

PUBLIC HEALTH SERVICES AT FORT RILEY, KANSAS, AND THE ASSESSMENT OF
TOBACCO USE AMONG ACTIVE-DUTY PERSONNEL

by

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Abstract

In support for the master's degree in public health, I conducted a field experience at Fort Riley Medical Activity, Department of Public Health, Irwin Army Community Hospital, Fort Riley, Kansas. The objectives for this project were to observe preventive medicine at a patient care level, investigate and manage a communicable and/or reportable disease and conduct a tobacco use prevalence study among active-duty personnel serving on Fort Riley Army post. I was able to gain valuable experience by working under the supervision of Lieutenant Colonel Paul D. Benne MD, MPH, Chief of Preventive Medicine.

Chapter one characterizes the Fort Riley community and health services, specifically the department of public health. Chapter two reviews the field experience focusing on patient care observation and disease outbreak investigation. Chapter three presents the tobacco use prevalence study and chapter four displays presentation slides and a poster generated for conference presentation.

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CHAPTER 1 – *Fort Riley*

The Fort Riley Demographics

Fort Riley is a United States Army post located in Northeast Kansas between Junction City and Manhattan. It was established in 1853 to protect the movement of people and trade over the Oregon-California and Santa Fe trails. Fort Riley was officially established as a permanent post by the War Department on June 27, 1853. The fort is named in honor of Major General Bennett C. Riley who led the first military escort along the Santa Fe Trail⁽²⁾.

The total resident population on Fort Riley is approximately 9,000 with a daytime population of nearly 25,000. The population is racially diverse; approximately 60% white, 23% Black, 13% Hispanic and the remaining 4% consists of other ethnic groups. The population is young with a median age of 21.9 years for both males and females. There are a larger number of males compared to females on Fort Riley, 63% and 37%, respectively⁽⁷⁾.

Irwin Army Community Hospital

Irwin Army Community Hospital (IACH) provides health care services for soldiers, families and retirees of Fort Riley and the surrounding community. Irwin Army Community Hospital is a general medical and surgical facility, with 44 beds. The hospital was dedicated on February 7, 1958 and named Irwin Army Community Hospital in honor of Brigadier General Bernard John Dowling Irwin "The Fighting Doctor" who earned the Congressional Medal of Honor for distinguished gallantry in action during an engagement with the Chiricahua Indians near Apache Pass Arizona in February 1861⁽³⁾.

Department of Public Health

The department of public health at Irwin Army Community Hospital is a team of public

health professionals led by a public health physician, Paul D. Benne MD, MPH. The staff includes environmental health specialists, industrial hygienists, occupational health nurses, public health nurses, epidemiologists, public health specialist and administrators. As members of this team, they work with the Fort Riley community (i.e., soldiers, their family members, retirees, and civilian contractors) to assess and prioritize health problems, and to help alleviate or eliminate problems and conditions that contribute to their development⁽⁴⁾.

Environmental Health

Environmental health encompasses the assessment and control of environmental factors that can potentially affect the health of the Fort Riley population. It is targeted towards preventing disease and creating health-supportive environments. Environmental health professionals at Fort Riley prevent environmental health hazards and promote and protect the public health and the environment in the following areas: food protection; housing; institutional environmental health; land use; recreational swimming areas and waters; on-site septic systems; drinking water quality; water sanitation; emergency preparedness; and vector control, including the control of mosquitoes, rodents, flies, cockroaches and other animals that may transmit pathogens⁽⁵⁾.

Occupational Health

Occupational health nurses ensure the establishment and maintenance of a safe and healthy working environment, which facilitates the optimal physical and mental health in relation to work. They identify and assess the risks from health hazards in the workplace. Occupational health nurses at the Department of Public Health deal with all aspects of health and safety in the Fort Riley workforce and have a strong focus on primary prevention of hazards. The health of the workers at Fort Riley has several determinants, including risk factors that can lead to

accidents, musculoskeletal diseases, respiratory diseases, hearing loss, stress related disorders, communicable diseases and others. Occupational health nurses provide advice, information, training and education, on occupational health, safety and hygiene and on ergonomics and protective equipment. They conduct pre-employment health physical examinations as well as civilian pre-deployment and post deployment health physical examinations⁽⁶⁾.

Industrial Hygiene

Industrial hygienists work in parallel with environmental health and occupational health staff in order to protect the health and safety of the Fort Riley workplace and community. They investigate and examine workplace hazards by researching harmful conditions. They educate the Fort Riley community about job-related risk, and ensure workers are following health and safety procedures. They may also recommend safety improvements for workers and the surrounding community. The US Army has major occupation hazards that industrial hygienists work to eliminate or mitigate, which may include: chemical hazards such as solvents, heavy metals, cleaning solutions and combustion products; physical hazards such as noise, temperature, radiation; and, ergonomic hazards. They also protect the public from toxic chemical exposure whether in consumer products, housing, workplace air, water or soil⁽¹⁾.

Public Health Nursing

Public health nurses assist individuals and families to take action to improve their health status. They work on improving the health status of the entire Fort Riley community. This is done through teaching about healthy lifestyle choices in the home, in the workplace, and in community settings. Public health nurses assist people in applying improved health behavior choices to their everyday lives. For example, personal behaviors that can contribute to health problems are tobacco use, improper diet, and lack of physical exercise, and unsafe sexual

practices. Examples of community issues on which the public health nurse may work are reducing tobacco sales to minors, immunization of community members against communicable diseases, and child-care center inspections. Fort Riley public health nurses work with the local school district in the prevention of childhood obesity and coordinate with local county health services with disease outbreak investigation and mitigation⁽⁸⁾.

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CHAPTER 2 – Field Experience

Student Learning Objectives

The learning objectives for the field experience included: conducting a tobacco use prevalence study among active-duty personnel serving on Fort Riley Army post, observing preventive medicine at a patient care level, and investigating and managing a communicable and/or reportable disease.

Student Activities

The majority of field experience time was devoted to a tobacco use study, which involved conducting a review of literature of tobacco use in the US military and civilian populations, developing a database, inputting tobacco use survey data into the database, conducting statistical analysis of data and creating a written report of the findings (see Chapter 3 for study report). Other field experience activities included shadowing the public health physician in the public health clinic (more detail below) and responding to a communicable disease and participating in the investigation and management (see below).

Patient Care Observation

Smoking Cessation

Tobacco use is the single largest preventable cause of disease and premature death in the United States with an estimated 443,000 pre-mature deaths each year⁽⁵⁾. Smoking cessation could prevent much of the premature death. Moreover, smokers who quit can expect to live as many as 10 years longer than those who continue to smoke⁽⁹⁾. Unfortunately only about 5% of those who attempt to quit are successful in quitting for at least a year⁽⁷⁾.

Free tobacco cessation counseling and medication are available to active-duty soldiers,

their families, and retirees through the public health services at Fort Riley. As part of my field experience, I was provided the opportunity to observe a number of tobacco cessation counseling sessions.

Through shadowing, I was able to observe physician-patient interaction during various tobacco cessation counseling sessions. I observed that the discussions about quitting varied greatly; with several patients reporting a long history of smoking with multiple quit attempts. It was my understanding that the counseling was only a link in the patient's long chain of cessation experiences. Patients nearly always had conducted their own prior research, or knew people who had quit using a particular medication, most notably Varenicline (Chantix).

Dr. Paul Benne, Fort Riley's public health physician, provided each patient a description of a comprehensive plan for quitting over time. However, the main focus of the physician-patient interaction was around medication. Medication options included nicotine replacement products such as gum, patch, inhaler, nasal spray and lozenges or prescription medication such as Bupropion (Zyban) or Varenicline (Chantix). Dr. Benne provided information on medication selection and information about its use. Patients seemed very willing to comply with Dr. Benne's recommendations. Dr. Benne also seemed willing to go along with any strong patient interest in the approach to quitting medication or medication selection. Dr. Benne also encouraged external resources such as the local cessation course run by a public health nurse, and on-line resources such as the Chantix web cessation program. The local program consists of a classroom-style session, held once a week for four weeks. This program is run in conjunction with the 12-week medication (Chantix) cycle.

