
# NAVAL POSTGRADUATE SCHOOL

**MONTEREY, CALIFORNIA**

# THESIS

**MARIJUANA AND THE U.S. NAVY: THE IMPACT OF CHANGING LAWS, ATTITUDES AND BEHAVIOR ON RECRUITING**

by

Katherine G. Martinez Alvarez

March 2017

Thesis Advisor: Ryan Sullivan
Co-Advisor: Chad Seagren

THIS PAGE INTENTIONALLY LEFT BLANK

| REPORT DOCUMENTATION PAGE | | | *Form Approved OMB No. 0704–0188* |
|---|---|---|---|
| Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instruction, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188) Washington, DC 20503. | | | |
| **1. AGENCY USE ONLY** ***(Leave blank)*** | **2. REPORT DATE** March 2017 | **3. REPORT TYPE AND DATES COVERED** Master's thesis | |
| **4. TITLE AND SUBTITLE** MARIJUANA AND THE U.S. NAVY: THE IMPACT OF CHANGING LAWS, ATTITUDES AND BEHAVIOR ON RECRUITING | | **5. FUNDING NUMBERS** | |
| **6. AUTHOR(S)** Katherine G. Martinez Alvarez | | | |
| **7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)** Naval Postgraduate School Monterey, CA 93943-5000 | | **8. PERFORMING ORGANIZATION REPORT NUMBER** | |
| **9. SPONSORING /MONITORING AGENCY NAME(S) AND ADDRESS(ES)** N/A | | **10. SPONSORING / MONITORING AGENCY REPORT NUMBER** | |
| **11. SUPPLEMENTARY NOTES** The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government. IRB number ____N/A____. | | | |
| **12a. DISTRIBUTION / AVAILABILITY STATEMENT** Approved for public release. Distribution is unlimited. | | **12b. DISTRIBUTION CODE** A | |


**13. ABSTRACT (maximum 200 words)**

While marijuana remains a Schedule I drug under federal regulations, 28 states have legalized it in some form. Meanwhile, the U.S. Navy's Zero Tolerance policy and the Department of Defense drug testing program have become stricter. As marijuana becomes more popular, the Navy faces a recruiting challenge. This thesis analyzes the generational shift of perception toward marijuana legalization and the impact of legalization on military accessions and marijuana waivers granted in the U.S. Navy.

I utilize a difference-in-difference (DID) framework with accession data from Naval Recruiting Command to study these issues. On a basic level, the DID framework compares total number of marijuana waivers and accessions in states where marijuana has been legalized with those states where it is not legal, over time. The data I use includes the total number of U.S. Navy accessions and marijuana waivers granted in each of the 50 states and U.S. territories from October 2010 until January 2017. I find that state marijuana legalization leads to a decrease of 0.2 waivers granted per month in the most robust model (i.e., when comparing states that have legalized marijuana to those that have not while controlling for state and time fixed effects). In addition, the estimates suggest legalization increases the total number of recruits by 4.9 per month in a similar framework. Both of these results were statistically significant at the standard 5 percent level.


| **14. SUBJECT TERMS** Navy, recruiting, recruit, conduct waiver, accession, pre-accession, Military Entry Processing Station, MEPS, drug test, marijuana, cannabis, THC, medical marijuana, recreational marijuana, personalized recruiting for immediate and delayed enlistment, PRIDE, difference-in-difference | | | **15. NUMBER OF PAGES** 117 |
|---|---|---|---|
| | | | **16. PRICE CODE** |
| **17. SECURITY CLASSIFICATION OF REPORT** Unclassified | **18. SECURITY CLASSIFICATION OF THIS PAGE** Unclassified | **19. SECURITY CLASSIFICATION OF ABSTRACT** Unclassified | **20. LIMITATION OF ABSTRACT** UU |

NSN 7540-01-280-5500 Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std. 239-18

THIS PAGE INTENTIONALLY LEFT BLANK

**Approved for public release. Distribution is unlimited.**

# MARIJUANA AND THE U.S. NAVY: THE IMPACT OF CHANGING LAWS, ATTITUDES AND BEHAVIOR ON RECRUITING

Katherine G. Martinez Alvarez
Lieutenant, United States Navy
B.A., University of Puerto Rico, 2008

