two other MAJCOM-level trends from the current study could be related to this finding, namely, ACC personnel were least likely to have sought a prescription for sleep (ANG 2.25 times more likely; AFSOC 2.0 times more likely) and ACC respondents were less likely than both ANG and AFSOC to indicate an

increase in prescription medication use since being assigned to their current duties (ANG 1.8 times more likely; AFSOC 2.44 times more likely to report an increase).

MAJCOM-specific analyses of tobacco use revealed that 89% of all RPA operators between the ages of 18 and 25 who endorsed using smoking tobacco were ACC respondents (0% in ANG; 11% in AFSOC). Additionally, ACC respondents of all ages were less likely to consume smokeless tobacco products than ANG respondents of all ages. These findings may suggest a trend toward smoking tobacco use and away from the other forms of tobacco/nicotine consumption within ACC.

In general terms, caffeine consumption within ACC RPA operators appears to suggest that ACC's consumption patterns fall in-between AFSOC and ANG in terms of type of caffeine being consumed and frequency of consumption. In young ACC respondents (18-25 years of age), proportionally fewer people endorsed consuming 1-2 designer energy portions per day than AFSOC respondents 18-25 years of age. However, ACC respondents 26 years of age and older were more likely to endorse 0 traditional caffeine portions per day and less likely to endorse 5+ traditional caffeine portions per day than ANG respondents while being less likely to endorse 0 designer energy portions per day and more likely to endorse 1-2 designer energy portions per day than ANG. ACC respondents over 25 years of age were 1.4 times more likely to consume both traditional and designer drinks than ANG respondents and were 1.3 times more likely than ANG respondents to report an increase in caffeine consumption since being assigned to RPA duties.

5.8.2 Air Force Special Operations Command. Overall sample size for AFSOC was small in comparison to participants from ACC and ANG (see Table 2). Although the sample size was smaller, other notable differences were found. AFSOC respondents were more likely to be female (20.37%) than both ACC (12.14%) and ANG (8.44%) respondents and were more likely to endorse shift work (88.79%) than both ACC (80.68%) and ANG (74.92%) respondents. AFSOC respondents were also more likely to have 2 years time on station or less than both ANG and ACC. For those AFSOC respondents endorsing shift work, more than half of them indicated they rotate every 30 days or less. While the proportions of AFSOC and ACC respondents endorsing 51+ hour work weeks were similar, a significantly higher proportion of AFSOC respondents endorsed working 51+ hours per week than ANG.

An alarming 13.25% of AFSOC respondents 26 years of age and older endorsed binge drinking on at least a monthly basis. Except for females ages 18-25, AFSOC had the highest proportions of people scoring above threshold for alcohol misuse on the AUDIT-C (29% of AFSOC males ages 26 years or older; 31.3% of AFSOC males ages 18-25; and 23.1% of AFSOC females ages 26 years of age or older). The proportional comparisons were not statistically significant between MAJCOMs on these data, but this could be related to the small AFSOC sample size. AFSOC respondents ages 26 years of age and older were proportionally more likely to endorse monthly binge drinking as well as an increase in alcohol use since being assigned to RPA duties as compared to ACC and ANG respondents. More than 1 out of every 5 AFSOC RPA operators indicated they had increased their alcohol consumption since being assigned to RPA duties. Logistic regression analyses indicated that AFSOC respondents 26 years of age and older were more than three times more likely to endorse monthly binge drinking and nearly two times more likely to report an increase in alcohol use than older ACC respondents.

