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THE EFFECTIVENESS OF THE ARMY MEDICAL COMMAND TOBACCO CESSATION
REGULATION ON SELF-REPORTED TOBACCO QUIT RATES OF SOLDIERS

BY

Michael S. MacEachern

A doctoral project submitted to the faculty of the Medical University of South Carolina in partial fulfillment of the requirements for the degree Doctor of Health Administration in the College of Health Professions

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DEDICATION

I would like to dedicate this project to my wife, Jennie. Throughout all of my scholastic and career endeavors, she has been constantly supportive of my work. Although I may have been able to reach this achievement without her, it is not likely that I would have. She consistently motivates me to achieve the best in everything I do, and it is because of her motivation and support that I have reached this goal now.

In addition, I would like to thank Doctor Eric Shry, who provided assistance in gathering my data, and in my entire Doctoral team: my Chair, Doctor Annie Simpson, Doctor Mark Mellott, and Doctor Jillian Harvey. In particular, Doctor Annie Simpson provided an incredible amount of help in navigating the entire process, and in making sense of the data that I gained in my research.

I. INTRODUCTION

Background

On the 4th of March, 2013, LTG Patricia D. Horoho, then the Surgeon General and Commanding General of the United States Army Medical Command (MEDCOM) published the Army Medicine 2020 Campaign Plan. The plan incorporates three different methods to take action within MEDCOM. These are to: “Increase Capacity, Enhance Diplomacy and Improve Stamina” (*Army Medicine 2020 Campaign Plan*; “Extension”). Within the “Improve Stamina” component of the plan, Campaign Objective 3-3 is to “Increase Healthy Behavior.” Specifically detailed within this section is to promote tobacco-free living under sub-objective 3-3.1. This sub-objective seeks to establish a change in culture throughout the United States Army: decreasing use and subsequently reducing the tobacco-related morbidity and mortality in Soldiers, retirees and their families. One specific method mentioned in the 2020 Campaign Plan is to establish more tobacco-free areas both in Army Medical Treatment Facilities (MTF) as well as locations on Army installations.

Going one step further, the MEDCOM issued an Operations Order (Medical Command Tobacco Free Living Operations Order 15-48, 8 May 15), which took effect on 1 April, 2016, which not only mandated tobacco-free MTFs, but also states that all MEDCOM Soldiers are not authorized to use tobacco products (including e-cigarettes) while on duty or in uniform. Although many businesses including hospitals throughout

the United States have enacted tobacco-free workplaces and campuses, never before has this requirement extended beyond the range of the campus itself. It can be readily assumed that the scope of a regulation of this nature will have far-reaching effects on improving the health of staff through enforcing a change in culture in much of its workforce. This research will determine what effects the new policy has on MEDCOM Soldiers over a short term in an effort to ascertain the future potential for this policy and others to be based upon it.

Need for the Study

The United States Centers for Disease Control and Prevention (CDC) estimates that 21.3% of adults in the United States use tobacco products either every day or some days (Hu et al 2016). Of these, the greatest users were in the 18-24 year old male category. Tobacco use has been found to be the cause of approximately 480,000 American deaths per year, with health costs approaching \$170 billion and \$156 billion in lost productivity (“Tobacco Use,” 2016). Although tobacco use has gone down in the United States over the last fifty years, it is still attributed to 5%-14% of all U.S. healthcare dollars spent per year (Xu, Bishop, Kennedy, Simpson, & Pechacek, 2015). Furthermore, Xu et al explains that based on the 2006-2010 Medical Expenditure Panel Survey (MEPS), approximately 32.8% of spending from federal health insurance programs (including the Veterans Affairs, Indian Health, and military treatment facilities) was directed toward cigarette smoking related illness.

The United States CDC found that smoking in the military is higher than that of the general population on the whole. In 2008, approximately 31% of all Active Duty military were smokers (Bray et al, 2010). In 2011, 24% of Active military smoked

compared with 19% of civilians, and from the period of 2007-2010 male veterans were 5% more likely than nonveterans to be smokers (“Current Cigarette Smoking Among U.S. Adults Aged 18 Years and Older,” 2016). According to GlobalSecurity.org (2016), there were approximately 1,301,300 total members of the Active United States military in 2016. This would mean that as many as 312,312 personnel could be smoking in the active duty. The financial and lost work hours of this are significant. In September, 2015, the Veterans Affairs projected a total Veteran population of 21,681,000 (“Department of Veterans Affairs Statistics at a Glance,” 2016). The five percent difference as mentioned above equates to over a million Veterans who are more likely to smoke than their civilian counterparts, which by extension increases the cost to care for these Veterans. The size of the Veteran population continues to grow as new military retirees enter the system, and modern medicine increases the lifespan of those currently enrolled in the system.

Lastly, although an older study, Robert Klesges et al (2000) presented statistics on the effects of smoking on military training. The researchers specifically looked at the relationship between smoking and early discharges from the United States Air Force. It was found that of 29,044 personnel entering the Air Force between August, 1995 and August, 1996, smokers were found to be 1.8 times more likely to be prematurely discharged than non-smokers. This equated to 629 Airmen being discharged for problems related to smoking, costing the Air Force in excess of \$18 million in excess cost. Their findings over all services were over \$133 million, which approached 1% of the total military training budget.