Submitted in partial fulfillment of the
requirements for the degree of

**MASTER OF SCIENCE IN MANAGEMENT**

from the

**NAVAL POSTGRADUATE SCHOOL**
**March 2017**

Approved by: Ryan Sullivan
Thesis Advisor

Chad Seagren
Co-Advisor

Yu-Shu Chen
Academic Associate
Graduate School of Business and Public Policy

THIS PAGE INTENTIONALLY LEFT BLANK

# ABSTRACT

While marijuana remains a Schedule I drug under federal regulations, 28 states have legalized it in some form. Meanwhile, the U.S. Navy's Zero Tolerance policy and the Department of Defense drug testing program have become stricter. As marijuana becomes more popular, the Navy faces a recruiting challenge. This thesis analyzes the generational shift of perception toward marijuana legalization and the impact of legalization on military accessions and marijuana waivers granted in the U.S. Navy.

I utilize a difference-in-difference (DID) framework with accession data from Naval Recruiting Command to study these issues. On a basic level, the DID framework compares total number of marijuana waivers and accessions in states where marijuana has been legalized with those states where it is not legal, over time. The data I use includes the total number of U.S. Navy accessions and marijuana waivers granted in each of the 50 states and U.S. territories from October 2010 until January 2017. I find that state marijuana legalization leads to a decrease of 0.2 waivers granted per month in the most robust model (i.e., when comparing states that have legalized marijuana to those that have not while controlling for state and time fixed effects). In addition, the estimates suggest legalization increases the total number of recruits by 4.9 per month in a similar framework. Both of these results were statistically significant at the standard 5 percent level.

THIS PAGE INTENTIONALLY LEFT BLANK

# TABLE OF CONTENTS

# LIST OF FIGURES

THIS PAGE INTENTIONALLY LEFT BLANK

# LIST OF TABLES

# LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| CBD | Cannabidiol |
| CNRC | Command Naval Recruiting Command |
| CO | Commanding Officer |
| DDRP | Drug Demand Reduction Program |
| DEA | Drug Enforcement Administration |
| DEP | Delayed Entry Program |
| DOD | Department of Defense |
| FDA | Food and Drug Administration |
| MEPS | Military Entry Processing Station |
| MML | Medical marijuana laws |
| MPDATP | Military Personnel Drug Abuse Testing Program |
| MTF | Monitoring the Future |
| NIDA | National Institute on Drug Abuse |
| NLSY | National Longitudinal Survey Year |
| NORML | National Organization for the Reform of Marijuana Laws |
| NRC | Naval Recruiting Command |
| NRD | Naval Recruiting District |
| NSDUH | National survey on Drug Use and Health |
| PRIDE | Personalized Recruiting for Immediate and Delayed Enlistment |
| SAMHSA | Substance Abuse and Mental Health Services Administration |
| TEDS | Treatment Episode Data Set |
| THC | 9-Tetrahydro-Cannabinol |
| UCMJ | Uniform Code of Military Justice |

THIS PAGE INTENTIONALLY LEFT BLANK

# ACKNOWLEDGMENTS

First and foremost, I would like to thank my family for always providing their unconditional support and motivation for me to pursue my dreams and accomplish my goals. I would also like to thank my professors and peers at NPS for being available when I needed them the most, and for making this a memorable tour both personally and professionally.

Last, but not least, I am thankful to my thesis advisors, Dr. Ryan Sullivan and Dr. Chad Seagren, for their patience, time and availability during this process. Their professionalism and guidance greatly contributed to a positive and meaningful experience.

THIS PAGE INTENTIONALLY LEFT BLANK

# I. INTRODUCTION

## A. PROBLEM DESCRIPTION

In the last 20 years, the perception of marijuana as a harmful drug has decreased dramatically in the United States, while its use has increase to the highest numbers documented since the late 1960s (Saad, 2013). Currently, 28 states have legalized medical marijuana, while eight allow its regulated use for recreational purposes. According to 2014 data from the Substance Abuse and Mental Health Services Administration (SAMHSA), the largest group that had consumed marijuana in the last 12 months, and past month are among the ages of 18 to 25 years old (Substance Abuse and Mental Health Service Administration [SAMHSA], 2016). This age group is also the largest recruiting pool for the U.S. Navy. In 2016, the Gallup Poll reported a 60 percent support for legalization of marijuana across the nation (Swift, 2016).