The results of data analyses also reveal a larger proportion of AFSOC respondents 26 years of age and older were 3.3 times more likely to report an increase in smoking tobacco as compared to ACC respondents and almost five times more likely than ANG respondents to

endorse alternative nicotine use. It is difficult to determine the reasons for why older AFSOC RPA operators endorse high rates of binge alcohol use and tobacco use. Another notable finding was a larger portion of AFSOC operators ages 18-25 endorse the daily use of 1-2 designer energy drinks than ACC operators. Overall, caffeine consumption suggests more AFSOC operators are consuming caffeine and in higher quantities, especially in those between 18-25 years of age, but our sample size was too small to detect these differences statistically. Furthermore, AFSOC operators were proportionally more likely than ACC to endorse an increase in prescription drug use and a larger proportion endorsed seeking prescription drug use for sleep as compared to ACC. Speculating on the exhaustive list of possibilities for these findings is beyond the scope of this study. However, it is likely a combination of operational factors (i.e., operational missions and time on station) and cultural factors (i.e., organizational climate) contributes to the between group differences regarding prescription drug use.

5.8.3 Air National Guard. ANG respondents were more likely to be married, have dependents living at home, be enlisted, endorse 24 months or more time on station, and endorse working less than 50 hours per week than both AFSOC and ACC respondents. ANG respondents were also older (76.8% of sample 31+) than both AFSOC and ACC RPA operators.

ANG responses were more likely than AFSOC respondents, but less likely than ACC, to endorse on-site facilities for rest. ANG respondents were also more likely to report that their work schedule allows them to meet fitness requirements. ANG respondents 26 years of age and older were proportionally more likely to consume 5 or more traditional caffeinated beverages per day than ACC respondents but comparable to AFSOC respondents. ANG respondents were twice as likely to endorse the daily consumption of 5 or more traditional caffeinated beverages per day as ACC respondents. However, ANG respondents 26 years of age and older were less likely to consume both traditional and designer drinks than ACC respondents. ANG respondents were proportionally more likely to endorse an increase in alternative healthcare utilization than both ACC and AFSOC. They were also more likely than ACC but less likely than AFSOC to endorse an increase in prescription medication usage. Identification of such differences between active and ANG respondents may help to shape force management strategies for promoting health that are specific to the needs of ANG operators.

6.0 STUDY OUTCOME RECOMMENDATIONS

6.1 First Tier – Line Leadership

The outcome data from this study support the recommendations that were originally outlined in the original study conducted by USAFSAM approximately 5 years ago. The data from this study suggest that impactful changes line leadership can make are to continue to (a) optimize work hours and shift work schedules, (b) maintain sufficient manning for sustaining around-the-clock operations, (c) model and mentor operators on appropriate and adaptive health behaviors, (d) encourage and build into daily or weekly schedules opportunity to engage in exercise and/or meet with healthcare specialists to address concerns, as well as (e) educate and model effective sleep hygiene habits to optimize recovery following shifts. As mentioned in the previous USAFSAM study, optimizing work/rest cycles and shift rotation schedules is necessary to minimize transition periods from one cycle to another and to allow operators to fully adjust to a shift before requiring another change. Maintaining appropriate manning levels to meet

operational requirements will allow for flexibility and modifications to shift length, as well as frequency of work breaks, as well as allow operators opportunities to care for themselves (e.g., medical appointments and exercise), which will, in turn, ensure they are performing at their maximum capabilities when they are at work. These changes would significantly improve quantity and quality of sleep, as well as allow time for exercise and healthcare appointments, which would, in turn, decrease the need for alcohol, tobacco, and prescription and OTC medications. Additionally, taking measures to encourage base facilities (e.g., the gym, commissary, and recreational facilities) to support 24/7 operations increase opportunities for shift workers to take charge of their personal fitness and rest time without having the perception that their only option when they finish their shift is to go home and consume alcohol alone until they can fall asleep. Lastly, line leadership should take the necessary steps to assess the unique challenges inherent in a given geographic and organizational climate. This information will allow leadership to make additional, targeted changes to maximize the health and well-being of this unique population of warriors.