The effects of tobacco use in the United States military plays a significant impact on multiple levels. The impact on health from tobacco use has potential effects from the

individual Soldiers and their families' health, through the unit level and on to the readiness of the entire Army. The direct effects of smoking and tobacco on the individual, and smoking-related illness resulting in lost work time has been well documented by numerous studies. In addition, the effects of second-hand smoke on the general population and on the families of smokers has also been noted. Because of the extremely physical nature of many of the career fields in the Army, any loss of physical capacity equates to a decrease in job performance and a degradation in capability to accomplish assigned missions. This results in a direct impact from tobacco. Lastly, due to the nature of military health insurance, which covers 100% of a Soldier's and family's care, there is the direct financial impact on caring for the sequelae of tobacco use, with the additional impact of sick time taken by the Soldier, keeping them from being able to support the unit and their mission.

Problem Statement

Although the evidence is apparent for the inherent health risks from tobacco use, quit rates in tobacco users are historically low, with a high degree of recidivism back to tobacco use. The Active Duty Army, in having authority to dictate policies to affect their employees (Soldiers) has the potential to influence tobacco use through policies making it "illegal" to use tobacco during the duty day. The purpose of this study is to assess whether the MEDCOM policy against tobacco use results in greater tobacco quit rates among MEDCOM Soldiers, in comparison to the same sample of Soldiers prior to the implementation of the new MEDCOM tobacco use policy.

Specific Aim 1

What are the current statistics of tobacco use in the United States Army at this time, in comparison to the American population-at-large?

Specific Aim 2

Is there a difference in tobacco quit rates in MEDCOM Soldiers after implementation of the 2016 Tobacco Cessation Policy?

Population

The population to be considered by this study includes all Active Duty Soldiers stationed on a large Army installation between October 2015 and October 2016, which includes sample data from before and after policy implementation.

Hypotheses

The primary goal of the MEDCOM tobacco policy is to reduce the number of Soldiers using tobacco. Thus, the aim of this study will be to examine the use rates and quit rates before and after the implementation of the new tobacco policy.

Through accessing data from routine appointments, the following hypotheses will be studied:

Hypothesis 1: There is no difference in tobacco use following implementation of the new MEDCOM tobacco policy, in comparison to prior to the policy implementation.

Hypothesis 2: There is no difference in tobacco use between MEDCOM Soldiers and non-MEDCOM Soldiers following the implementation of the new tobacco policy.

II. REVIEW OF THE LITERATURE

This study considers two different, but relevant aspects of tobacco usage and cessation approaches. The first aspect is in geography: where the tobacco users are, and how can the location of the tobacco user be manipulated to decrease or eliminate the use of tobacco products. The second aspect is in the users, themselves. The military population is a very specific subset made up of, but differing from, the United States population as a whole. Military service provides a different culture from that of the civilian population, and it is this culture that creates the opportunity for a different strategy in tobacco cessation that that which can be seen in the civilian workplace. Because of these differences, two separate literature searches were conducted. The first was to ascertain what, if any, similar tobacco cessation programs have been studied in the United States, especially in reference to tobacco limitations based on location, and the second on tobacco use and cessation attempts specific to the United States military establishment. Additionally, a section is included on recent and current policies throughout the active military.

Consideration of Geography

One of the earliest documents uncovered in the literature search is Department of Defense Directive (DoDD) 1010.10, titled, "Health Promotion" (1986). Within the document, creation of smoking prevention and cessation programs are recommended, as well as providing limitations on areas in which smoking would be authorized. Within the

regulation, smoking was permitted in buildings, “only to the extent that it does not endanger life or property, or risk impairing nonsmokers’ health” (p.4). Additionally, the regulation required nonsmoking areas in dining facilities, made elevators nonsmoking and made official busses and vans nonsmoking (but did not address government sedans). At the time, smoking was allowed within healthcare facilities, but only within private offices and not when a patient was present.

Cronan, Hervig and Conway (1987) studied potential cessation programs with U.S. Naval recruits during their basic training. This study was directly related to the previously mentioned 1986 DoDD 1010.10 regulation. The two experimental groups in their study were two companies which received one hour of education on smoking risks and cessation strategies, one company which was not authorized smoking throughout training except during their “liberty weekend,” two companies which received feedback on at-risk health behaviors (including smoking), and two control groups which were assessed but did not have any direct tobacco cessation interventions. In addition, company commanders were questioned as to their tobacco use. It was found that the no-smoking companies and those receiving health risk appraisals showed the greatest decrease in tobacco use. It was found that 8 out of 14 company commanders smoked, and 2 of 14 chewed tobacco. Out of these 10 company commanders, 9 used tobacco in front of their trainees. Six of them considered tobacco to be a disciplinary or motivational tool – utilizing smoke breaks (either granting or forbidding) as a means of enforcing policy and increasing discipline. This was recognized to be a potential influence on the importance trainees gave to tobacco use. The combination of these two findings indicate that altering not only geographical locations where tobacco is authorized but also the social aspects of tobacco use could feasibly decrease tobacco use in the military.