While the national trend seems to be shifting in favor of marijuana legalization, the U.S. Navy continues to adapt its recruiting and drug testing policies in response to social attitudes and behaviors. The drug testing panels are improving the amount of new drugs tested, including synthetic marijuana, and hence increasing its detectability margin. At the same time, the recruiting policies are becoming more accepting of a generation that is more exposed and tolerant to marijuana. In the recruiting process, individuals who self-admit marijuana use and are fit for service, are authorized to join with a marijuana conduct waiver. However, the Navy policy is zero tolerance to drug use and abuse after accession into the service.

This thesis assumes that as more states continue to legalize marijuana, patterns of attitudes and behavior toward marijuana will replicate from states that have already experienced legalization. Therefore, with legalization more individuals are likely to start experimenting and self-admitting marijuana use as it becomes more popular. It is widely known that the U.S. Navy's anti-drug policy and values are strict. The challenge the Navy faces is that with potential increase in usage, there will be a smaller pool from

which to recruit. This thesis explores how the marijuana legalization policies at the state level have been affecting recruiting for the U.S. Navy.

## B. DATA AND APPROACH

This thesis utilizes Personalized Recruiting for Immediate and Delayed Enlistment (PRIDE) system accession data from the Naval Recruiting Command in Millington, Tennessee. It looks at the total number of marijuana conduct waivers granted in the 50 the states and U.S. territories from October 2010 through January 2017. Various difference-in-difference models were utilized to observe changes in the granting of conduct waivers during the accession process to the U.S. Navy in states where pro-marijuana policies have taken place, and to observe changes in the total number of recruits in those states. Different models reference to states where medical and recreational marijuana policies have been implemented, controlling for states and year fixed effects across the nation.

## C. RESEARCH QUESTIONS

### 1. Primary Research Question

> Has marijuana use increased among prospective U.S. Navy recruits, particularly since medical and recreational legalization policies were implemented in the affected states?

The study utilizes the amount of marijuana conduct waivers granted during the accession process as the unit of measurement for marijuana consumption among prospective U.S. Navy recruits. The employed difference-in-difference model found that in states where recreational marijuana is legal, the granting of marijuana waivers decreases by a total .2 waivers per month. The result is only valid at the five percent level when controlling for state and time fixed effects altogether, and when controlling for state fixed effects only. These results were unexpected, but justified by previous studies findings that suggested that marijuana consumption among the recruiting pool age was already higher in states that legalized marijuana prior to the policy change. Additionally, there has not been sufficient time to observe the true effect of recreational marijuana policies since it has only been legally implemented in any of the states since 2014.

However, this small change in granting waivers represents that marijuana legalization policies are not affecting recruiting for the U.S. Navy negatively. The results also suggest that legalization policies might segregate marijuana users from non-users, facilitating the recruiter's selection of candidates.

In states where medical marijuana is legal, the model employed did not find any significant effect on the granting of marijuana waivers prior accession to the U.S. Navy.

### 2. Secondary Research Question

> Will changes in marijuana acceptance, or pre-service use by recruits, be expected to affect the Navy's recruiting, enlistment screening, or personnel policies?

This thesis navigates the reader through the shift in the public's perception that favors marijuana and how consumption has been increasing through the years, particularly among the adolescents and the 18 to 25 years old population. In response to these social trends, the U.S. Navy has been adjusting its recruiting policies to attract high quality candidates that have consumed marijuana previously. Additionally, it has been improving its drug policies to detect and deter drug use among prospective recruits and service members. Based on historical trends and present evidence, it could be expected that as more states continue to legalize marijuana, consumption will continue to increase throughout the nation, therefore the U.S. Navy will continue to adapt to social changes in order to maintain its recruiting goals and its zero tolerance policy.

## D. ORGANIZATION OF THE THESIS

This thesis is organized into six chapters. The first chapter is the introduction. Chapter II, the historical background, explains what marijuana is and why it is important to understand its effects on the human body. This chapter navigates the reader through the history of marijuana in the United States, considering its economical and medical uses, as well as the age and generational factors as the public opinion has been shifting through time in favor of marijuana across the nation. Additionally, this chapter explores how the military has been engaged in the early detection and deterrence of drug abuse

among its service members, and how social behaviors have been affecting the policy changes in recruiting for the U.S. Navy.