6.2 Second Tier – Medical Treatment Facilities

The current survey results also indicate changes that could be made in the military medical treatment facilities to mitigate some of the health impacts of sustaining around-the-clock in-garrison operations in the Predator/Reaper community. A key issue for medical treatment facility commanders to consider is the access to care issues created by 24/7 flight operations. Access to flight medicine physicians and other healthcare providers is essential to maintaining a safe, healthy force. However, a significant percentage of Predator/Reaper operators indicated that poor access to care – due to distance, schedule availability, and types of services available – was a significant issue in maintaining their health and fitness. Although AFSOC and ACC units have embedded, full-time, dedicated doctoral level mental health providers with the appropriate security clearances (e.g., Top Secret) to perform primary and secondary intervention briefings, it is unclear whether or not such mental health providers are actively engaged or have an effective outreach strategy. Embedded mental health providers can also improve access to health services by decreasing stigma and being an advocate, as well as advising line leadership regarding organizational, physical, and social climate factors unique to the unit.

To help optimize the success of this recommendation, mental health providers embedded within line units or flight medicine should be selected based upon their consultation capabilities, leadership qualifications and experience as mental health providers, clinical diagnoses and treatment acumen, intrinsic interest in learning and being a part of RPA operations, and capabilities to effectively bridge the gap and remove stigmas to mental healthcare.

7.0 STRENGTHS AND LIMITATIONS OF THE STUDY

Self-report surveys are prone to response bias from a self-selected sample that might affect generalization of results. Simply put, whenever assessing for the impact within an organization, it is always a possibility there will be sampling bias. This bias may occur as a result of those individuals who are at highest risk and wanting to expose their concerns. However, sampling bias is not necessarily a negative issue if it helps reveal the intended at-risk population. Additionally, response categories for some survey items did not allow for direct comparisons with national averages/trends or diagnostic thresholds, and the format of these questions has been

altered for future survey data collection. In addition to these survey content issues, the absence of a USAF comparison group assigned to the same location as the Predator/Reaper operators limits our ability to make definitive statements about changes and challenges that are unique to this RPA community versus a given geographic and cultural milieu that exists at a specific base. Although analyses of textual responses provide reasons for increased use of alcohol, tobacco, caffeine, medical/mental healthcare, and medication usage (prescription and OTC), additional studies are needed for making definitive conclusions. The results of this study did not fully address the functional impairment of the health behaviors reported, such as insufficient sleep and substance use (i.e., alcohol, prescription drugs). Furthermore, participants reporting high levels of sleep issues, increased medical use, medical problems, and substance abuse do not necessarily require treatment. The study can be improved via simultaneous assessment of functional impairment to support the validity of assumptions to performance that are made. In spite of these limitations, the current findings support the notion that working around-the-clock, real-time operations may place one at risk for adverse health consequences that would benefit from being addressed by leadership and medical personnel.

8.0 CONCLUSION

The operators who maintain battlefield-essential, around-the-clock RPA operations face demands that are inherently arduous and taxing. However, organizational and environmental factors such as work schedules, manning status, duration of assignment, and even local climate can present additional stressors and demands that can negatively impact the health and well-being of these operators. The increases in substance use, medical issues, and healthcare utilization do not have to be necessary outcomes for these operators. The current survey results indicate that modifications to aspects of the RPA work environment, such as frequency of shift work rotations and hours worked per week, may go a long way toward primary and secondary prevention of poor health behaviors and outcomes.

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APPENDIX

Data Collected from Support/Logistics Personnel

DEMOGRAPHICS

Table A-1. Demographics by RPA Operators Overall and Support/Logistics, Proportion Comparisons, Logistic Regressions