Patients almost always seemed to have been satisfied with the physician interaction. Patient motivation and self-action appeared to be critical in cessation success. Patients usually have

ideas and experiences about what they want to do. The interviews helped me gain insight into the patient-physician interaction in a clinical public health setting.

Tuberculosis

Tuberculosis (TB) is a disease caused by the bacteria, *Mycobacterium tuberculosis*⁽¹⁾. Tuberculosis typically infects the lungs but it can attack any part of the body to include the kidneys, spine, or brain⁽¹⁾. The majority of tuberculosis-test-positive patients at Fort Riley are active-duty soldiers or their spouses who are either foreign-borne or have contact in a foreign country⁽⁸⁾. The tuberculosis infection rate of foreign-born residents in the US is 10 times greater than US-born residents. In addition, 59% of all TB cases occurred in foreign-born residents⁽³⁾. As part of the field experience I was provided the opportunity to be involved in the supervision of two cases of latent tuberculosis among military family members. One case was from a military spouse and infant child who had recently traveled to the Philippines, while the other, was a military spouse who had returned from a trip to Germany.

In the discussion with the patients, Dr. Benne explained the natural course of the disease and mode of transmission, focusing on the fact that tuberculosis bacteria are transmitted via the airborne route⁽¹⁾. He asked whether the patient had been on any kind of tuberculosis treatment in the past, about symptoms the patient had been having (coughing, losing weight, night sweats, fever, fatigue, etc.) and probed about appetite, asking about weight loss. He also inquired whether the patient knew anyone having tuberculosis that may have exposed them to the bacteria. He also questioned the patient about other medical history (e.g., diabetes, cancer, kidney problems and other immuno-compromising conditions). He prescribed the medication Isoniazid (INH). INH kills the tuberculosis bacteria in the body⁽²⁾. However, the medication cycle is a nine-month process and patients are required to be followed up on a monthly basis.

Cold Weather Injury

The military profession may expose soldiers to harsh environmental conditions, particularly those who attend rigorous training such as Ranger School at Fort Benning, Georgia. Ranger students typically conduct 20 hours of training per day during Ranger School, while consuming two or fewer meals daily with an average of 3.5 hours of sleep⁽¹⁰⁾. They are at an increased risk to experience weight loss, dehydration, trench foot, heatstroke, frostbite, chilblains, fractures, tissue tears, among a myriad of other injuries⁽¹⁰⁾.

Dr. Benne saw a young Ranger School student recovering from frostbite on digits of all four extremities. Frostbite causes loss of feeling and color in affected areas, with a white or grayish-yellow skin area⁽⁶⁾. Factors that contribute to frostbite include extreme cold, inadequate clothing, wet clothes, wind chill, and poor circulation. Tight clothing or boots, cramped positions, fatigue, certain medication, smoking, and alcohol use, among other factors, can cause poor circulation⁽⁶⁾. The rigors of Ranger School expose students to several of these factors especially during the winter months.

The soldier with cold weather injury complained of numbness and tingling sensation on the tips of fingers. Pictures of the feet indicated signs of trench foot, according to Dr. Benne. Environmental injuries such as frostbite persist and are bound to repeat. Patients are protected with “profiling” depending on severity or how quickly the patient recovers. Profiling or being put on a “profile” provides the patient (i.e., soldier) with written instruction for limiting exposure to an environment that may exacerbate the condition or provides protection that may otherwise not be available or permitted. For example, a soldier on profile may be excused from training in cold weather environments or permitted to use additional protection such as gloves.

Disease Outbreak Investigation

Respiratory Syncytial Virus

Each year, approximately 75,000 to 125,000 children under the age of one are hospitalized due to respiratory syncytial virus (RSV) infection in the US. Almost all children are infected with RSV by the age of 2, but only a few develop severe disease. Individuals with RSV suffer from symptoms, which may include cough, sneeze, and runny nose. Young infants may experience breathing difficulties, irritability, and decreased activity. Hospitalization usually lasts on a few days, and recovery usually takes 1 to 2 weeks. Contagious settings include child-care centers⁽⁴⁾.

An objective of the field experience was to conduct a disease outbreak investigation. The investigation was conducted on RSV infections in Fort Riley child-care centers during the month of January 2010. A total of 62 RSV-positive cases were cultured at the microbiology laboratory at Irwin Army Community Hospital. Figure 1 shows the number of RSV-positive cases per day during the month of January 2010 at Fort Riley. The range of cases per day ranged from no cases to five cases. Consistent with a disease outbreak, there appeared to be a bi-phasic curve; an early spike of the curve during the 6th through the 8th days of the month followed by a second spike during the period of the 19th through the 31st days of January. An incubation period (receipt of infection to the time of clinical illness) was identified to be about 7 days.

A specific child-care center was thought to be the source of the outbreak, noted as Child-care center A. There were a total of five RSV-positive cases of children attending Child-care center A, but no discernable pattern to indicate this center as the source of the outbreak (see Figure 2.). There was no indication that any other child-care center was the source of the outbreak. It was also considered that weekend days were more likely to see hospitalization of children with RSV, however no pattern was observed (see Figure 2).

Figure 3 shows the difference in RSV-positive cases at Irwin Army Community Hospital for the month of January in the years 2009 and 2010. There appeared to be a greater number of RSV-positive in the year 2010 (62 cases) compared to the year 2009 (10 cases). This pattern is indicative of a disease outbreak for the month of January in the year 2010.

Figure 1. RSV positive cases on Fort Riley, Kansas.

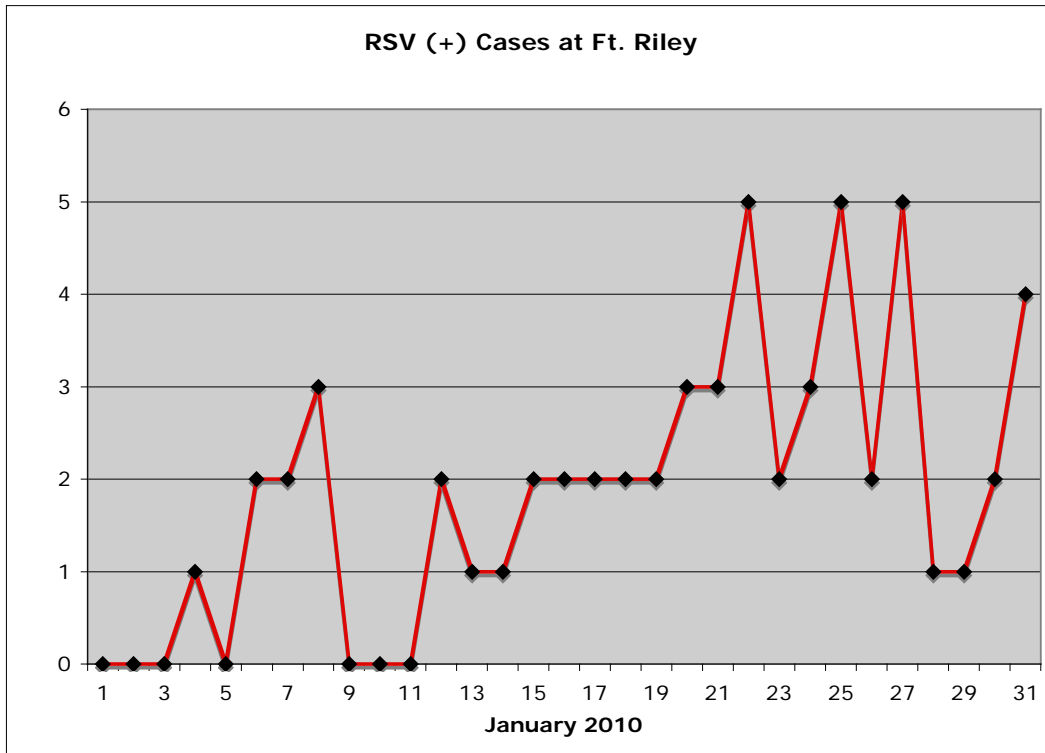


Figure 1. RSV positive cases on Fort Riley, Kansas (with illustrations).