Chapter III is the literature review. This chapter was divided in three sections; the first section explores previous studies that analyzed the impact that legalization of marijuana has had on consumption, especially among the young adult population in the civilian sector. The second section explores studies that have observed changes in marijuana consumption before and after an individual joins the military service. The third section looks at the performance of those individuals who have entered the service with conduct waivers, in order to understand if recruiting pre-service marijuana users is beneficial or detrimental to the U.S. Navy.

Chapter IV describes the data source and the variables, as well as the methodology utilized. Chapter V guides the reader through the analysis process and presents the results of the selected difference-in-difference models. And finally, Chapter VI presents the summary, conclusions, and recommendations.

# II. MARIJUANA IN THE UNITED STATES AND THE MILITARY SYSTEM

The changes in marijuana legalization policies across the United States have shifted the upcoming generation's perception toward the drug. Through this chapter, marijuana is introduced, first as an economic good and a medical alternative, and later as a controlled substance under federal regulations. Currently, the age group that favors marijuana the most is also the same age group that composes the largest recruiting pool for the U.S. Navy. This chapter examines the attitude of this group of young American adults toward marijuana legalization in order to outline the present situation, which is reflected in the granting of marijuana conduct waivers prior to joining the service. Understanding the relationship between social conduct and military recruiting policies will help to anticipate future patterns of behavior as legalization policies continue to evolve throughout the nation.

## A. DESCRIBING MARIJUANA

Marijuana is the name granted to the cannabis plant when harvested for medical or recreational purposes. However, the cannabis plant is also used to produce oils, waxes, and hemp fiber, among other products. The cannabis plant contains more than 480 different compounds, from which approximately 66 are considered cannabinoids (Mandal, 2014). The human central nervous system contains natural cannabinoid receptors called CB1 and CB2. "CB1 receptors are responsible for marijuana psychoactive effects, while CB2 receptors are responsible for anti-inflammatory effects" (Leaf Science, n.d., para. 4). Therefore, the interaction of the cannabinoids with the human brain produces a physical and/or psychological effect. The female plant, in contrast to the male plant, when cultivated under the right conditions, yields a potent flower. This flower is responsible for the psychoactive components that make the plant so popular and forbidden.

The most researched and known cannabinoid is 9-tetrahydro-cannabinol (THC), a psychoactive chemical that, when it interacts with the CB1 receptor, enables the mind-

altering effects sought by recreational users (National Institute on Drug Abuse [NIDA], 2016a). Cannabidiol (CBD) is another cannabinoid which makes 40 percent of the plant's resin extract (Mandal, 2014). CBD, among other cannabinoids, can be used for medical purposes without the mind-altering effect.

Other cannabinoids such as "CBG, CBC and CBD are not known to be psychologically active agents whereas THC, CBN and CBDL along with some other cannabinoids are known to have varying degrees of psycho-activity" (Mandal, 2014, para. 10).

## B. WHY MARIJUANA IS AN ILLICIT DRUG

The Controlled Substance Act of 1970 classifies marijuana as a Schedule 1 drug. The Drug Enforcement Administration (DEA) defines a Schedule 1 drug as a "drug, substance, or chemical with no currently accepted medical use and high potential for abuse" (Drug Enforcement Administration [DEA], n.d. para. 3). The legality of marijuana in the United States appears to be conflictive. Under federal regulations, marijuana is considered an illicit drug. However, different states have passed laws to legalize marijuana under controlled environments and regulations. These laws vary per state. Despite marijuana being illegal at the federal level, Article 5940 of the 2014 Farm Bill authorizes the growth and cultivation of industrial hemp for research purposes under an agricultural pilot program, as long as the dry THC content is less than .3 percent (Agricultural Act, 2014). In this matter, CBD can be extracted from the hemp cultivation legally.

The present debate towards legalization began in 1972 with a petition of the National Organization for the Reform of Marijuana Laws (NORML) to move cannabis from a schedule I to a schedule II drug (NORML, n.d.-a). Since then, multiple organizations have joined the efforts to reclassify marijuana. On the other hand, the drug approval process from the Food and Drug Administration's (FDA) requires the performance of clinical trials in such manner that the agency is able to acquire sufficient scientific data to enable the approval of this decision. Until the data is reviewed, the FDA

cannot determine the safeness and effectiveness of marijuana as a medical drug (Food and Drug Administration [FDA], 2016).