Bock et al (2013) conducted a study of former prisoners who had been incarcerated in United States tobacco-free prisons. In their study of 247 former prisoners, the majority who had spent a great deal of time of forced tobacco abstinence returned to smoking shortly after being released from prison. The research found that 88% of these prisoners had family members that smoked, as well as friends who smoked. Half of respondents (prior to release) announced a plan to go back to smoking after their release. Overall, the study found that former inmates do not have sufficient social support to continue a non-smoking lifestyle, and generally do not have a personal desire to continue their abstinence from tobacco, despite the physical components of addiction being removed, as well as the behavioral habit of smoking.

The Bock study is particularly relevant to this research, as it directly considers a group which can be directly controlled and influenced within their environment, in contrast to the general population of the United States. The distinct limitations of this study were the small sample size and the fact that enforcing a total limitation of tobacco is far more attainable in the prison population than in the military. Also, the study cannot necessarily be generalized to the military population, as the culture studied is vastly different than that of the military.

Another study which considered smoking in incarcerated adults in the United States was conducted by Binswanger et al in 2014. This study may have the most bearing on this current research. In the study, the researchers considered the mortality data for smokers in prison, and whether smoke-free prisons provided a significant difference in smoking related deaths. The researchers gathered data from the Bureau of Justice Statistics for self-reported smoking, data on deaths from 2001 to 2011 in prisons in all 50 states, and total prison population estimates. Lastly, they gathered data on tobacco

policies at prisons, and gathered statistics on smoking in the general United States population. Their findings were that smoking bans within prisons provided definitive reductions in smoking-related mortality and morbidity in prisoners. One potential weakness of this study in considering a military smoking ban is in the prisoner population age, where about half were 35 years of age or older.

This study, in contrast to the Bock study is exceptionally strong in its sample size. Data were gathered from 287 prisons, incorporating 14,499 individuals. In addition, the primary measure of interest – mortality in smokers – provides a distinct correlation to the research in this study. The researchers considered prisoner deaths related to tobacco use including 19 separate categories against similar statistics from each state in the United States, stratifying the data by both age and gender. One inherent weakness of this study in the attempt to generalize against other populations is, as with the Bock study, prison populations are a distinct sub-group of Americans, and not necessarily equivalent in culture to any other area. Secondly, the researchers in this study admitted that the presence of second-hand smoke could not be adjusted for, and could have resulted in higher mortality ratings.

In considering whether smokers will support mandated smoke-free laws to assist them in quitting, Nagelhout et al (2015) utilized data from the Current Population Survey (CPS) Tobacco Use Supplements (TUS), which was administered in the United States. 6,415 adults were questioned as to whether they attempted to quit smoking over the past year, and were subsequently asked whether they felt smoking should be illegal in hospitals, indoor sporting events, restaurants, and other areas. The respondents were then re-questioned one year later to determine if they quit and stayed quit from tobacco. The findings were that those who supported the smoke-free laws and regulations were more

likely to have quit smoking than those who supported smoke-free laws in fewer or none of the areas listed. Not only does this research show that there are a subset of current smokers who are willing to support no-smoking laws and guidelines, but that these people are more likely to quit, themselves.

Although this study is reasonably strong in the sample size, the methodology could not ascertain whether smokers who promoted anti-smoking laws individually felt a need for assistance in self-control. In addition, as the researchers explain, other potential reasons for supporting non-smoking legislation are possible, including protection of non-smokers and children.

Because of the belief that those with mental health concerns are less able to quit smoking, or that quitting smoking could interfere with their therapy and well-being, psychiatric inpatient facilities in the United States received a waiver from requiring their facilities to be smoke-free in the early 1990's. Brown-Johnson, Sanders-Jackson, and Prochaska (2014) conducted a qualitative analysis to assess the public belief of the "necessity" of smoking for psychiatric patients, and whether cigarettes could truly be looked at as therapeutic. Their findings were that despite limited recent data showing any benefit to smoking for the mentally ill, there is a great deal of public support to maintain access to cigarettes for the inpatient psychiatric patient. This being said, the authors state that more efforts should be made to ensure that this particular population be given more opportunity to state their desires as to having a smoking-friendly or non-smoking environment.

Although this study is of potential value in comparison to the current research, there are some inherent limitations in its use. First, the sample size was small (N=261), and gathered from online forums where individuals were responding to articles in popular

media. Because this was a qualitative study, the sample size is understandable. Second, being that the question was directly related to the use of cigarettes within the inpatient behavioral health arena limits the generalizability of the study.

The final three studies were all conducted on college campuses. First, Fallin, Roditis and Glantz (2015) considered a variety of tobacco policies at eight public four-year colleges in California. A total of 1,093 policies were considered. These policies ranged from completely tobacco-free campuses to designations of outdoor smoking areas, to smoke-free policies, to existing California laws, to prohibition from smoking indoors only. Their findings were that the majority of students (67%-70% of 1,309 respondents) preferred smoke-free campuses, and also that on tobacco-free campuses, intention to smoke was greatly reduced.

This study is significantly limited in that it took place on eight college campuses, all in California. The biases potentially introduced by this are in average ages, which are not described by the researchers, the culture of Californians in contrast to other areas of the country, and the fact that the students were pursuing a minimum of four-year degrees. In addition, the researchers gathered a convenience sample rather than utilizing random sampling methods. Despite the limitations of generalizability of data due to location and level of education, the study is of value due to the presumed ages of the respondents being comparable to the average ages of most Soldiers.