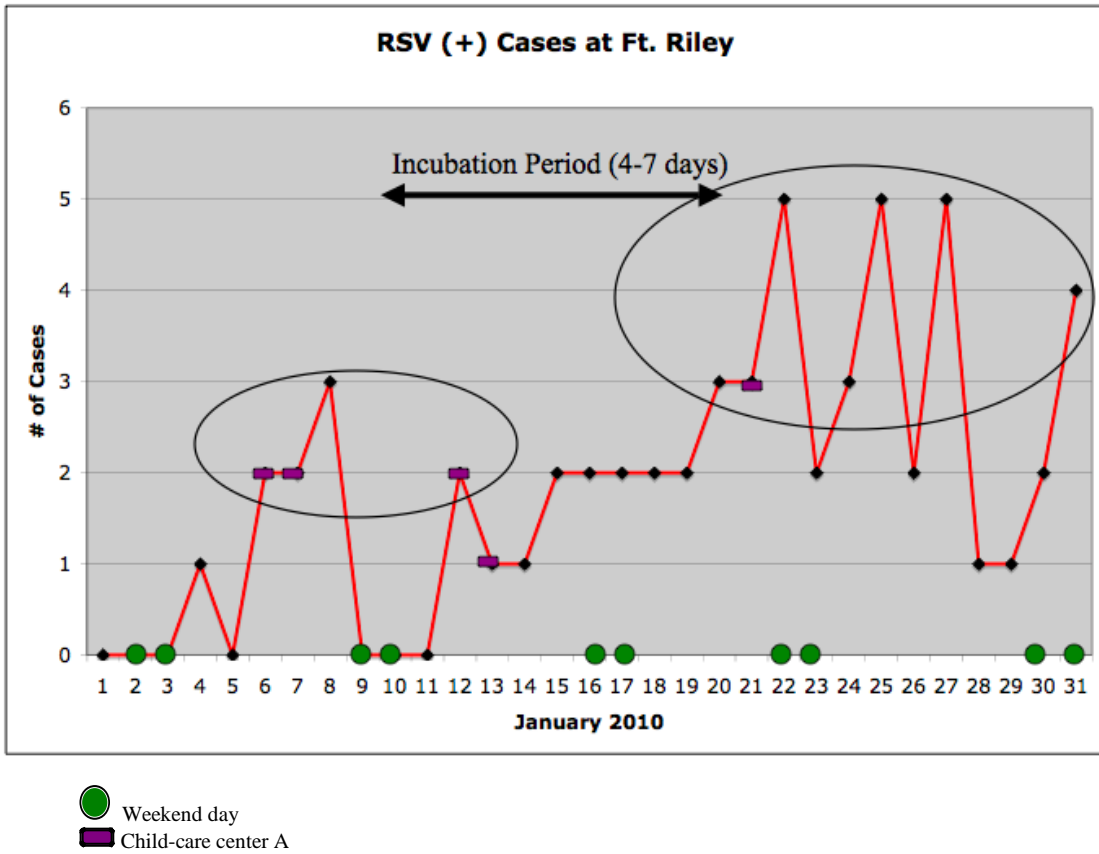
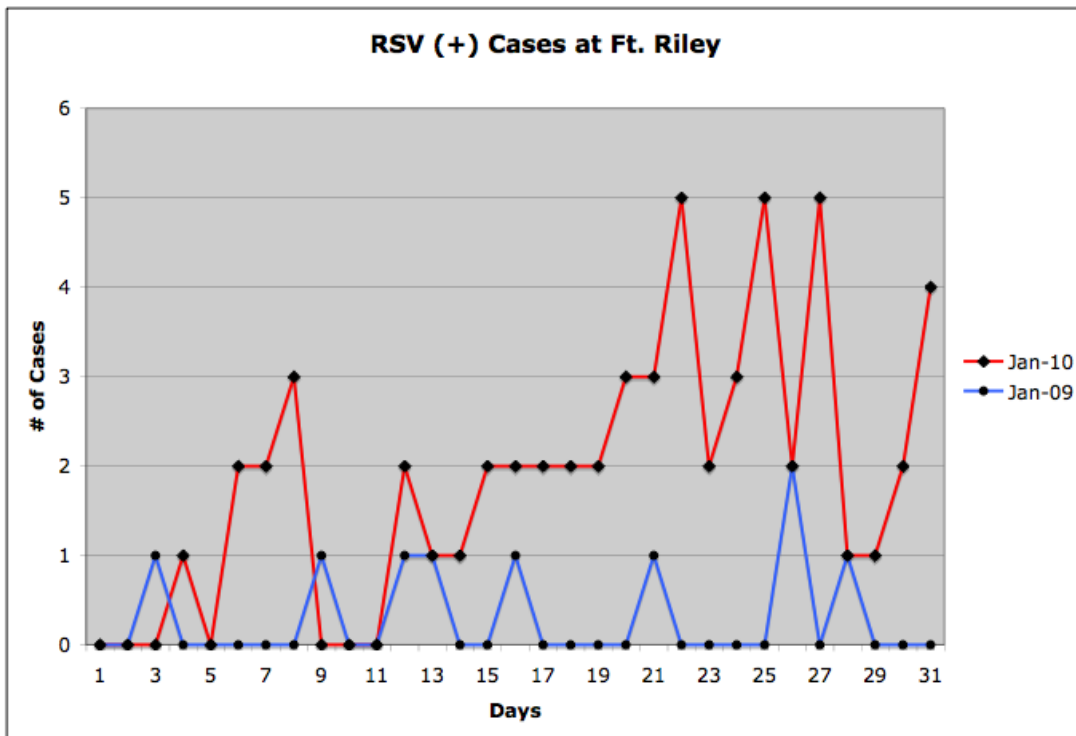


Figure 2. RSV positive cases on Fort Riley, Kansas during the months of January 2009 and January 2010.



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CHAPTER 3 – *Tobacco Use Study*

Abstract

Title: Tobacco use at Fort Riley: A study of the prevalence of tobacco use among active-duty Soldiers.

Background: Tobacco use is the leading cause of disease death in the United States. The military has witnessed an increase in tobacco use among active-duty personnel. Tobacco use among military Soldiers is of growing concern given its substantial burden on military health care and combat readiness.

Objective: This cross-sectional study investigated the prevalence of tobacco use among active-duty soldiers assigned to Fort Riley Army Post and to examine the determinants of tobacco use and interest in cessation.

Methods: Soldiers assigned to Fort Riley completed tobacco use questionnaires as a part of a soldier readiness process (SRP). Tobacco use questionnaires were collected at the SRP center. SPSS version 16.0 (SPSS Inc., Chicago, IL, USA) was used to calculate mean percent and multinomial logistic regression analysis.

Results: A total of 6,181 soldiers participated in the study (91.2% male, mean age of 26.8 years (SD = 6.8 yrs; range 17-56 yrs)). Forty-nine percent of participants reported using some form of tobacco product either smoked (ST) or smokeless (SLT). The overall ST use was nearly 39%. SLT use was over 19%. Factors associated with tobacco use included sex, age group, and unit or brigade. Thirty-six percent of tobacco users also reported interest in tobacco cessation. The overall reported interest in ST cessation was 40%. Reported interest in SLT cessation was 28%. Factors associated with interest in tobacco cessation included sex, age group, and unit or brigade.

Conclusion: Results suggest that active-duty soldiers serving at Fort Riley Army post represent a high-risk population for tobacco use and there may be unique factors contributing to greater tobacco use and interest in tobacco cessation. The observed increased use in the time period around deployment provides important information for local health care providers that can be used to tailor current prevention and cessation programs.

Introduction

Tobacco use is the leading cause of disease death in the United States (US) with an estimated 443,000 deaths each year to include approximately 50,000 non-smokers exposed to secondhand smoke⁽⁶⁾. Smoked tobacco has been associated with an increased risk of stroke, heart disease, chronic obstructive pulmonary disease, and several other forms of cancer⁽⁵⁾. Smokeless tobacco (typically consumed orally) has also been associated with an increased risk of oral cancer⁽¹⁸⁾, pancreatic cancer⁽¹⁾, and cardiovascular disease⁽¹⁰⁾.

