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## Introduction

This study focuses specifically on women sailors and whether their tobacco use prior to entering the Navy is predictive of subsequent job performance. We are testing the general predictions that smoking at entry into the Navy is related to attrition prior to completing the first term of enlistment, poorer performance evaluations and career advancement, more disciplinary problems, lower reenlistment, and more hospitalizations of various types. The sample includes over 5,500 women entering the US Navy between March 1996 and March 1997. These women were participants in a study called "Operation Stay Quit" (OSQ), which was funded by the Defense Women's Health Research Program (DWHRP) through the US Army Medical Research and Materiel Command (Grant #DAMD17-95-1-5075, "Improving Navy Women's Health: Preventing Smoking Relapse After Recruit Training"). Detailed information on women recruits' smoking history was collected for the OSQ study. This dataset, representing nearly the population (i.e., 93%) of women recruits entering the Navy during this 1-year period over seven years ago, provides a unique opportunity to examine *prospectively* the relationship between tobacco use prior to entering the Navy and subsequent career performance. Information on attrition and career performance has been obtained from the Career History Archival Medical and Personnel System (CHAMPS) database maintained by the Space and Naval Warfare Systems Command, San Diego (SSC-SD) working in collaboration with the Naval Health Research Center (NHRC). After matching existing OSQ smoking data on over 5,500 women recruits with their subsequent career performance and hospitalization data from the CHAMPS database, we can assess whether a women's smoking history prior to entering the Navy is a prospective predictor of career outcomes and hospitalizations after 5-6 years of Navy service. Identifying predictors of attrition, performance, and hospitalizations is an important first step for developing actions to prevent or circumvent the high costs associated with lifestyle-related early attrition and poor job performance and health outcomes.

## Body

Although this study was originally planned as a 1-year project, several unanticipated delays led to the request and approval of a 1-year no-cost extension. Data analyses are currently underway to complete the scope of work during the extension period. Key research accomplishments, findings, and manuscript(s) will be summarized in the final report for this study to be submitted by February 2006.

For this annual review, progress to date on the scope of work is summarized below.

### *STATEMENT OF WORK:*

*TASK 1. Prepare the tobacco-related OSQ and CHAMPS datasets for merging into linked files suitable for conducting secondary data analyses.*

*a. Prepare identification codes (IDs) for matching individuals in the OSQ dataset with events in the CHAMPS dataset so that personal identifying information (e.g., SSNs) will not be included in the merged files used for secondary analyses.*

- b. Finalize the variables of interest from the CHAMPS data for inclusion in the secondary analyses.*
- c. Match OSQ participants' records with all of their events occurring in the CHAMPS dataset.*

COMPLETED. TASK 1 has been completed. Operation Stay Quit (OSQ) participants' social security numbers (SSNs) were used to link their baseline tobacco use data with personnel/medical information from the Career History Archival Medical and Personnel System (CHAMPS). Procedures were used to ensure that SSNs never appeared in the *merged* database, thereby protecting participants' confidentiality. To accomplish this, a new dummy ID code was first created for each of the 5,503 OSQ participants. A file containing participants' SSNs and new dummy ID codes (but no tobacco use data) was then used to extract personnel/medical data elements from CHAMPS. SSNs were stripped off of the resulting CHAMPS data file extract, and that file was then merged with the tobacco use data using the dummy ID code. These steps ensured that individuals were not identifiable on the merged data file used in the present study. Furthermore, the merging of OSQ participant's tobacco use data and CHAMPS data was very successful—only 16 of 5,503 individual SSNs did not match.