Another study conducted on California college campuses by Roditis et al (2015) sought to determine how comprehensive tobacco policies were on sixteen different campuses. They found that although many schools had some type of tobacco policy in place, many of these were not sufficient to maintain American College Health

Association guidelines, due to not addressing the relationships between schools and tobacco companies, and not having distinct penalties for failure to abide by campus tobacco policies.

This study will prove to be an excellent comparison to the current study in assisting in determination of specific strengths or weaknesses of the MEDCOM policy in attempting a reduction in tobacco users. By considering Strategies, Norms and Rules in relation to the American College Health Association guidelines, the MEDCOM strategy can be assessed for distinct strengths and weaknesses in relation to results found in the data analysis.

Hahn et al (2012) considered the implementation of a tobacco-free campus policy at the University of Kentucky at Lexington. In preparation, the university spent approximately one year of preparation to establish buy-in utilizing a “3-Ts” approach: Tell, Treat and Train. The “Tell” component was the advertising of the upcoming policy, as well as continued advertising after implementation. “Treat” referred to providing for tobacco cessation services for the affected individuals on campus. Lastly, “Train” incorporated teaching faculty, student leaders and supervisors on how to maintain the policy, and what the appropriate actions were upon finding someone outside of compliance. 335 people took advantage of the tobacco treatment options on campus over two years following implementation of the policy. Of these, 207 follow-up surveys were provided by e-mail, with 36 respondents. Of these, an 8.7% quit rate was seen, and approximately 50% of those who still used tobacco had decreased their consumption by half. As in many of the other studies, this research is also limited by its small sample size and its specificity to the college environment. As in the Roditis study, though, the

method of assessing the program itself will prove valuable as a comparison in the methods utilized by MEDCOM in reducing smoking rates in its Soldiers.

In 2015, a case study was presented by Harry Lando and others, describing the banning of cigarette smoking on United States Navy submarines. Implementing a tobacco control policy on a submarine could be considered the most restrictive method of tobacco cessation. Not only is there a “captive audience,” but there are no means to acquire tobacco during off-duty time. In their study, they found that many submariners believed that the “scrubbers,” air filters on the submarine, would remove contaminants from the air, to include cigarette smoke. One of the researchers’ interviewees, though, noted that after three years aboard a new submarine in 1985, a definite yellowing of the paint could be seen, which was directly attributed to tobacco smoke. A study conducted in 2013 by the Navy showed significant second-hand smoke effects on nonsmokers, despite designated smoking areas and the onboard filters.

To implement the non-smoking policy, leadership explained that they understood the “right” for Sailors to smoke, but that the non-smokers had a right to not be affected by tobacco smoke. A significant portion of the plan to implement the policy involved utilizing the Chief Petty Officers (senior enlisted personnel) to act as role models in the program. The Master Chief Petty Officer of the Navy briefed the various Chief Petty Officers on the need for the ban and particularly the need for their support. He made it plain to them (many of whom were smokers) that success could not happen without their support and assistance. In addition to the cultural aspects of implementation of the ban, the Navy provided nicotine patches and gum to each of the submarines that would be impacted, and two personnel per ship were trained as tobacco cessation facilitators. Of interest in this

study, the expected (but baseless) concerns for increased stress from crewmembers who were not allowed to smoke never came to pass. Although some non-smoking crew found that the former smokers had some short tempers, this soon passed. Since this is a case study, there is no indication as to whether those who were forced to quit smoking have stayed quit, or how many of these Sailors simply switched to smokeless tobacco.

Considerations of the Military Life and Culture

Terry Conway (1998) provides greater detail on tobacco use in the military, and pays particular attention to the historical aspects of “positive reinforcement” of tobacco use. As of the writing, it cited the *Healthy People: 2000* document presented a goal of no more than 20% tobacco users in the military, a goal that was nowhere near being reached. At the time of the article, tobacco-related healthcare costs to the Department of Defense were estimated at \$530 million per year, with \$345 million in lost time. It was assumed that the tobacco bans in basic training which began in 1987 had seen reductions in smokers, both in those starting smoking and in getting existing smokers to quit during training. In addition, the Department of Defense was, at the time, the largest United States employer to ban smoking in all its’ buildings. The distinct problem which was seen and explained by Conway was that as soon as they graduate training, many of these trainees, whether former smokers or not, desire to exercise their “personal freedom” to smoke. It can be assumed that if a continuing restriction on tobacco use were to be emphasized, it would decrease either the likelihood or the amount that these new military service members would use tobacco.

In 2006, Robert Klesges et al studied tobacco cessation attempts by the military and found that the one-year quit rates were 12%-19% lower than those for the civilian

population. In an attempt to improve these statistics, they developed an alternative intervention to determine if a novel method for tobacco cessation planning and programming would be more effective in the military population. In their study, which was the largest of its type at the time, over 25,000 new recruits to the United States Air Force were studied. This incorporated all new Airmen from October, 1999 to October, 2000 for Active Duty, National Guard and Reserve Airmen Basic Military Training (BMT). In their study, all members were banned from smoking (due to existing regulations) for the six-week training period. 75% of the participants were in the study group and the remaining 25% in the control.