The US military environment has been perceived as one in which tobacco use has been accepted and often encouraged⁽⁸⁾. The US Department of Defense has taken measures to reduce tobacco use, including tobacco cessation programs that are available at every major military medical facility⁽¹¹⁾, which resulted in a substantial decline in smoked tobacco use from 51.0% in 1980 to 32.2% in 2005⁽⁴⁾. However, the US military experienced an increase in smoked tobacco use among active-duty personnel from 29.9% to 32.2% from 1998 to 2005, respectively⁽⁴⁾. In addition, smokeless tobacco use is substantially high among military personnel. Over 17% of military personnel reported using smokeless tobacco⁽⁴⁾ compared with 3.3% of their civilian counterparts⁽²¹⁾. A study by Bray and colleagues found a past 30-year prevalence of smokeless tobacco use among active-duty males 18 to 24 years of age of 21.6%⁽⁴⁾.

The high rate of tobacco use among military personnel is of growing concern given its substantial burden on military health care and combat readiness^(12,13). It has been estimated that military smoking-related health care costs are \$500 million per year and an associated lost productivity cost of nearly \$346 million per year⁽¹²⁾. Relative to non-smokers, military personnel who smoke are more likely to miss duty days because of illness⁽¹²⁾, are less productive⁽¹²⁾,

perform worse on physical fitness tests⁽¹⁶⁾, experience more training injuries⁽¹²⁾, and are more likely to be discharged within the first year of service⁽¹³⁾.

Within the military, tobacco use also places a financial burden on the user. A study by Siahpush and colleagues found that the odds of experiencing extreme financial stress were twice as high in smoking households compared to non-smoking households⁽¹⁹⁾. A similar study found an average net worth deficit of \$8,000 for heavy smokers and \$2,000 for light smokers compared to non-smokers⁽²⁴⁾. Pyle and colleagues estimated, based on the national average price of a pack of cigarettes, that a pack per day habit could consume up to 15% of base pay for an E-1 (approximately 2 months of salary) given the varying price of cigarettes among states⁽¹⁷⁾.

Tobacco use is particularly high among US Army personnel. In the study by Bray and colleagues, Army personnel reported the highest rate of smoking (38%) compared to other branches of the US Military (Navy 32%, Marine Corps 36%, and Air Force 23%) and only second to the Marine Corps in terms of reported smokeless tobacco use (19% and 22%, respectively)⁽⁴⁾. Even after controlling for differences in sociodemographic factors, the Army reported significantly higher rates of any smoking, heavy smoking and nicotine dependence than the other military services⁽⁴⁾. The prevalence of any smoking in the Army (38%) was higher in 2005 than at any point since 1998 and has shown a statistically significant increase since 1998^(2,3,4).

Tobacco use studies among military personnel at individual military installations are needed because the success of tobacco use control efforts is dependent upon reliable surveillance data to develop appropriate intervention strategies that will meet the needs of the military organization and personnel⁽⁴⁾. Therefore, the purpose of the current study was to examine the use of smoked and smokeless tobacco among active-duty personnel (soldiers) at the Army's post at

Fort Riley, Kansas. It was expected that this analysis would yield an understanding of the prevalence of tobacco use both for the Fort Riley active-duty population as a whole, and separately according to major unit (defined in this study as Brigade). To the best of our knowledge, this is the largest comprehensive assessment of tobacco use among Fort Riley active-duty personnel.

Methods

Participants

Participants for the present study consisted of 6,181 active-duty personnel assigned to Fort Riley, Kansas. Fort Riley has a population of approximately 18,000 active-duty personnel. The US Army has two main types of posts, one being dedicated to Training and Doctrine and the other to Forces Command. Fort Riley is a Forces Command Post, more specifically an Infantry Division Post. A large portion (44%) of study participants was in a pre-deployment or post deployment status during the course of the study. Members of Second Brigade returned from a combat deployment in Iraq and members of Fourth Brigade deployed to Iraq during the course of this study. All other major units were in a non-deployment status during the course of this study.

Design and Procedures

The study was conducted over nine months, from June 2009 to February 2010. This study was a collaborative effort between health care personnel at the Department of Public Health, Fort Riley Medical Activity and the Fort Riley Soldier Readiness Process (SRP) center. Active-duty military participants were recruited during their deployment SRP, post-deployment health assessment, or periodic health assessment. All military personnel including activated reserve or guard component personnel are required to process through SRP. Processing through SRP takes

approximately one to four hours. Upon arrival at the SRP center, military personnel were briefed on procedures and given their individual SRP packet (a folder containing personal medical documents and other forms) in which the tobacco use assessment questionnaire was included. Personnel were instructed to complete the documents including the tobacco use assessment questionnaire while waiting to process from one SRP station to the next. Tobacco use assessment questionnaires were returned to staff at the last SRP station. Questionnaires were collected at the SRP center and processed and analyzed at the Department of Public Health, Fort Riley Medical Activity.

Questionnaire

Data were obtained using a 24-item questionnaire assessing a variety of health-related items covering four general domains including demographics, pneumonia-related items (Pneumococcal vaccine screen), tuberculosis-related items (TB skin testing), and items specific to females (e.g., Are you pregnant?; Are you breastfeeding?; HPV vaccine/Gardasil vaccine). In terms of demographics, participants were asked to provide name, social security number, age, and unit (i.e., Brigade). Participants reported being in a specific Battalion or Brigade. Specific Battalions were categorized under their respective Brigade (e.g., 1-28th Infantry Battalion under 4th Brigade). Participants classified as “No unit” did not specify unit affiliation on the tobacco use measure and were therefore analyzed separately. Tobacco use items were located within the Pneumococcal vaccine screen domain. Tobacco use questions consisted of the following: Do you use tobacco (yes or no), smoke or chew (choose one, both or none), and are you interested in quitting (yes, no or not applicable)?

Data Analysis

Data analysis was carried out using SPSS statistical software version 16.0 (SPSS Inc., Chicago, IL, USA). Univariate analysis identified factors associated with participants' use of any type of tobacco (including smoked tobacco, smokeless tobacco, or both), smoked tobacco use only, and smokeless tobacco use only. Respondent level factors that were significantly associated with any tobacco use, smoked tobacco use, and smokeless tobacco use in the univariate analysis ($p < 0.05$) were included in the multinomial logistic regression model. Separate models were built for any tobacco, smoked tobacco, smokeless tobacco use and interest in tobacco cessation. Adjusted odds ratios (AOR) with 95% confidence intervals, indicating significance at the 0.05 level, are reported.

Results

Table 1 presents the descriptive characteristics of the 6,181 total active-duty personnel who participated in the study. The majority of participants were male (91.2%) and the average age was 26.8 years (SD, 6.8 years) with an age range of 17 to 58 years. Participants were divided into five groups according to age (17-21, 22-24, 25-27, 28-32, and 33-58 yrs). Participants were stratified according to Brigade. Members of Second Brigade represented the largest sample of participants ($n=1428$). Second Brigade contained the smallest percentage of female participants and Partner Units contained the largest, 4.7% and 15.6%, respectively. Participants not reporting being a member of a Brigade or Battalion (categorized as "No unit") represented slightly over 3% of the study sample.

Table 2 presents means and adjusted odds ratios for smoked and/or smokeless tobacco use. The adjusted estimates for any tobacco use, smoked tobacco use and smokeless tobacco use are shown in Table 2. Forty-nine percent of all study participants reported using any form of

tobacco, 39% reported using smoked tobacco, and 19% of participants reported using smokeless tobacco.

Sex was a significant factor in terms of reported tobacco use. Female participants were significantly less likely to report any (AOR=0.3, CI = 0.3-0.4), smoked (AOR=0.5, CI = 0.4-0.6) and smokeless tobacco use (AOR=0.1, CI = 0.07-0.2). More than half of all male participants reported using any form of tobacco compared to one-quarter of female participants. The most pronounced difference was seen in reported smokeless tobacco use; only 2% of female participants reported using smokeless tobacco compared to 20% of male participants.

Younger participants reported the highest tobacco use, 55% among 17-21 year-olds. Adjusting for sex, the odds of reporting any tobacco use for the youngest age groups, 17-21 and 22-24, were (AOR = 2.1, CI = 1.8-2.5) and (AOR = 2.0, CI = 1.7-2.3) respectively, compared to the eldest age group (33-58). In comparison, the odds of reporting smoked tobacco use for the 17-21-age group was (AOR = 2.5, CI = 2.1-3.0) compared to the eldest age group (referent). The pattern remained consistent with the odds of reporting smokeless tobacco use for the youngest age group being significantly higher (AOR = 1.7, CI = 1.4-2.1), when compared to the eldest group.