*TASK 2. Finalize analysis plans, conduct secondary data analyses, summarize results, and prepare report.*

- a. Finalize plans for data analysis.*
- b. Conduct all planned statistical analyses.*
- c. Summarize results and prepare final report.*

INCOMPLETE. Because of the need to request a 1-year no-cost extension, TASK 2 is currently underway and will be completed during the extension period. Progress to date has primarily involved extensive preparatory work with the CHAMPS database, a dynamic electronic system used to archive personnel and medical hospitalization information for active duty military personnel. This system includes information from 1961 up to the current time. CHAMPS is composed of fixed-block records based on career "events." These events indicate a personnel action related to military accession, change in pay grade, term of service, or duty station, unauthorized absence, discharge or separation from service, and medical inpatient hospitalizations. All events for an individual service member can be extracted and displayed as a career narrative or saved in an electronic database as a variable length record with "events" sequenced in chronological order. The objective for this project was to create a rectangular file with the CHAMPS records ordered by case that could be merged with the existing database from OSQ. Several steps were required to develop this file.

The extraction of personnel and medical "events" for the OSQ sample was completed by downloading all "events" that matched the social security numbers of OSQ participants. Of the original 5,503 women in the study, data were extracted for 5,487 participants. There were 16

participants for whom the social security number in the OSQ database did not match with CHAMPS.

Step 1 required grouping all "event" records by type. A 3-digit number on each event record codes the type of "event." Based on this code, "events" were grouped and written to 8 different files. The distribution of events is shown in Table 1. A record with demographic information was saved in a separate file (n=5,487).

Table 1. Distribution of Personnel and Medical Inpatient Events for the Sample of 5,487 Women

<i>Type of Event</i>	<i>Event Code</i>	<i>Number of Events</i>
Military Accession	100-198	7518
Pay Grade	327-330	17,091
Extension of Enlistment	382-387	7455
Duty Station Change	501-503	25,854
Unauthorized Absence/ Desertion	391, 591	223
Discharge from Service	800-943, 952-999	5830
Medical Inpatient	601-608	8289
Miscellaneous	250,301,344,345,347,348, 349,613,660,661,662	4830
Total		77,090

Step 2 built a rectangular file by case for each event type based on the maximum number of such events for any case. The distribution of records for each category of events is shown in Table 2.

Table 2. Maximum Number of Personnel and Medical Inpatient Event Categories for the Sample of 5,487 Women

<i>Type of Event</i>	<i>Maximum No. Events</i>
Military Accession	4
Pay Grade	12
Extension of Enlistment	12
Duty Station Change	15
Unauthorized Absence/ Desertion	7
Discharge from Service	4
Medical Inpatient	53
Miscellaneous	7

Step 3 merged the records from the 8 "event" files. Step 4 added the demographic record to build a complete record for each participant. Step 5 replaced the social security number with a unique study identification number and omitted the name field. These latter two changes were done to protect the privacy of the participants. This file was provided to SDSU for merging with the OSQ study tobacco history data.

Variable Names. All variable names are 8 characters and are composed of 3 elements. Element 1 is the first character of each name and defines the event type. For example, all event variable names beginning with 'A' originate in the military accession events. The other characters are: P = paygrade events, S = duty station events, E = extension events, u = unauthorized absence, absent without leave events, D = discharge events, and I = medical inpatient hospitalization events. Element 2 is 4-6 characters that provide an abbreviation of the specific variable. Some standardization was used and common abbreviations are listed in Table 3. Element 3 is a numeric value that indicates the sequence for the number of event records. For example, this number has a value of 1 to 4 for the accession events, or 1 to 15 for the duty station events.

Table 3. Examples of Common abbreviations in variable names.