In the study, three different behavioral modification programs were developed. The smoking cessation and prevention intervention incorporated two separate one-hour sessions. A portion of the recruits in the cessation group also attended an additional one-hour smokeless tobacco session. The participants were also offered nicotine gum which was not authorized during BMT (no chewing gum of any sort is allowed), but could be initiated immediately following BMT. 27.8% of these trainees accepted the gum.

Their overall findings showed that 10.23% of those who reported never having smoked prior to BMT had some cigarette use after one year. Nearly 30% of experimental smokers and 65% of former smokers also reported some cigarette use and 90% of those who reported being smokers on entry to BMT reported that they did some smoking at the one-year follow-up. Although there was still continued (or beginning) tobacco use amongst the study participants, it was found that Airmen who were in the cessation group were 1.16-1.23 times more likely to remain abstinent at the one-year follow-up. For smokeless tobacco users, they were 1.33 times more likely to be abstaining from smokeless. Of particular interest is that those Airmen who chose to accept the nicotine

gum were more likely to return to tobacco use following training. Kathy Green et al (2008) also studied smoking in Air Force BMT trainees. In their study, they considered the influences of the trainees' peers and role models, specifically instructors, on initiation of smoking. In their study, a questionnaire was administered to trainees at four different bases from April 16-May 14, 2005. 2,962 trainees (out of 4,505) responded. Their findings were that training leaders and instructors proved to have a high degree of influence in having Airmen begin use of tobacco. These influences proved to increase the initiation of tobacco use in Airmen even after controlling for typical demographic factors such as age, gender and educational level. A finding of particular interest, especially in considering non-smoking campuses, was that the trainees believed that a larger percentage of their fellow trainees smoked, due to the requirement to smoke in established areas, which increases their visibility to others. From this finding it could be inferred that the establishment of authorized smoking areas could serve to increase the number of military members, especially junior members, to initiate tobacco use.

The difficulty in which the military has had in controlling tobacco use has been shown to be somewhat inherent in its culture. Sara Jahnke and her team (2010) studied the tobacco control climate in the military to ascertain if the culture was one of non-use or if it in some way continued to promote the use of tobacco. In their qualitative study, they found that smoking was generally considered acceptable, that availability of tobacco cessation programs was good, but that commanders did not consistently support tobacco control programs, that leaders using tobacco provided the appearance of acceptability, that "smoke breaks" were a means of bonding, and that high-ranking medical officers made it either more difficult for personnel to quit or made it more acceptable. Additionally, barriers to the control of tobacco were seen in the affordable pricing of

tobacco products on-post. One particular concern presented by the researchers was that if smoking restrictions were placed, it may increase the use of smokeless tobacco, as many military members utilize smokeless during periods that they are not able to smoke. Poston et al (2010) made similar findings when investigating policy leaders in the military as well as tobacco control managers. Their study, which included key informant interviews with sixteen policy leaders and 36 tobacco control managers found that the impression was that the actual leaders “on the line” had little buy-in for tobacco control plans, policies and strategy. The overall impression was that “tobacco is simply not a priority for service leaders during this time of war and that it is not clear how stopping tobacco use affects their bottom line” (Poston et al 3). Overall, although leadership could see a theoretical benefit to the service members being tobacco-free, there was not enough of an apparent benefit to make it worthwhile for them to promote a tobacco-free environment. The policy leaders and tobacco control managers also explained that the affordable availability of tobacco made it difficult to effect tobacco control over military members. Lastly, the readiness of leaders to allow smoke breaks (in contrast to other free time) effectively promotes tobacco to the service members. Thomas Brandon et al (2014) provided perhaps the most relevant research to this study, in considering methods to prevent or reduce relapse to tobacco use following Basic Training of new recruits. During their time in Basic Training, military members are not authorized the use of tobacco products, and have their liberty restricted to the level of it being almost impossible to gain access to tobacco. For a period of approximately eight weeks, therefore, new recruits become tobacco-free. While citing that less than 80% of tobacco users facing involuntary cessation due to military service had returned to smoking within one year, that no studies had been done concerning methods to reduce or prevent relapse following involuntary

cessation such as seen in military service, hospitalization, or prison incarceration. This study (which was still in progress as of the writing of the article) described three methods being tested for their ability to diminish a return to tobacco use following training. These methods were: providing a self-help manual developed by the National Cancer Institute for general tobacco cessation clients, a modified Air Force-specific self-help manual, and a combination of the Air Force-specific manual with a one-on-one motivational counseling session.

Recent and Current Policy

Sara Jahnke et al (2011) studied the policies available at the time to determine which from amongst the four armed services could be considered the best and worst in considerations of “enforcement, smoking cessation, smokeless tobacco use, environmental tobacco smoke, framing tobacco as non-normative, designated tobacco use areas, and monitoring of tobacco use” (Jahnke et al 1). In considering best practices, Fort Lewis, WA (U.S. Army) was considered for having one of the best enforcement policies, as it was detailed that failure to comply with regulation could subject Soldiers to adverse actions to include criminal punishment. This policy, though, included civilians with their unauthorized use also being subject to disciplinary actions. On Tinker Air Force Base (Oklahoma), supervisors were assigned responsibility for enforcement and explained that excessive smoke breaks are unacceptable from a business standpoint. Another best practice listed which is apropos to this study is that of policies considering tobacco use as “non-normative.” The Air Force Material Command presented a memorandum to all of its bases which insist that each base describe their tobacco control policies with the intent of encouraging tobacco-free lifestyles. Within the memorandum, it is stated that “[t]he