Estimates for any, smoked and smokeless tobacco use were highest among members of Fourth Brigade (63%, 48%, and 33%, respectively). Members of Partner Units reported the lowest smoked tobacco use (33%) and any tobacco use (39%). Smokeless tobacco use was found to be lowest among members of Aviation Brigade (12%). Members of Fourth Brigade were significantly more likely to report any tobacco use (AOR= 1.7, CI = 1.4-2.1), smoked tobacco use (AOR= 1.4, CI = 1.2-1.7) and significantly more likely to report smokeless tobacco use (AOR= 1.8, CI = 1.4-2.3) compared to the Partner Units (referent). Members of Second Brigade

were also significantly more likely to report any tobacco use (AOR = 1.2, CI = 1.04-1.5) and smoked tobacco use (AOR= 1.2, CI = 1.03-1.5) but were not significantly different in reporting the use of smokeless tobacco as compared to Partner Units.

Table 3 presents sociodemographic factors associated with reported interest in tobacco cessation among active-duty personnel on Fort Riley. Of the 3,032 participants who reported using any form of tobacco, over 36% reported an interest in tobacco cessation. There was no significant difference in the reported interest to quit tobacco between male and female participants (AOR=1.0, CI = 0.7-1.5). The youngest age group (age 17-21) was significantly less likely (AOR=0.6, CI = 0.5-0.8) to report an interest in tobacco cessation than the eldest age group (33-58). All other age groups were not significantly likely to report interest in tobacco cessation compared to the eldest age group (22-24 yrs, AOR= 0.9, CI= 0.7-1.1; 25-27 yrs, AOR= 1.0, CI= 0.8-1.3; 28-32 yrs, AOR= 1.2, CI= 0.9-1.6). A comparison between brigades with respect to interest in tobacco cessation indicates that members of all other brigades were significantly more likely to report interest in quitting tobacco use than Partner Units (First Brigade, AOR= 1.9, CI= 1.4-2.5; Second Brigade, AOR= 2.1, CI= 1.6-2.8; Aviation Brigade, AOR= 1.4, CI= 1.02-1.9; and Fourth Brigade, AOR= 1.6, CI = 1.2- 2.2). Operationally engaged Brigades (First, Second, and Fourth Brigades) reported a greater desire to quit tobacco use than Partner Units, with members of 2nd Brigade being most likely (AOR=2.1, CI= 1.6-2.8) to report a desire to quit than Partner Units.

Discussion

The present study is the largest comprehensive assessment of tobacco use among active-duty personnel assigned to the US Army Post at Fort Riley. Data were collected on tobacco use patterns of 6,181 active-duty personnel in the setting of a Soldier Readiness Process center. The

SRP center was a particularly opportune location because of the requirement for the target population to process prior to and after a deployment, and during periodic examinations (periodic health assessments) of which the majority of our target population was to complete. The study time frame provided the opportunity to survey active-duty personnel prior to a combat deployment to Iraq (Fourth Brigade) and active-duty personnel returning from a combat deployment to Iraq (Second Brigade).

In the present study, results indicate that tobacco use was common among active-duty personnel serving at Fort Riley. Approximately one in two participants reported using any form of tobacco product (smoked or smokeless). Overall, the prevalence of smoked and smokeless tobacco use tended to be higher than those found among civilian and other military populations^(2,3,7,14,21). However, the current findings are similar to Bray and colleagues' findings of 38% smoking prevalence and 19% smokeless tobacco prevalence among US Army personnel⁽⁴⁾. A striking deviation from the expected was seen in two units closest to deployment with an increased prevalence of smoked tobacco use of 50 and 63%.

Consistent with other studies^(2,3,4,7,14,21), male tobacco use was greater than female tobacco use. The current findings on the female-reported tobacco use may not be completely representative, given a relatively small sample size. However, Fort Riley is an Infantry Forces Command Post; females have traditionally been excluded from serving in the combat arms military occupational specialties, most notably in the infantry. Females are more likely to be serving in support elements (i.e., Partner Units). Therefore, the small percentage of female participants in the current study likely accurately represents the general active-duty population at Fort Riley. Results of this study were adjusted for sex.

After adjusting for sociodemographic factors, members of Fourth and Second Brigades reported greater tobacco use than the other brigades. The data collected in the present study did not allow for the explanation for why members of these units reported higher rates of tobacco use. However, it is important to note that these groups were in closest proximity to a combat deployment, either pre-deployment or re-deployment. Some studies have shown that there is an increased use of tobacco products during a deployment particularly in areas where alcohol is prohibited, such as Iraq^(20,23). Deployed personnel may experience high levels of stress, particularly those in combat situations. Combat related stressors, which may include the need for constant vigilance against enemy attack and difficulty in distinguishing insurgents from civilians⁽⁹⁾. In response to the negative impact of stress, some soldiers cite using tobacco as a management tool⁽¹⁵⁾ with the assumption that tobacco reduces their perceived level of stress. It may also be that stress prior to a deployment, which include separation from family and friends, loss of income and fear of deployment to a war zone⁽⁹⁾, increases tobacco use, which may explain the increased use among members of Fourth Brigade. Other units in this study, who were in a more stable (not deploying) status, may be exposed to an environment less conducive to tobacco use (i.e., absent of deployment stressors).

Another interesting finding is that approximately one-third or more of tobacco users in each brigade reported an interest in tobacco cessation. This is an interesting finding, considering that although there is a reported interest in cessation, there exists a continued high prevalence of tobacco use. Peterson and colleagues highlight several barriers to participation in tobacco cessation programs among military personnel (duty requirements, time when programs are offered, and the requirement to attend multiple appointments in many programs)⁽¹⁴⁾. This may explain the phenomenon of high percentage use and high percentage interest in quitting.

Moreover, the highest reported interest to quit came from the operationally engaged brigades, particularly Second Brigade, who was recently re-deploying from a combat tour in Iraq.

The youngest age group (17-21) reported the least desire to quit (28%), yet had the highest reported tobacco use. This age group is typical for new or recent enlistees into the military. Bray and colleagues found that 39% of young adults age 18-25 who were current smokers initiated smoking after joining the military⁽⁴⁾. Theoretically, this may represent a stage of life where social and role model influences lead to initiation or re-initiation of tobacco use.

The results of the present study should be interpreted with consideration of the following limitations. The data were obtained via a self-report measure, which allows the potential for the underreporting of tobacco use; no biological verification was sought. However, Velicer and colleagues have shown self-report measures to be generally valid for assessing smoking status in most epidemiological studies⁽²²⁾. Also, several demographic characteristics such as rank, marital status, education level, and race or ethnicity were not assessed in the current study. Other studies have found that tobacco use differs by these demographic characteristics^(2,3,4,7,14,21). Additionally, there is a potential for those participants who did not specify unit affiliation to be fundamentally different from those who responded with a unit affiliation. Furthermore, it is uncertain whether the data from this study will generalize to active-duty personnel assigned to other military installations. Another limitation was that the sample although large, was limited by the small female sample size. Although females constitute a smaller percentage of the Army population, patterns of tobacco use generally differ by sex and should be further explored in future studies. Lastly, the tobacco use measure used in this study was limited in that it assessed tobacco use as current users in a binary fashion (yes or no), limiting our assessment of tobacco use. Generally the criterion used to assess smoking in adults is someone who smoked at least 100 cigarettes in

his or her lifetime and has smoked at least once in the past thirty days and the criterion for smokeless tobacco users to have used at least twenty times⁽⁴⁾.

Counterbalancing the limitations, the current study had several strengths. First, the sample was very large and represented active duty personnel serving on a large Army installation. Second, the questionnaire completion rate was quite high. Lastly, the study allowed for the capitalization on the opportunity to ask cohort members about tobacco use shortly after and before a combat deployment.