Demographics and Occupational Variables	Total RPA Operators		Support/ Logistics		*p*	Logistic Regression Predicting RPA Op		
	n	%	n	%		OR [95% CI]	Omnibus $\chi^2(df)$	*p*
Gender								
Male[a]	1016	88.12	89	78.07	.00		8.12(1)	.00
Female	137	11.88	25	21.93	.00	0.48*,[b] [0.30, 0.77]		
Age Range (yr)								
18-25[a]	205	17.75	17	14.78	.42		8.33(4)	.08
26-30	328	28.40	27	23.48	.26	1.01 [0.54, 1.89]		
31-35	302	26.15	30	26.09	.99	0.84 [0.45, 1.55]		
36-40	182	15.76	16	13.91	.60	0.94 [0.46, 1.92]		
41+	138	11.95	25	21.74	.00	0.46 [0.24, 0.88]		
Marital Status								
Single[a]	408	35.20	47	40.87	.23		1.31(1)	.25
Married	751	64.80	68	59.13	.23	1.26 [0.85, 1.87]		
Dependents at Home								
Yes[a]	605	52.11	63	55.26	.52		0.42(1)	.52
No	556	47.89	51	44.74	.52	1.14 [0.77, 1.67]		
Rank Range								
Enlisted[a]	573	49.74	108	95.58	.00		108.28(1)	.00
Officer	579	50.26	5	4.42	.00	21.83* [8.84, 53.90]		
Time on Station (mo)								
≤ 24	595	51.38	56	48.70	.58	1.11 [0.76, 1.63]		
> 24[a]	563	48.62	59	51.30	.58		0.30(1)	.58
Shift Schedule								
Standard Day[a]	233	20.16	42	37.17	.00		15.60(1)	.00
Shift Work	923	79.84	71	62.83	.00	2.34* [1.56, 3.52]		
Shift Rotation Frequency (days)								
≤ 30	284	24.70	19	16.81	.06	2.19* [1.32, 3.63]		
31-60	495	43.04	13	11.50	.00	7.15* [3.79, 13.48]		
61+	68	5.91	22	19.47	.00	0.58 [0.33, 1.03]		
Permanent	27	2.35	5	4.42	.18	1.01 [0.37, 2.77]		
N/A[a]	245	21.30	46	40.71	.00		69.36(4)	.00
Hours Worked per Week								
30-50[a]	707	60.90	99	86.84	.00	4.24* [2.43, 7.39]		
51+	454	39.10	15	13.16	.00		34.70(1)	.00

Note: N/A = does not rotate shifts. * indicates significant chi-square ($p < .05$) and OR.
[a]Indicates comparison category for predictor.
[b]Inverse OR = 2.08 [1.29, 3.36].

Table A-2. Sleep and Exercise by RPA Operators Overall and Support/Logistics, Proportion Comparisons, Logistic Regressions

Health Behaviors	Total RPA Operators		Support/ Logistics		*p*	Logistic Regression		
	n	%	n	%		OR [95% CI]	Omnibus $\chi^2(df)$	*p*
Hours of Sleep before Work								
4 or less	92	7.93	10	8.77	.75	0.83 [0.39, 1.74]		
5-6	690	59.48	70	61.40	.69	0.89 [0.58, 1.36]		
7-8[a]	370	31.90	34	29.82	.65		0.40(2)	.82
9 or more	8	0.69	0	0.00	*a*			
Hours of Sleep Off Duty								
4 or less	20	1.72	1	0.09	*a*	0.68 [0.09, 5.24]		
5-6	196	16.87	24	20.34	.34	1.61 [0.89, 2.93]		
7-8	651	56.02	70	59.32	.49	1.38 [0.85, 2.25]		
9 or more[a]	295	25.39	23	19.49	.16		3.27(3)	.35
Difficulty Commuting To/From Work								
Yes	621	53.53	37	32.46	.00	2.40* [1.59, 3.61]		
No[a]	539	46.47	77	67.54	.00		18.76(1)	.00
On-Site Facilities for Rest								
Yes[a]	751	64.80	71	61.74	.51		16.19(2)	.00
No	307	26.49	20	17.39	.03	1.45 [0.87, 2.43]		
I don't know	101	8.71	24	20.87	.00	0.40*,[b] [0.24, 0.66]		
Sought RX to Aid in Sleep								
Yes	177	15.27	10	8.77	.06	1.88 [0.96, 3.66]		
No[a]	982	84.73	104	91.23	.06		3.95(1)	.05
Sought OTC to Aid in Sleep								
Yes	269	23.19	26	22.61	.89	1.03 [0.65, 1.63]		
No[a]	891	76.81	89	77.39	.89		0.20(1)	.89
Received Timing of Medication Education								
Yes[a]	214	18.66	18	15.65	.43		1.64(2)	.44
No	224	19.53	19	16.52	.44	0.99 [0.51, 1.94]		
N/A	709	61.81	78	67.83	.20	0.77 [0.45, 1.31]		
Aerobic Exercise per Week								
None	63	5.43	10	8.70	.15	0.61 [0.29, 1.30]		
1-2 times	400	34.48	38	33.04	.76	1.02 [0.65, 1.58]		
3-4 times[a]	508	43.79	49	42.61	.81		3.96(3)	.41
5-6 times	141	12.16	16	13.91	.58	0.85 [0.47, 1.54]		
Daily	48	4.14	2	1.74	*a*			
Strength Training per Week								
None	192	16.55	23	20.00	.35	1.10 [0.64, 1.87]		
1-2 times	457	39.40	36	31.30	.09	1.67* [1.05, 2.65]		
3-4 times[a]	335	28.88	44	38.26	.04		8.76(3)	.07
5-6 times	137	11.81	11	9.57	.47	1.64 [0.82, 3.26]		
Daily	39	3.36	1	0.87	*a*			
Schedule Allows for Fitness Requirements								
Yes[a]	531	45.82	79	68.70	.00		25.57(2)	.00
No	544	46.94	27	23.48	.00	3.00* [1.91, 4.72]		
I'm not sure	84	7.25	9	7.83	.82	1.39 [0.67, 2.87]		