In the meantime, the FDA requires *sound and scientific research*, while demands that the same protocol for any investigation on new drugs must be applied to research on marijuana. Until clinical trials are conducted as required by law, marijuana will remain a schedule I drug.

According to Nancy Marion (2014), in the seventeenth century, hemp and tobacco were major commercial crops in the colonies. Virginia imposed penalties to its settlers for not growing hemp. George Washington, John Adams, and Thomas Jefferson also harvested hemp during this period (Marion, 2014). Caulkins, Kilmer and Kleiman (2016) contextualize the use of marijuana before prohibition; they explain that the harvesting of cannabis was primarily used for its main fiber, hemp, as well as for fuel and therapeutic purposes. In the late 1800s, cannabis was also used as a pain reliever until the invention of aspirin. Therefore, the concept of marijuana usage was not associated at the moment with any illegal activity outside its commercial use:

> Before the late nineteenth century, there was little or no use of marijuana for intoxication in the United States or many other Western countries. Commerce pertained primarily to medicines and to the non-drug uses of the cannabis plant as a source of food, fuel, and fiber. So the absence of prohibition did not indicate a liberal stance toward recreational intoxication. (Caulkins et al., 2016, p. 199)

Later, in 1906, the FDA was created to regulate food and drugs designated for human consumption. Any product that contained any drug, including marijuana, had to be labeled. For the first time in history, the federal government began regulating drugs for public consumption. During this process, cannabis was restricted exclusively to approved FDA research. Soon after, several states outlawed cannabis use (Marion, 2014).

Then, in 1914, the Harrison Tax Act made the transportation of opium for non-medical purposes illegal; it was the first federal regulation that controlled narcotics in the United States (Marion, 2014). Since this law did not apply to cannabis, it did not control the buying or selling of the plant derivate for non-medical purposes. When alcohol prohibition hit the nation, marijuana became more widely used for recreation, possibly

because prohibition made alcohol less available for enjoyment. Cannabis clubs, "otherwise known as tea pads, were opened in every major city" (Marion, 2014, p. 25).

In 1930, Harry Anslinger, the commissioner of the Federal Bureau of Narcotics, and firmly against marijuana, advertised it as a getaway drug. A getaway drug is a drug that, through its use, would incite users to try other more addictive drugs (Marion, 2014). Between 1910 and 1930, around 200,000 to 600,000 Mexican immigrants arrived in the United States (Library of Congress, n.d.). In a possible connectivity at the time, Anslinger successfully associated cannabis with Mexican immigrants, hence the name of marijuana (Marion, 2014).

As new drugs, such as aspirin, were being developed as pain relievers the need for marijuana started to fade away. There were at least 2,000 cannabis medicines prior to 1937 with over 280 manufacturers (Marion, 2014, p. 23). The Marijuana Tax Act of 1937 made marijuana illegal at the federal level (Marion, 2014). Since marijuana was mostly used for its medical properties, the use of marijuana for its psychoactive properties was not a huge concern at the time. The psychoactive properties became widely known in the second half of the twentieth century, and the illegality of marijuana was then associated with the recreational purpose rather than its original medical use.

## C. MEDICAL MARIJUANA

Despite the efforts to maintain marijuana as an illicit controlled substance, the federal government has shown some initiative to acknowledge the medical benefits of the plant. "In 1976 the federal government, under court order, distributed marijuana cigarettes to a handful of patients under a compassionate use program until 1992" (Caulkins et al., 2016, p. 199). To this date, only the University of Mississippi holds a DEA license to grow marijuana for research purposes; this contract is funded by the National Institute on Drug Abuse (NIDA, 2016b). Additionally, in the present, only "two pill versions of THC, marijuana's psychoactive ingredient, have been approved to treat nausea in cancer chemotherapy patients and to stimulate appetite in some patients with AIDS" (NIDA, 2015, p. 18).