Military installations offer a potential site for interventions that discourage the use of tobacco among active duty personnel. Current efforts are needed to broaden intervention beyond smoked tobacco to address smokeless tobacco. Data from this study can help military installations target personnel at greatest risk of using specific types of tobacco products. These efforts could include policy changes that discourage tobacco use, reinforcing the message that tobacco use is not the norm. One key component is to utilize the leadership influence by targeting commanders, particularly of units near deployment. In addition, policies protecting non-smokers from passive smoke exposure are needed. It is also important to limit the visibility and accessibility of tobacco products in order to discourage initiation, potentially helping those who are attempting to quit or keeping occasional tobacco users from becoming habitual tobacco users.

In summary, the results of the present study suggest that active-duty personnel serving at Fort Riley Army Post represent a high-risk population for tobacco use; approximately one in two participants indicated using any form of tobacco. This prevalence is much higher than initially expected. Although there is a high prevalence of tobacco use, there exists a substantial interest in cessation; approximately one in three tobacco users reported an interest in quitting. The results

provide important information for local health care providers that can be used to tailor current prevention and cessation programs. The findings also indicate a potential deploying and re-deploying effect, although further research is needed to elucidate this effect. Additional research is also needed to examine the difference of tobacco use found between units, to include tobacco use through an entire deployment cycle.

Tables

Table 1. Descriptive characteristics of participants of a tobacco use study among active-duty personnel at Fort Riley Army post.

Factor	Value	SD^a		
Age (yrs)				
Mean	26.8	6.8		
Range	17-58			
	n	(%)		
Sex				
Male	5635	91.2		
Female	546	8.8		
Age Group				
17-21	1397	22.6		
22-24	1523	24.7		
25-27	1048	17.0		
28-32	976	15.8		
33-58	1236	20.0		
	n	(%)	% Male	% Female
Unit/Brigade				
1st Brigade	1406	22.7	91.6	8.4
2nd Brigade	1428	23.1	95.3	4.7
Avn Brigade	881	14.3	86.8	13.2
4th Brigade	1265	20.5	94.3	5.2
No Unit	208	3.4	88.9	11.1
Partner Units	993	16.1	84.4	15.6
Total Participants	6181			

^aStandard Deviation

Table 2. Tobacco use at Fort Riley, Kansas (N = 6181).

Factor	<u>Any Tobacco Use</u>		<u>Smoked Tobacco Use</u>		<u>Smokeless Tobacco Use</u>	
	Prevalence (%)	AOR ^a (95% CI ^b)	Prevalence (%)	AOR ^a (95% CI ^b)	Prevalence (%)	AOR ^a (95% CI ^b)
Sex						
Female	25	0.3 (0.3-0.4) ^c	25	0.5 (0.4-0.6) ^c	2	0.1 (.07-0.2) ^c
Male	51	Referent	41	Referent	20	Referent
Age						
17-21	55	2.1 (1.8-2.5) ^c	47	2.5 (2.1-3.0) ^c	22	1.7 (1.4-2.1) ^c
22-24	54	2.0 (1.7-2.3) ^c	43	2.2 (1.8-2.5) ^c	21	1.6 (1.3-2.0) ^c
25-27	52	1.8 (1.5-2.1) ^c	43	2.1 (1.7-2.5) ^c	19	1.4 (1.1-1.8) ^c
28-32	46	1.5 (1.3-1.8) ^c	35	1.6 (1.3-1.9) ^c	17	1.3 (1.1-1.7) ^c
33-58	36	Referent	26	Referent	13	Referent
Unit/Brigade						
1 st Brigade	46	1.1 (1.0-1.3)	37	1.1 (0.9-1.3)	16	1.0 (0.8-1.3)
2 nd Brigade	50	1.2 (1.04-1.5) ^c	41	1.2 (1.03-1.5) ^c	17	1.0 (0.8-1.3)
Avn Brigade	44	1.2 (1.0-1.4)	37	1.2 (1.0-1.4)	12	0.9 (0.7-1.2)
4 th Brigade	63	1.7 (1.4-2.1) ^c	48	1.4 (1.2-1.7) ^c	33	1.8 (1.4-2.3) ^c
No Unit	45	1.2 (0.9-1.7)	35	1.1 (0.8-1.3)	17	1.4 (0.9-2.0)
Partner-Units	39	Referent	33	Referent	13	Referent
Total Participants	49		39		19	

^a Odds ratios were adjusted for sex, age group, and unit/brigade.

^b 95% CI = 95% confidence interval of the adjusted odds ratio (AOR).

^c Estimate is significantly different from the reference group at the 95% confidence interval.

Table 3. Interest in tobacco cessation among total tobacco users (N=3032).

Factor	AOR^a (95% CI^b)	AT^d (%)	ST^e (%)	SLT^f (%)
Sex				
Male	1.0 (0.7-1.5)	36	40	28
Female	Referent	36	37	31
Age				
17-21	0.6 (0.5-0.8) ^c	28	30	27
22-24	0.9 (0.7-1.1)	36	40	23
25-27	1.0 (0.8-1.3)	39	43	33
28-32	1.2 (0.9-1.6)	44	48	37
33-58	Referent	39	45	28
Unit/Brigade				
1 st Brigade	1.9 (1.4-2.5) ^c	40	43	35
2 nd Brigade	2.1 (1.6-2.8) ^c	43	46	36
Avn Brigade	1.4 (1.02-1.9) ^c	34	37	21
4 th Brigade	1.6 (1.2-2.2) ^c	33	37	25
No Unit	1.7 (1.1-2.7) ^c	39	42	17
Partner Units	Referent	27	30	31
Total tobacco users		36	40	28

^a Odds ratios were adjusted for sex, age group, and unit/brigade.

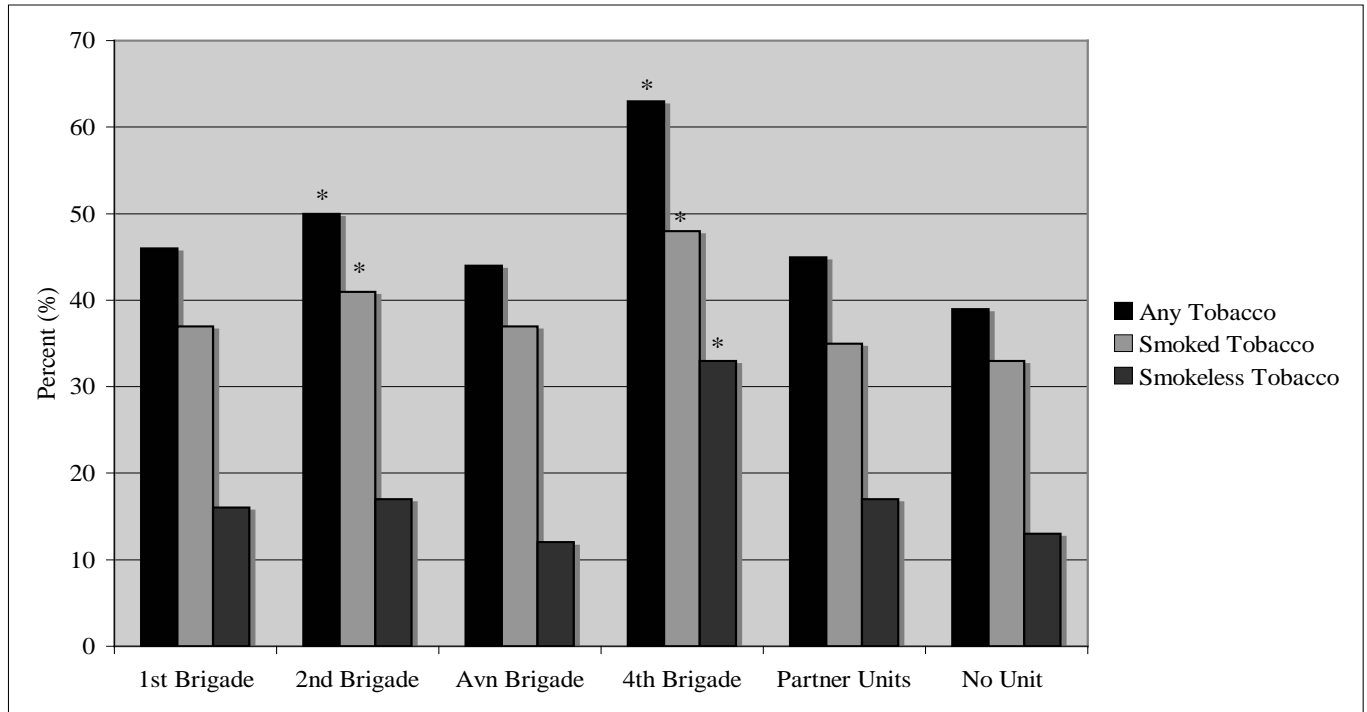
^b 95% CI = 95% confidence interval of the adjusted odds ratio (AOR).