Note: a indicates sample size assumption ($n \geq 5$) was not met for proportions analysis. * indicates significant chi-square ($p < .05$) and OR.

[a]Indicates comparison category for predictor.

[b]Inverse OR = 2.51 [1.51, 4.17].

POOR HEALTH HABITS (ALCOHOL, TOBACCO, CAFFEINE USE)

Table A-3. Alcohol Use by RPA Operators Overall and Support/Logistics, Proportion Comparisons

Alcohol Use	18-25 years					26+ years				
	RPA Operators		Support/ Logistics		*p*	RPA Operators		Support/ Logistics		*p*
	n	%	n	%		n	%	n	%	
Alcohol Frequency										
Never	39	18.93*	8	44.44*	.01	128	13.47	12	12.00	.68
Monthly or less	52	25.24	5	27.78	.81	269	28.32*	41	41.00*	.01
2-4x a month	73	35.44	4	22.22	*a*	307	32.32	32	32.00	.95
2-3x a week	37	17.96	1	5.56	*a*	172	18.11	12	12.00	.13
4+ x a week	5	2.43	0	0.00	.50	74	7.79	3	3.00	*a*
Drinks Per Day Males										
0	93	49.47*	11	91.67*	.00	352	35.06	32	40.00	.37
1-2	68	36.17	1	8.33	*a*	507	50.50	35	43.75	.25
3-4	26	13.83	0	0.00	.17	125	12.45	12	15.00	.51
5+	1	0.53	0	0.00	.80	20	19.92	1	1.25	*a*
Drinks Per Day Females										
0	28	49.12	4	66.67	.41	49	41.53	12	63.16	.08
1-2	24	42.11	1	16.67	*a*	62	52.54	6	31.58	.09
3-4	5	8.77	1	16.67	*a*	7	5.93	1	5.26	*a*
5+	0	0.00	0	0.00	*a*	0	0.00	0	0.00	*a*
Drinks Per Day Threshold Males (3+)										
0-2	161	85.64	12	100.00	.16	859	85.56	67	83.75	.66
3+	27	14.36	0	0.00	*a*	145	14.44	13	16.25	.66
Drinks Per Day Threshold Females (2+)										
0-1	45	78.95	5	83.33	.80	84	71.19*	17	89.47*	.00
2+	12	21.05	1	16.67	*a*	34	28.81	2	10.53	*a*
6+ drinks per Occasion										
Never	115	55.83	13	72.22	.18	592	62.32	66	66.00	.47
Less than Monthly	74	35.92	3	16.67	*a*	289	30.42	32	32.00	.74
Monthly	15	7.28	2	11.11	*a*	56	5.89	2	2.00	*a*
Weekly/Daily	2	0.97	0	0.00	*a*	13	1.37	0	0.00	*a*
AUDIT-C Threshold Males										
Above	43	27.04	2	16.67	*a*	219	25.80	17	21.25	.37
Below	116	72.96	10	83.33	.43	630	74.20	63	78.75	.37
AUDIT-C Secondary Threshold Males										
Above	43	27.04	2	16.67	*a*	203	23.91	17	21.25	.59
Below	116	72.96	10	83.33	.43	646	76.09	63	78.75	.59
AUDIT-C Threshold Females										
Above	11	23.91	1	16.67	*a*	26	28.26	1	5.26	*a*
Below	35	76.09	5	83.33	.69	66	71.74*	18	94.74*	.03
AUDIT-C Secondary Threshold Females										
Above	10	21.74	1	16.67	*a*	15	16.30	0	0.00	*a*
Below	36	78.26	5	83.33	.77	77	83.70	19	100.00	.06
Alcohol Increase										
Yes	33	16.02	1	5.56	*a*	131	13.77*	6	6.00*	.03
No	173	83.98	17	94.44	.24	820	86.23	94	94.00	.03