In 1996, California became the first state to legalize medical marijuana. California's political initiatives tend to escalate across the United States quickly, due to its geographical importance, the vast population in contrast with the rest of the states, and the power of its multiple industries. Alaska, Colorado and Oregon followed the legalization lead in 1998, and Maine in 1999. According to an article from *Business Insider*, in FY13, California had the largest recruiting numbers for the military in comparison with the rest of the nation; California recruited 11.6 percent of the total Department of Defense (DOD) force. Additionally, 13.3 percent of the new recruits were between the ages of 18 to 24 years old (Bender, Kiersz, & Rosen, 2014). Table 1 shows the numbers and percentage of active duty accessions by age and state. When the percentage of accessions of the pro-medical marijuana states are added up (excluding states with CBD-only marijuana laws), the total DOD accessions from these states adds up to 45.75 percent in FY13. If the number of accessions were the same in 2017, the percentage of accessions from pro-medical marijuana states would have increased to 59.04 percent. The article highlights that the majority of the military recruiting occurs in the southern states, where medical marijuana remains illegal at the state level (with the exception of Arkansas, Louisiana and Florida). Taking this data into consideration, currently more than 59 percent of new Navy recruits are exposed in one way or another to pro-marijuana policies.

Table 1. Active Duty Accessions by Region FY13. Source: Bender et al. (2014).

| Non-Prior Service (NPS) Active Component Enlisted Accessions, FY13: by Census Region, Division, and State with Civilian Comparison Group | | | |
|---|---|---|---|
| **CENSUS REGION** | **DoD** | | **18-24 YEAR-OLD CIVILIAN POP.** |
| ***Census Division*** | **TOTAL** | | **TOTAL** |
| **State** | **#** | **%** | **%** |
| **NORTHEAST REGION** | **22,318** | **13.7** | **18.2** |
| ***New England Division*** | ***5,881*** | ***3.6*** | ***4.7*** |
| Maine | 811 | 0.50 | 0.38 |
| New Hampshire | 723 | 0.44 | 0.38 |
| Vermont | 253 | 0.16 | 0.19 |
| Massachusetts | 2,409 | 1.5 | 2.3 |
| Rhode Island | 387 | 0.24 | 0.34 |
| Connecticut | 1,298 | 0.80 | 1.1 |
| ***Middle Atlantic Division*** | ***16,437*** | ***10.1*** | ***13.4*** |
| New York | 7,681 | 4.7 | 6.6 |
| New Jersey | 3,326 | 2.0 | 2.9 |
| Pennsylvania | 5,430 | 3.3 | 3.9 |
| **NORTH CENTRAL REGION** | **31,558** | **19.3** | **21.3** |
| ***East North Central Division*** | ***22,420*** | ***13.7*** | ***14.7*** |
| Ohio | 6,151 | 3.8 | 3.7 |
| Indiana | 3,338 | 2.0 | 1.9 |
| Illinois | 5,718 | 3.5 | 4.2 |
| Michigan | 4,727 | 2.9 | 3.2 |
| Wisconsin | 2,486 | 1.5 | 1.7 |
| ***West North Central Division*** | ***9,138*** | ***5.6*** | ***6.5*** |
| Minnesota | 1,804 | 1.1 | 1.7 |
| Iowa | 1,272 | 0.78 | 0.97 |
| Missouri | 3,325 | 2.0 | 1.7 |
| North Dakota | 169 | 0.10 | 0.25 |
| South Dakota | 360 | 0.22 | 0.28 |
| Nebraska | 901 | 0.55 | 0.59 |
| Kansas | 1,307 | 0.80 | 0.99 |
| **SOUTH REGION** | **70,968** | **43.5** | **36.4** |
| ***South Atlantic Division*** | ***38,768*** | ***23.8*** | ***18.2*** |
| Delaware | 419 | 0.26 | 0.29 |
| Maryland | 2,805 | 1.7 | 1.9 |
| District of Columbia | 109 | 0.07 | 0.25 |

Table 1. (cont'd) Active Duty Accessions by Region FY 13. Source: Bender et al. (2014).