^d Any tobacco use

^e Smoked tobacco use

^f Smokeless tobacco use

Figure 3. Adjusted prevalence of tobacco use by unit.



* Significant at the 0.05 level after multinomial logistic regression, see Table 2.

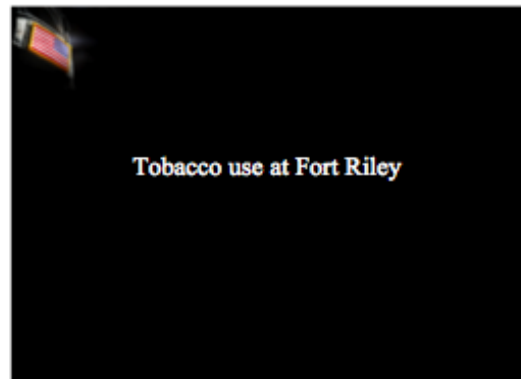
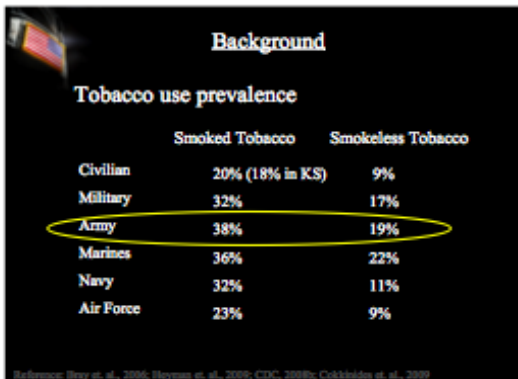
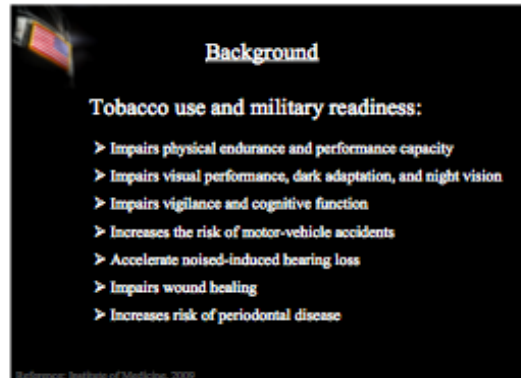
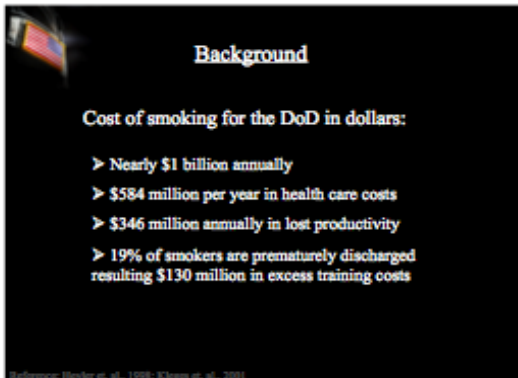
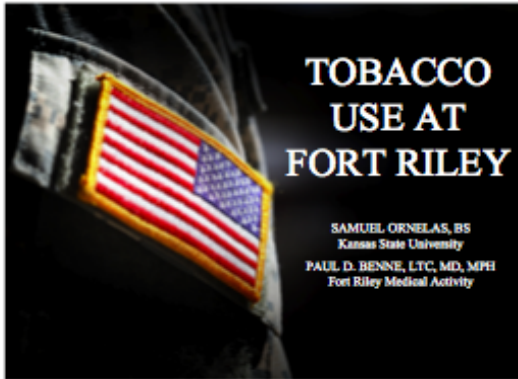
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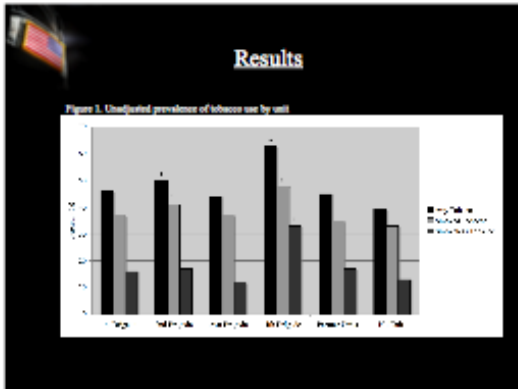
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Chapter 4 – Presentation Slides and Poster

Presentation for Irwin Army Community Hospital Commander





Results

Table 4. Tobacco use at Fort Riley, Kansas (N = 1031)

Factor	All Enlisted		Smoking Enlisted		Nonsmoking Enlisted	
	Prevalence	95% CI*	Prevalence	95% CI*	Prevalence	95% CI*
Sex						
Male	33	9.0 (6.4-12.7)	21	9.2 (6.4-12.7)	2	0.1 (0.0-0.2)
Female	35	10.0 (7.2-13.3)	20	9.2 (6.4-12.7)	13	1.9 (0.7-3.1)
Age						
17-21	39	21.2 (16.2-27.2)	47	22.2 (16.2-27.2)	22	12.1 (8.2-17.1)
22-24	39	20.0 (15.0-25.0)	49	23.0 (17.0-29.0)	31	16.0 (11.0-21.0)
25-27	39	18.0 (13.0-23.0)	49	21.0 (15.0-27.0)	36	18.0 (13.0-23.0)
28-32	39	14.0 (9.0-19.0)	39	16.0 (11.0-21.0)	17	10.0 (5.0-15.0)
33-39	39	10.0 (5.0-15.0)	26	12.0 (7.0-17.0)	12	6.0 (1.0-11.0)
Enlisted Unit						
1 st Brigade	46	11.0 (6.0-16.0)	37	11.0 (6.0-16.0)	16	10.0 (5.0-15.0)
2 nd Brigade	36	12.0 (7.0-17.0)	41	12.0 (7.0-17.0)	17	10.0 (5.0-15.0)
3 rd Brigade	46	13.0 (8.0-18.0)	41	13.0 (8.0-18.0)	18	10.0 (5.0-15.0)
4 th Brigade	46	17.0 (12.0-22.0)	46	14.0 (9.0-19.0)	22	10.0 (5.0-15.0)
Head Unit	46	13.0 (8.0-18.0)	33	13.0 (8.0-18.0)	17	10.0 (5.0-15.0)
Patrol Units	39	10.0 (5.0-15.0)	27	10.0 (5.0-15.0)	12	10.0 (5.0-15.0)
Total Enlisted	1031		703		328	

*95% confidence interval for sex, age groups, and enlisting units.
 †95% CI is significantly different from the reference group at the 95% confidence interval.
 ‡All tobacco use reported without use.
 §Nonsmoking without use.

Results

Table 3. Interest in tobacco cessation among and tobacco users (N = 1031)

Factor	ARR (95% CI)*	AT [†] (%)	AT [‡] (%)	AT [§] (%)
Sex				
Male	0.0 (0.0-0.0)	36	40	28
Female		36	37	31
Age				
17-21	0.0 (0.0-0.0)	26	36	27
22-24	0.0 (0.0-0.0)	36	40	33
25-27	0.0 (0.0-0.0)	36	40	33
28-32	0.2 (0.0-0.4)	44	48	37
33-39		39	43	28
Enlisted Unit				
1 st Brigade	0.1 (0.0-0.2)	40	43	32
2 nd Brigade	0.1 (0.0-0.2)	43	43	36
3 rd Brigade	0.1 (0.0-0.2)	36	37	31
4 th Brigade	0.1 (0.0-0.2)	33	37	29
Head Unit	0.1 (0.0-0.2)	39	43	37
Patrol Units		27	34	21
Total Enlisted		36	40	30

*ARR values were adjusted for sex, age groups, and enlisting units.
 †AT = 95% confidence interval of the adjusted odds ratio (CI95%).
 ‡AT is significantly different from the reference group at the 95% confidence interval.
 §All tobacco use reported without use.
 ¶Nonsmoking without use.