Note: a indicates sample size assumption ($n \geq 5$) was not met for proportions analysis. * indicates significant proportion comparison ($p < .05$.)

Table A-4. Summary of Significant Odds Ratios for Alcohol Variables

Alcohol Use	26+ years Operator/Support		
	OR [95% CI]	Omnibus $\chi^2(df)$	*p*
Alcohol Increase			
Yes	2.39* [1.03, 5.56]		
No[a]		5.18(1)	.02

Note: * indicates significant chi-square ($p < .05$) and OR. No significant results for ages 18-25 for alcohol-related logistic regressions.

Table A-5. Tobacco Use by RPA Operators Overall and Support/Logistics, Proportion Comparisons

Tobacco Use	18-25 years				26+ years				*p*
	RPA Operators		Support/ Logistics		RPA Operators		Support/ Logistics		
	n	%	n	%	n	%	n	%	
Any Current Use									
Yes	45	21.84	3	16.67	150	15.77	20	20.00	.27
No	161	78.16	15	83.33	801	84.23	80	80.00	.27
Smoking Tobacco Use									
Yes	18	8.74	1	5.56	69	7.26	9	9.00	.53
No	188	91.26	17	94.44	882	92.74	91	91.00	.53
Smoking Frequency Use									
Daily	9	50.00	0	0.00	32	46.38	5	55.56	.60
Less than daily	8	44.44	1	100.00	33	47.83	4	44.44	*a*
I don't know	1	5.56	0	0.00	4	5.80	0	0.00	*a*
Smoking Tobacco Increase									
Yes	6	2.91	1	5.56	22	2.31	3	3.00	*a*
No	200	97.09	17	94.44	929	97.69	97	97.00	.67
Smokeless Tobacco Use									
Yes	29	14.08	1	5.56	79	8.31	9	9.00	.81
No	177	85.92	17	94.44	872	91.69	91	91.00	.81
Smokeless Frequency Use									
Daily	16	55.17	1	100.00	36	45.56	5	55.56	.57
Less than daily	4	13.79	0	0.00	7	8.89	4	44.44	*a*
No Response	9	31.03	0	0.00	36	45.56	0	0.00	*a*
Smokeless Tobacco Increase									
Yes	15	7.28	0	0.00	25	2.63	4	4.00	*a*
No	191	92.72	18	100.00	926	97.37	96	96.00	.43
Alternative Nicotine Use									
	2	0.97	1	5.56	17	1.79	6	6.00	.11
No	204	99.03	17	94.44	934	98.21	94	94.00	.11
Alternative Nicotine Frequency Use									
Daily	1	50.00	1	100.00	12	70.59	2	33.33	*a*
Less than daily	1	50.00	0	0.00	5	29.41	4	66.67	*a*
Alternative Nicotine Increase									
Yes	2	0.97	1	5.56	11	1.16	2	2.00	*a*
No	204	99.03	17	94.44	940	98.84	98	98.00	.47

Note: Proportion comparisons were not run for the 18-25 age group because sample size assumptions were not met. *a* indicates sample size assumption ($n \geq 5$) was not met for proportions analysis. * indicates significant proportion comparison ($p < .05$).