| | | | |
|---|---|---|---|
| Virginia | 5,252 | 3.2 | 2.4 |
| West Virginia | 825 | 0.51 | 0.49 |
| North Carolina | 6,049 | 3.7 | 3.0 |
| South Carolina | 3,313 | 2.0 | 1.5 |
| Georgia | 7,387 | 4.5 | 3.1 |
| Florida | 12,609 | 7.7 | 5.4 |
| ***East South Central Division*** | ***10,395*** | ***6.4*** | ***5.9*** |
| Kentucky | 1,916 | 1.2 | 1.5 |
| Tennessee | 3,722 | 2.3 | 1.9 |
| Alabama | 3,124 | 1.9 | 1.5 |
| Mississippi | 1,633 | 1.0 | 0.97 |
| ***West South Central Division*** | ***21,805*** | ***13.4*** | ***12.2*** |
| Arkansas | 1,456 | 0.89 | 0.91 |
| Louisiana | 2,132 | 1.3 | 1.5 |
| Oklahoma | 2,139 | 1.3 | 1.2 |
| Texas | 16,078 | 9.9 | 8.6 |
| **WEST REGION** | **38,311** | **23.5** | **24.2** |
| ***Mountain Division*** | ***12,302*** | ***7.5*** | ***7.0*** |
| Montana | 481 | 0.29 | 0.26 |
| Idaho | 994 | 0.61 | 0.43 |
| Wyoming | 266 | 0.16 | 0.18 |
| Colorado | 2,914 | 1.8 | 1.6 |
| New Mexico | 1,078 | 0.66 | 0.66 |
| Arizona | 4,121 | 2.5 | 1.9 |
| Utah | 1,016 | 0.62 | 0.92 |
| Nevada | 1,432 | 0.88 | 0.96 |
| ***Pacific Division*** | ***26,009*** | ***15.9*** | ***17.2*** |
| Washington | 3,570 | 2.2 | 2.0 |
| Oregon | 2,161 | 1.3 | 1.2 |
| California | 18,987 | 11.6 | 13.3 |
| Alaska | 487 | 0.30 | 0.24 |
| Hawaii | 804 | 0.49 | 0.39 |
| **UNITED STATES SUBTOTAL** | **163,155** | **100** | **100** |
| **TERRITORIES, POSSESSIONS, OR UNKNOWN** | **1,519** | **1.1** | |
| **TOTAL** | **164,674** | | |

During the presidential elections of November 2016, eight new states approved laws that legalized medical or recreational marijuana, summing up a total of 28 states with pro-marijuana laws. As of January 2017, medical marijuana has been voted 'yes' on the ballot in 28 states, DC, Guam and Puerto Rico (even though legalization has been only implemented in 28 states). Another form of medical marijuana is the CBD-specific marijuana, although it does not possess any THC or psychoactive properties, it is also a cannabis extract. Some states, where medical marijuana is illegal, allow the use of CBD-specific marijuana. When states are added up, including those with CBD-specific marijuana laws, a total of 44 states have some sort of pro-medical marijuana initiative approved. These numbers confirm that in the last 20 years, marijuana in its different forms has become widely known, used and accepted among society for a variety of purposes despite federal regulations.

The process of legalization of alcohol could be compared to the legalization of marijuana; alcohol went from legal to illegal, then back to legal. In 1920, the 18th amendment prohibited the sale, distribution and manufacture of alcohol, it was then repealed by the 21st amendment in 1933. This only took place when the necessary majority of 36 states voted in favor to end prohibition (History, 2010). As of 2017, 31 states and U.S. territories have taken their stand on legalization of medical marijuana. Recreational marijuana use is expected to follow the domino effect.

The argument for legalization has opposite sides. On the anti-legalization side, the National Institute on Drug Abuse (NIDA) estimated 4.2 million of people are afflicted marijuana addiction problems in 2011; the youngest age among this group was 12 years old (NIDA, 2015). On the pro-legalization side, medical marijuana is regulated and taxed differently per state laws, it has been prescribed to relieve various symptoms and illness such as: anxiety, addiction, alcohol dependence/withdrawals, Alzheimer, anorexia, arthritis, asthma, attention deficit disorder, autism, bipolar, cachexia (AIDS wasting syndrome), cancer, crohn's disease, constipation, delirium, depression, diabetes, dry mouth, diarrhea, gastritis, hepatitis, huntington's chorea, irritable bowel syndrome, mesothelioma, neurodermitis, rheumatoid arthritis, spasticity, fibromyalgia, glaucoma,

hypertension, insomnia, migraines, multiple sclerosis, nausea, pain and seizures/epilepsy, among others (Marion, 2014).

## D. RECREATIONAL MARIJUANA

The difference between medical and recreational marijuana, is that medical marijuana is prescribed by a physician to address particular diseases, while recreational marijuana is sold for the purpose of personal enjoyment. A cannabis plant grown for medical purposes can be used for recreational purposes as well.