main reason junior Airmen use tobacco are: (1) they see their mentors, instructors and peers using tobacco, and (2) inconsistent enforcement of rules” (Jahnke et al 5). One example of a “worst practice” is in Army Regulation (AR) 600-63 which, in referencing smoking in living quarters, states that smoking will be a determining factor for assigning shared rooms, and that non-smokers will be reassigned to a different room if their room has a smoker in it. This appears to place any inconvenience on the non-smoker, and additionally does not describe a policy for if there are not sufficient rooms to separate the smokers from non-smokers.

A similar study was completed by Hoffman et al (2011), analyzing the content of tobacco control policies throughout the military. In the study, they analyzed policies of each service, to include the Department of Defense on the whole, to ascertain whether they specified any or all of fifteen domains considered. Some of these domains included whether tobacco advertising was mentioned, whether designated smoking areas were described, and whether tobacco prevalence rates were mentioned in the policy. They found that 75% of the policies described negative health effects, environmental aspects, authorized smoking areas, cessation programs and smokeless tobacco. Of note, only 6.2% of policies defined tobacco use as being incompatible with military service and 0% described the cost of tobacco.

Many installations throughout the military have implemented some type of tobacco control program, but there is still a 40%-61% incidence of tobacco use depending on service. Smith et al (2016) queried personnel at four separate installations which were highly rated by their individual services as having excellent tobacco control programs. These included three hospitals: Tripler Army Medical Center, Naval Hospital Guam, and Naval Hospital Twentynine Palms and one Air Force Base: MacDill Air Force Base. In

their study, they looked at seven different considerations including: leadership support, culture, climate, tobacco-free areas, cessation classes (pros and cons), tobacco sales, and the impact on mission.

All of the sites reported good leadership support and explained that the support is critical in providing tobacco cessation classes, in that they remove a medical provider from their regular patient care, at least for the duration of the class. This results in the potential for “lost revenue.”

Additionally, leadership is responsible for those who are attempting to quit – removing the “normalcy” from smoking, providing alternative activities, and being supportive of quit attempts. Associated with these is the provision of a culture of non-smoking. Where in some areas there is a real or perceived culture of peer pressure leading to smoking, on these installations the reverse was true: peer pressure toward non-smoking. One Marine explained that when leadership was seen outside smoking it presents one message, but their conducting exercise and staying healthy also shows another, more positive message.

Each of the installations were in warm climates and at three of them this was directly listed as a reason for successful policies. At Twentynine Palms, the temperature frequently rises to 120 degrees Fahrenheit, which decreases the desire to go out and smoke. At other, more tropical areas, the rain provides an additional de-motivator. Although all installations require some amount of in-person classes to qualify for pharmacotherapy (nicotine replacement gum, Zyban, etc.), this is not a standardized process and some areas have longer or shorter classroom periods than others.

Although this is a good study for those installations seeking to expand upon their tobacco control policies, a distinct weakness is that there was no guidance as to what

metric(s) were used for the individual services to consider these areas in particular as being exemplary. In addition, there are no statistics provided for greater (or lesser) quit rates on these installations in comparison to others, or to the United States population as a whole.

Summary

There is a wide range of literature on tobacco use and cessation programs, but there is a distinct deficit on studies, either recently or in the past on tobacco cessation attempts within the United States Army. In fact, there were no recent statistics published on current tobacco use in the Army completed by the Army, itself. It appears that most current studies are based on documentation by the Centers for Disease Control, rather than from the Department of Defense, itself. The literature search shows, in this way, the distinct need for current research to be completed on Active Duty Soldiers to make determinations on the significance of the problem, as well as the effects of attempts to reduce tobacco use within the Army.

III: METHODOLOGY

Research Design

Data from routine medical appointments from a large Army installation in Washington State was gathered from available databases and de-identified. From the appointments, one appointment (per Soldier) pre-implementation (the closest appointment to the implementation) and one appointment post-implementation (the date farthest from implementation, no later than October, 2016) were selected for study. The data requested includes basic demographic information as well as self-reported tobacco use, defined as a “Yes/No.” Additionally, each military unit is assigned a distinctive Unit Identification Code (UIC). The UIC information is included in the demographic information, and through the UIC, MEDCOM versus non-MEDCOM Soldiers is identifiable. Because the regulation is specific to Soldiers assigned to MEDCOM units, gathering the UIC information provides critical data to allude to whether tobacco cessation is relative to assignment to MEDCOM units.

Operational Definitions

Tobacco Product: Any nicotine containing product. These include cigarettes, cigars, e-cigarettes (“Vapes”), dip, chew, and snuff.

Tobacco User: A person that self-reports as using a tobacco product as defined.

Tobacco Non-User: A person that self-reports as not using tobacco products as defined.

Sample Selection

The sample will consist of all available Active Army appointments on a large Army installation located in Washington State between October, 2015 and October, 2016. One appointment per Soldier prior to and one appointment following implementation of the policy will be included in the study. In the event there is not both a pre- and post-implementation appointment for a Soldier, that record will be removed and not considered.