Table A-6. Summary of Significant Odds Ratios for Tobacco Variables

Tobacco Use	26+ years Support/Operators		
	OR [95% CI]	Omnibus $\chi^2(df)$	*p*
Alternative Nicotine Use			
Yes	3.63* [1.41, 9.36]		
No[a]		5.70(1)	.02

Note: * indicates significant chi-square ($p < .05$) and OR. No significant results for ages 18-25 for tobacco-related logistic regressions.

Table A-7. Caffeine Use by RPA Operators Overall and Support/Logistics, Proportion Comparisons, Logistic Regressions

Caffeine Use	18-25 years					26+ years				
	RPA Operators		Support/ Logistics		*p*	RPA Operators		Support/ Logistics		*p*
	n	%	n	%		n	%	n	%	
Caffeine Use in Past Month										
Yes	160	77.67	14	77.78	.99	794	83.49	83	83.00	.90
No	46	22.33	4	22.22	*a*	157	16.51	17	17.00	.90
Caffeine Portions Per Day										
0	38	18.45	6	33.33	.13	165	17.35	17	17.00	.93
1-2	63	30.58	4	22.22	*a*	301	31.65	29	29.00	.59
3-4	61	29.61	5	27.78	.87	274	28.81	35	35.00	.20
5+	44	21.36	3	16.67	*a*	211	22.19	19	19.00	.46
Traditional Caffeine Portions Per Day										
0	45	21.84	6	33.33	.26	192	20.19	20	20.00	.96
1-2	73	35.44	5	27.78	.51	317	33.33	33	33.00	.95
3-4	57	27.67	5	27.78	.99	276	29.02	30	30.00	.84
5+	31	15.05	2	11.11	*a*	166	17.46	17	17.00	.91
Designer Energy Portions Per Day										
0	141	68.45	10	55.56	.26	746	78.44	80	80.00	.72
1-2	54	26.21	8	44.44	.10	180	18.93	15	15.00	.34
3-4	7	3.40	0	0.00	*a*	20	2.10	5	5.00	.07
5+	4	1.94	0	0.00	*a*	5	0.53	0	0.00	.47
Consume Traditional & Designer Energy Drinks										
Yes	58	28.16	8	44.44	.15	178	18.72	17	17.00	.54
No	148	71.84	10	55.56	.15	733	81.28	83	83.00	.54
Caffeine or Energy Supplement Use										
Yes	15	7.32*	5	27.78*	.00	60	6.32	8	8.00	.52
No	190	92.68	13	72.22	.00	889	93.68	92	92.00	.52
Frequency of Caffeine/ Energy Supplements Use										
Occasionally	2	13.33	2	40.00	*a*	20	33.90	4	50.00	*a*
Frequently	3	20.00	0	0.00	*a*	12	20.34	2	25.00	*a*
Daily	10	66.67	3	60.00	*a*	27	45.76	2	25.00	*a*
Caffeine Increase										
Yes	106	51.46	2	11.11	*a*	473	49.74*	35	35.00*	.01
No	100	48.54	16	88.89	.00	478	50.26	65	65.00	.01
Consulted with Physician for Maintaining Alertness										
Yes	5	2.46	0	0.00	.00	82	8.70	5	5.00	.20
No or N/A	198	97.54	18	100.00	.00	860	91.30	95	95.00	.20

Note: a indicates sample size assumption ($n \geq 5$) was not met for proportions analysis. * indicates significant proportion comparison ($p < .05$).