EOS	End Obligated Service
EVNT	Event
NAM	Number
ENL	Enlistment
TRM	Term
REG	Regular (active duty status)
RCS	Reserve
NAV	Navy
MAR	Marine Corps
PAYGRD	Pay Grade
SEASHR	Location at sea vs. shore
DS	Duty Station
UIC	Unit Identification Code
BRCLS	Branch Class
EDUC	Education level
MARST	Marital status
PRIDEP	Primary dependents
DDEVN	Days since 1 <sup>st</sup> event (usually 1 <sup>st</sup> accession)
DOD	Department of Defense
OC	Occupation code
ENL	Enlistment
YR	Year of date
MM	Month of date
DD	Day of date
DIAG	Diagnosis
DSC	Discharge
ADM	Admission
HOS	Hospital

Sample Description. A preliminary examination of career history suggests that a set of dependent variables for analysis can be defined. Both positive and negative categories of a tour of service have sufficient cell sizes for analysis. For example, at initial induction into the Navy the women joined for primarily 4 years (n=4820) and 8 years (n=662). An examination of the

type of discharge at the end of the 4-year tour can be done to assess the successful and unsuccessful completion of duty. Approximately 32% of the women extended their first enlistment or reenlisted for a second tour of service. A rating based on job performance, "recommended for enlistment" provides a classification of success. Distribution of this rating is presented in Table 4. The types of discharges at the end of the first tour of service are presented in Table 5. The categories suggest both successful completion of the first tour of service, and discharge for negative and unacceptable reasons. Behavioral and punitive-related discharges account for 18.5% of the discharges at the end of the first tour.

Table 4. Distribution of "Recommended for Reenlistment" for the Sample of 5,487 Women

<i>Recommendation</i>	<i>n</i>
Not recommended	1233
Recommended, but qualifying issue	1046
Recommended	1552
Preferred Reenlistment	1481
Unknown	175
Total	5487

Table 5. Type of Discharge at end of First Enlistment for the Sample of 5,487 Women

<i>Type of Discharge</i>	<i>n</i>
Appointed Officer Status	39
End of Service	1554
Convenience of Government	2362
Medical	363
Died on Active Duty	6
Behavior Disorder Discharges	146
Personality Disorder Discharges	642
Sexual Behavior Discharges	50
Punitive Discharges	177
Unknown	148
Total	5487

Further analyses are currently underway to examine the distributional properties of the other variables down-loaded from the CHAMPS. This is an important step prior to conducting correlational/regression analyses to determine whether it is necessary to recode or transform variables to improve the psychometric or conceptual characteristics of the measures. In addition, various summary/composite variables are being computed (e.g., total number of hospitalization events, sum of disciplinary actions, etc.).

A series of statistical procedures will be conducted to assess the influence of smoking as a risk factor on subsequent personnel and health outcomes. Depending upon the measurement of a particular outcome variable, the type of regression will be either (a) logistic regression for

dichotomous outcomes (e.g., recommended for reenlistment during career, yes versus no), (b) multinomial regression for outcomes with more than two categories (e.g., reason for discharge), or (c) linear regression for outcomes that can be considered normally distributed (e.g., total number of days hospitalized). All three types of regression can handle smoking predictors that are dichotomous (e.g., baseline smoker, yes versus no), ordered (e.g., type of smoker), or continuous (e.g., amount smoked on a typical day). Regression analyses will also be used to assess multivariate associations, and can be used to test for multiplicative interactions and confounders. For example, the association between baseline smoking and the number of promotions during the woman's career may be examined after controlling for education level and mental/achievement score.

In general, various statistical analyses will be conducted during the extension year to test the hypotheses that women's tobacco use prior to entering the Navy is predictive of attrition prior to completing the first term of enlistment, poorer performance evaluations and career advancement, more disciplinary problems, lower reenlistment, and more hospitalizations of various types.

#### **Key research accomplishments**

NA. As data analyses are still underway for this project, key research accomplishments and results found during the 1-year extension period will be summarized in the final report for this study to be submitted by February 2006.

#### **Reportable outcomes**

NA. There are no reportable outcomes at this point in the project. Data analyses are still underway. Manuscript(s) summarizing key research findings will be prepared during the 1-year extension period, and will be reported in the final report for this study to be submitted by February 2006.

#### **Conclusions**

NA. Conclusions summarizing the results and their implications will be included in the final report prepared at the end of the 1-year extension period (February 2006).

#### **References**

NA.

#### **Appendices**

NA.