- ### Conclusions
- Active-duty personnel at Fort Riley represent a high-risk population for tobacco use
 - Potential deploying and re-deploying effect
 - There is substantial interest in cessation
 - Results provide important information for local health care providers that can be used to tailor current prevention and cessation programs
 - Additional research is needed to examine the difference of tobacco use found between units, to include tobacco use through an entire deployment cycle



Strategies: Raising Prices

Present pricing on Fort Riley is 11% below total cost off post

- Prevents tobacco use in adolescents and young adults
- Lower SES (i.e., lower enlisted) are more responsive to tax increases compared to higher groups
- 10% increase in price decreased overall consumption by 3%-5%

Tobacco on post commensurate with local civilian retail cost

Reference: D'Onofrio, 2009; NIH, 2006; Thomas et al., 2008; Walquist et al., 2009

Strategies: Surveillance and Targeted Intervention

- Increased identification of active-duty tobacco users
- Identify who to offer cessation program to
 - > Post deployment SRP
 - > Pre-deployment SRP
- Action or referral upon user identification
- Advertise for cessation at tobacco point of sale
- Approach will be effective for all age groups

Recommendations

Limit where tobacco can be used; address all forms of tobacco use (i.e., smokeless tobacco)

- > All building (to include barracks)
- > Vehicles
- > Restaurants and bars
- > In uniform

Eliminate non-smoker exposure

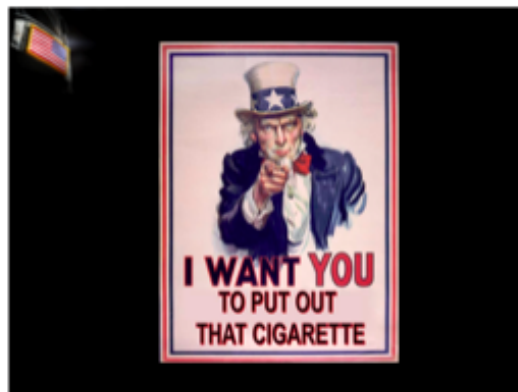
- > Decrease social acceptability
- > Deter initiation
- > 47% decrease in 2nd hand exposure to non-smokers

Eliminate sales (at least in commissary like Navy and Marine Corps)

Reference: CDC, 2007


Recommendations

- > Pricing: equal cost to off base
- > Increase tobacco use surveillance at all SRP and medical care encounters
- > Targeted intervention
 - > Based on rapid response to surveillance
 - > Advertise cessation at point of sale
- > Limit tobacco use
 - > Strict enforcement of tobacco use to include smokeless in all building
 - > Consideration of expanded limitation of all vehicles and in uniform on post
 - > Encouragement of smoke free areas (i.e., medical campus)
 - > Limit tobacco use among leaders in the presence of subordinates



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Tobacco use at Fort Riley: A study of the prevalence of tobacco use among active-duty Soldiers.

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Background

Tobacco use is the leading cause of disease death in the United States¹. The military has witnessed an increase in tobacco use among active-duty personnel². Tobacco use among military personnel is of growing concern given its substantial burden on military health care and combat readiness³.

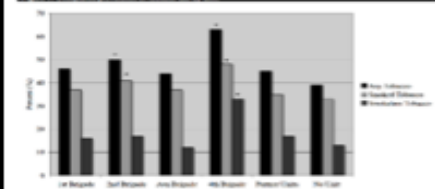
Objective

This cross-sectional study investigated the prevalence of tobacco use and interest in tobacco cessation among active-duty military cohorts assigned to Fort Riley Army Post and examined the determinants of tobacco use and interest in cessation.

Methods

Soldiers completed tobacco use questionnaires as a part of a Soldier Readiness Process (SRP). Tobacco use questionnaires were collected at the SRP center. SPSS version 16.0 (SPSS Inc., Chicago, IL, USA) was used to calculate mean percent and multinomial logistic regression analysis.

Figure 1B. Conditional probabilities of tobacco use by unit



* Significant at the 0.05 level after multinomial logistic regression, see Table 1.

Table 1. Tobacco use at Fort Riley, Kansas (N = 6181)

Gender	Any Tobacco Use		Smoked Tobacco Use		Smokeless Tobacco Use	
	Prevalence (%)	AOR* (95% CI)†	Prevalence (%)	AOR* (95% CI)†	Prevalence (%)	AOR* (95% CI)†
Male	31	0.9 (0.9-0.9)	25	0.9 (0.9-0.9)	6	0.1 (0.0-0.2)
Female	21		15		6	
Age						
17-21	30	1.1 (1.0-1.2)	25	1.0 (1.0-1.0)	5	1.7 (1.4-2.1)
22-24	30		25		5	
25-27	30		25		5	
28-32	30		25		5	
33-38	28		23		5	
Unit/Brigade						
1 st Brigade	46	1.1 (1.0-1.2)	37	1.1 (0.9-1.3)	9	1.0 (0.8-1.2)
2 nd Brigade	30	1.2 (1.0-1.5)	25	1.2 (1.0-1.5)	5	1.0 (0.8-1.2)
4 th Brigade	40	1.2 (1.0-1.5)	31	1.2 (1.0-1.5)	9	0.9 (0.7-1.1)
6 th Brigade	40	1.7 (1.4-2.2)	30	1.6 (1.2-2.2)	10	1.8 (1.4-2.3)
No Unit	40	1.2 (0.9-1.7)	30	1.1 (0.8-1.5)	10	1.1 (0.8-1.6)
Partner Units	30		23		7	
Total Participants	31		25		11	

* Odds ratios were adjusted for sex, age group, and unit/brigade.
† 95% CI = 95% confidence interval of the adjusted odds ratio (AOR).
‡ Estimates in significantly different from the reference group at the 95% confidence interval.

Table 2. Interest in tobacco cessation among total tobacco users (N=1022)

Factor	AOR* (95% CI)†	ST* (%)	SLT* (%)	Both* (%)
Sex				
Male	1.0 (0.7-1.5)	36	40	28
Female		36	37	31
Age				
17-21	0.6 (0.5-0.8)	28	30	27
22-24	0.9 (0.7-1.1)	36	40	23
25-27	1.0 (0.8-1.3)	39	43	33
28-32	1.2 (0.9-1.6)	44	48	37
33-38		39	43	28
Unit/Brigade				
1 st Brigade	1.9 (1.4-2.5)	40	43	35
2 nd Brigade	2.3 (1.6-3.3)	43	46	36
4 th Brigade	1.4 (1.0-1.9)	34	37	21
6 th Brigade	1.4 (1.1-2.2)	33	37	25
No Unit	1.7 (1.1-2.7)	39	42	37
Partner Units		27	30	31
Total tobacco users		36	40	28

* Odds ratios were adjusted for sex, age group, and unit/brigade.
† 95% CI = 95% confidence interval of the adjusted odds ratio (AOR).
‡ Estimates in significantly different from the reference group at the 95% confidence interval.
§ Any tobacco use
¶ Smoked tobacco use
‡ Smokeless tobacco use

Results

A Total of 6,181 soldiers participated in the study (91.2% male, mean age of 26.8 years (SD = 6.8 yrs; range 17-56 yrs)). Forty-nine percent of participants reported using some form of tobacco product either smoked (ST) or smokeless (SLT). The overall ST use was nearly 39%. SLT use was 19%. Factors associated with interest in tobacco cessation included sex, age group, and unit/brigade. Thirty-six percent of tobacco users also reported interest in tobacco cessation. The overall reported interest in ST cessation was 40%; reported interest in SLT cessation was 28%. Factors associated with interest in tobacco cessation included sex, age group, and unit/brigade.

Conclusion

Results suggest that active-duty soldiers serving at Fort Riley represent a high-risk population for tobacco use, particularly those closest to deployment. There may be unique factors contributing to greater tobacco use and interest in tobacco cessation. Results provide important information for local health care providers that can be used to tailor current prevention and cessation programs.

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