Table A-8. Summary of Significant Odds Ratios for Caffeine Variables

Caffeine Use	Support/Operators		
	OR [95% CI]	Omnibus $\chi^2(df)$	*p*
Caffeine or Energy Supplement Use (18-25 yr)			
Yes	5.12* [1.62, 16.17]		
No[a]		6.40(1)	.01
Caffeine Increase (26+ yr)			
Yes	0.59*,[a] [0.38, 0.90]		
No[a]		6.15(1)	.01

Note: * indicates significant chi-square ($p < .05$) and OR.
[a]Inverse OR 1.70 = [1.11 ,2.62].

MEDICAL CONDITIONS CREATED BY OR MADE WORSE BY ASSIGNMENT

Table A-9. Most Frequency Cited Conditions Perceived to be Created or Worsened by their Unit Assignment or Occupational Stress and Proportion Comparisons

Medical Condition	Total RPA Operators[a]		Support/ Logistics[b]		*p*
	n	%	n	%	
Headaches, eye strain/vision problems	604	52.02	46	40.00	.01
Sleep problems (e.g., insufficient sleep)	500	43.07	38	33.04	.04
Musculoskeletal injury/pain (e.g., back, neck, joint pain)	434	37.38	22	19.13	.00

[a]Denominator n = 1161.
[b]Denominator n = 115.

CHANGES IN HEALTHCARE UTILIZATION SINCE CURRENT UNIT ASSIGNMENT

Table A-10. Healthcare Utilization by RPA Operators Overall and Support/Logistics, Proportion Comparisons, Logistic Regressions

Healthcare Utilization	Total RPA Operators		Support/ Logistics		*p*	Logistic Regression		
	n	%	n	%		OR [95% CI]	Omnibus $\chi^2(df)$	*p*
Medical Care Increase								
Yes	196	16.88	24	20.87	.28	0.77 [0.48, 1.24]		
No[a]	965	83.12	91	79.13	.28		1.11(1)	.29
Alternative Health Provider Increase								
Yes	225	19.38	16	13.91	.15	1.49 [0.86, 2.57]		
No[a]	936	80.62	99	86.09	.15		2.19(1)	.14

Note: * indicates significant chi-square ($p < .05$) and OR. [a] indicates comparison category for predictor.
Support/Logistics: 1 individual (1%) reported medical services decrease, 4 individuals (3%) reported alternative health provider decrease.

CHANGES IN PRESCRIPTION AND OTC MEDICATION USE

Table A-11. Medication Use by RPA Operators Overall and Support/Logistics, Proportion Comparisons, Logistic Regressions

Medication Use	Total RPA Operators		Support/ Logistics		*p*	Logistic Regression		
	n	%	n	%		OR [95% CI]	Omnibus $\chi^2(df)$	*p*
Prescription Increase								
Yes	108	9.30	13	11.30	.48	0.81 [0.44, 1.48]		
No[a]	1053	90.70	102	88.70	.48		0.47(1)	.50
OTC Increase								
Yes	201	17.31	9	7.83	.01	2.47* [1.23, 4.95]		
No[a]	960	82.69	106	92.17	.01		8.07(1)	.00

Note: * indicates significant chi-square ($p < .05$) and OR. [a] indicates comparison category for predictor. Support/Logistics: 0 individuals (0%) reported a decrease in prescription or OTC use.

LIST OF ABBREVIATIONS AND ACRONYMS

ACC	Air Combat Command
AFSOC	Air Force Special Operations Command
ANG	Air National Guard
AUDIT-C	Alcohol Use Disorders Identification Test
CI	confidence interval
DHHS	U.S. Department of Health and Human Services
MAJCOM	major command
NHIS	National Health Interview Survey
NSDUH	National Survey on Drug Use and Health
OR	odds ratio
OTC	over-the-counter
RPA	remotely piloted aircraft
RX	prescription
SD	standard deviation
USAF	U.S. Air Force