Instrumentation

SAS© Version 9.4 was used for data analytics in this study.

Data Set Description

Due to the transitory nature of Active Duty Soldiers, it was not possible to ascertain a definite number of Soldiers assigned to the installation being investigated during this timeframe. In gathering data, the specific fields acquired include general demographic information (age, gender, ethnicity), Unit Information Codes (UIC) and tobacco use (Y/N). There is not a readily accessible method to determine amount of tobacco use, and therefore the amount of use is not considered for this study.

The UIC is a specific code assigned to each unit within the United States Department of Defense. Through the use of the UIC, it is possible to determine the unit of assignment for each Soldier studied, at the time of their appointment. This data is utilized to determine whether a Soldier is in a MEDCOM unit or a non-MEDCOM unit. Random identification numbers are assigned to each Soldier to ensure matching for a pre-post evaluation. In the event that there is not both a pre- and post-implementation appointment available, the record will be removed from study.

Study Aims

As described earlier, the overall objective of this research is to determine descriptive statistics for current tobacco use within the sample, and to determine whether the MEDCOM tobacco policy has resulted in decreased tobacco use in MEDCOM Soldiers.

Aim 1

Is the proportion of tobacco users before tobacco use policy enactment equal to the tobacco users after policy enactment, within MEDCOM Soldiers?

Aim 2

Is the proportion of tobacco users before tobacco use policy enactment between MEDCOM and non-MEDCOM Soldiers equal to the proportion of tobacco users after policy enactment between MEDCOM and non-MEDCOM Soldiers.

Statistical Analysis

Statistical analysis was accomplished with SAS© Version 9.4. Descriptive statistics were used to describe rates and characteristics of tobacco users within the sample and between MEDCOM and non- MEDCOM comparison groups, during the study time period. Demographic characteristics are described using means and standard deviations for continuous variables and number and percentages for categorical variables. For Aim 1, unadjusted tobacco use rates were examined within the MEDCOM group to examine if they changed pre- and post-policy implementation. Unadjusted MEDCOM pre-post quit differences were examined using McNamar's test for paired nominal data. For Aim 2,

tobacco use proportion differences were compared between the MEDCOM and non-MEDCOM Soldiers during the post time periods while controlling for pre-period use, using a Cochran Mantel-Haenzel test. To adjust for differences in baseline characteristics in Aim 2, final models were tested using multivariable Logistic Regression when demographic characteristics were not equal between comparison groups.

IV. RESULTS

Patient records from routine exams were drawn from clinical databases at a large Army installation in Washington State. A total of 540,766 records were downloaded, which were subsequently limited to one appointment pre-intervention and one appointment post-intervention for each Soldier. This resulted in a total of 14,585 individual pre/post entries for study.

Descriptive characteristics of the data are found below in *Table 1*.

Table 1: Descriptive Characteristics of MEDCOM and non-MEDCOM Soldiers (N=14,585)

	Total	MEDCOM (n=839)	Non-MEDCOM (n=13,746)	p-value
	Mean (StdDev)	Mean (StdDev)	Mean (StdDev)	
Age (years)	29.82 (7.80)	34.47 (8.78)	29.54 (7.65)	<0.0001
	N (%)	N (%)	N (%)	
Sex				<0.0001
Male	11,763 (80.65)	515 (61.38)	11,248 (81.83)	
Female	2,822 (19.35)	324 (38.62)	2,498 (19.17)	
Race				0.51
White	6189 (42.43)	343 (40.88)	5846 (42.53)	
Minority	4577 (31.38)	263 (31.34)	4314 (31.38)	
Unknown	3819 (26.18)	233 (27.77)	3586 (26.08)	
Tobacco User				
Pre Policy	3,689 (25.29)	123 (14.66)	3,566 (25.94)	<0.0001
Post Policy	3,704 (25.40)	102 (12.16)	3,602 (26.20)	<0.0001

As seen in *Table 1*, an overall 25.29 percent of Soldiers sampled were tobacco-users pre-policy implementation and 25.4 percent post-policy. This data corresponds with historic measures of tobacco use in the United States military, in general. MEDCOM Soldiers are seen to have lower tobacco use rates both pre- and post-policy, compared to non-MEDCOM Soldiers (p-values <0.0001) (*Table 1*). MEDCOM soldiers, compared

with non- MEDCOM soldiers in this sample, were more likely to be female (38.62% versus 19.17%, respectively, p -value<0.0001) and were older (34.47 years versus 29.54 years, respectively (p -value <0.0001) (Table 1). There were no differences in the racial categories within the sample (p -value=0.51) (Table 1). With regard to changes between pre and post policy time periods within the MEDCOM group, it was found that there was a statistically significant reduction in pre- versus post-implementation tobacco usage in MEDCOM Soldiers. Among MEDCOM pre-policy tobacco users, 40.65% were non-users after the policy implementation and 59.35% remained tobacco users, while tobacco use increased among pre-policy non-users by only 4.05% (p -value=0.02) (Table 2).

Table 2. Results – Among the MEDCOM Soldiers (n=839)

	Frequency Row % Col %	Post Policy		
		No Tobacco Use	Tobacco User	Total
Pre Policy	No Tobacco Use	687 95.95 93.22	29 4.05 28.43	716
	Tobacco User	50 40.65 6.78	73 59.35 71.57	123
	Total	737	102	839

*MacNemar's Test Statistic = 5.58; p -value=0.02

In Aim 2, a comparison of tobacco use rates pre- and post-policy between MEDCOM and Non- MEDCOM groups, findings indicate MEDCOM soldiers significantly reduced tobacco use over that time period while non- MEDCOM soldiers did not. In adjusted

Logistic Regression analysis of post-policy tobacco use, Soldiers in MEDCOM units have a 1.89 (95% CI 1.45-2.46) higher odds of quitting tobacco after implementation of the policy when compared to non-MEDCOM soldiers ($p < 0.0001$), while controlling for pre-policy tobacco use, sex and age. Unadjusted Mantel-Hanzel results were consistent with adjusted logistic regression results.

V: DISCUSSION

Tobacco use has been found, through numerous studies, to have a significant mortality and morbidity rate (“Tobacco Use” (2016); Xu et al, 2015; Binswanger et al, 2014). In addition, it has been shown that military tobacco users may have an increased rate of early release from service (Kluges et al, 2000). This has an impact both on maintenance of adequate personnel numbers, as well as the cost attributed to training new personnel. In the general U.S. population, the highest number of users of tobacco is the 18-24 year-old male category, which incorporates a large percentage of Active Duty Soldiers.

According to the United States Centers for Disease Control, cigarette smoking rates decreased throughout the country between 2005 and 2015. In 2005, the estimated usage rate was 20.9%, and in 2015, 15.1% (CDC, 2016). In the same study, CDC showed that 24% of all active duty military personnel were smokers (CDC, 2016).

The percentage of smokers in this study corresponds, if not exceeds previous CDC reporting. This study shows a 25 percent tobacco use rate among all Soldiers in this sample, which could feasibly be even higher due to the potential failure in self-reporting as well as the fact that the current methods of capturing medical appointment data that do not account for use of electronic cigarettes. MEDCOM Soldier tobacco usage is lower in this sample than the CDC statistics, however, under-reporting may be present.

Self-reported tobacco use data examined in this sample confirms that the MEDCOM tobacco use policy is resulting in a reduction in MEDCOM Soldiers’ use of

tobacco. Tobacco free medical campuses, as well as a specific directive for MEDCOM Soldiers to not smoke while on duty appear to be making a difference in the use of tobacco for this subset of Soldiers. Also, the number of non-tobacco users within MEDCOM units that converted to tobacco use after the policy implementation was small, accounting for 4.05 percent of post-policy tobacco use. The inherent inconvenience of tobacco use when faced with a tobacco-free working environment is likely keeping the number of new smokers minimized.

Limitations

The necessity of using self-reported data provides an inherent limitation, especially due to the fact that as of April, 2016, it was against regulations for MEDCOM Soldiers to use tobacco while on duty and/or in uniform. This creates a potential for non-reporting of tobacco use due to fears of repercussions for individual Soldiers. Another factor related to this is the potential for respondent bias, as MEDCOM Soldiers may fear that their superiors may be able to access their tobacco usage information from the medical record. A second limitation is that this study did not seek to measure reductions in tobacco use. Although some MEDCOM Soldiers self-report as tobacco users, it is likely that their amount of use has decreased on a daily basis, due to the prohibition on tobacco use during their duty hours. A reduction in tobacco could still be a measure of partial success of the program, but this study did not measure for reductions. Additionally, there is no distinct method for reporting the use of “e-cigarettes.” Because of this, there is a potential for underreporting the use of these devices, as well. Lastly, although the sample was drawn from a large Army installation, the data are not necessarily representative of other armed services (Navy, Air Force, Marines). In

addition, there may be differences in tobacco use at other installations based on geography and climate; for instance, there may be further decreases in tobacco use at installations with severe climactic conditions, such as in the Arctic or desert areas due to further inability and inconvenience in leaving campus to use tobacco during duty hours.

Opportunities for Future Study

Future studies should incorporate larger data sets from a variety of installations. In addition, researchers should consider using more objective bio-analytic studies of blood nicotine levels to determine the correlations between self-reporting and actual usage of tobacco products. Also, conducting an interrupted time series, providing an adequate amount of time pre- and post-implementation would strengthen the study. Lastly, future studies should incorporate a longer post-policy time period to ascertain whether those tobacco users that quit were able to maintain a tobacco-free lifestyle following their quit date.

VI: CONCLUSION

Tobacco use is considered by many to be among the most significant controllable factors for many health concerns including cardiovascular and respiratory illnesses, cancer and other processes greatly decreasing lifespan and health related quality of life. A variety of methods have been employed throughout the United States to increase awareness of the risks of tobacco use and benefits of quitting (or not starting to begin with). In addition, many areas are promoting tobacco-free lifestyles through the removal of smoking areas, limiting access to tobacco through age restrictions and increased price, and rewarding non-smoking behavior. This study shows that the MEDCOM tobacco use policy appears to be an effective tool in providing for a reduction of tobacco use within a specific employee population. The results of the study should provide for continuing research in tobacco cessation strategies and methods which can be employed to assist current users to reduce or eliminate the use of tobacco within their lives.

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