As previously referenced, in the 1920s, marijuana was becoming broadly used for recreational purposes due to the unavailability of alcohol during the prohibition years (Marion, 2014). It was then consumed in teas or smoked. Marijuana was then associated with the jazz music scene of the 1940s, as jazz spread through the mainstream, and was appreciated outside of its inner circle, marijuana followed (Rothman, 2015). Later in the 1960s, marijuana became widely known for its recreational use, when in conjunction with the Vietnam War's opposition movement and the hippie counterculture, it became a symbol of anti-establishment.

In 1971, President Nixon declared a *war on drugs*, and designated marijuana as a Schedule I controlled substance. Marijuana remained illegal in the United States, but between 1973 and 1977, its possession was decriminalized in eleven states. However, as shown in Figure 1, the numbers of incarcerations due to nonviolent drug offenses increased from 50,000 in the 1980s to 400,000 in 1997. During this period, the public's perception of drug abuse as America's number one problem went from 2-6 percent in 1985, to 64 percent in 1986. The Drug Policy Alliance described the behavioral response to media as "one of the most intense fixations by the American public on any issue in polling history" (Drug Policy Alliance, n.d., para. 11). Next year, the 64 percent dropped to less than ten percent, and the media lost enthusiasm for the issue as well. In a message to the nation in 2002 by President Bush, he noted that:

> More than 50 percent of our high school seniors have said that they've experimented with illegal drugs at least once prior to graduation. Further, a full 25 percent of high school seniors had reported using illegal drugs in the past month. It was clear that after declines in youth drug use

> throughout the 1980s and early 1990s, drug use in the United States had rebounded. (United States Office of National Drug Control Policy, 2008, p. 1)

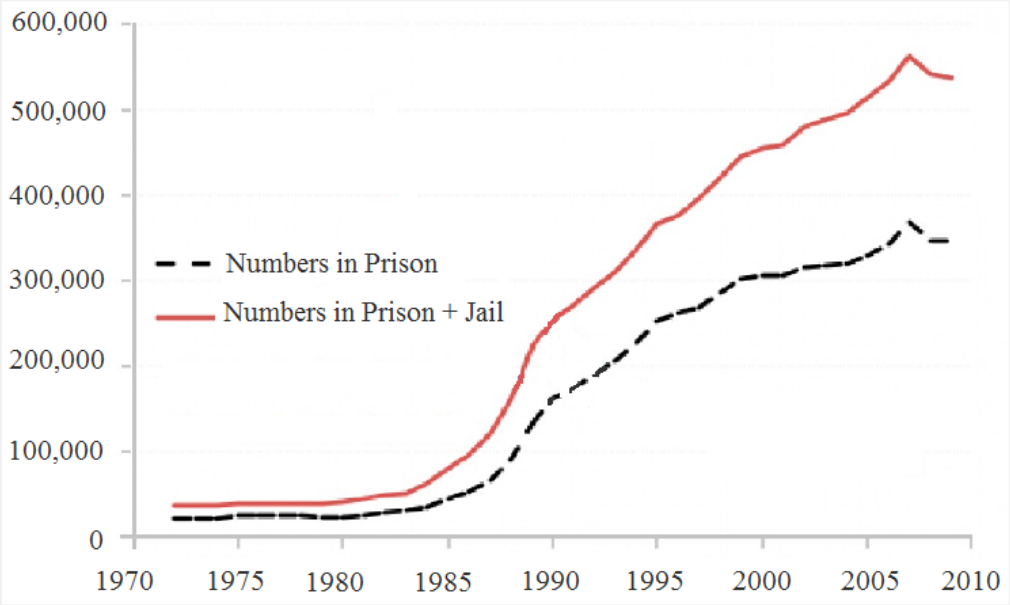



Figure 1. Drug Offense Incarcerations from 1980 to 2010. Adapted from Pollack (2013).

Soon after 2002, the efforts to reduce consumption of all drugs among youth had a positive effect. However, the change in marijuana consumption was slightly impacted, suggesting that the perception of harmfulness of the drug among the youth was continuously decreasing. During President Obama's administration, the direction toward marijuana legalization shifted. In 2013, the Gallup Poll reported for the first time that 58 percent of Americans approved legalization of marijuana (Swift, 2013). In 2012, Colorado and Washington became the first states to legalize recreational marijuana. By 2017, eight states and the District of Columbia had followed the trend.

The implementation of policies differs per state. For example, in Alaska, the maximum possession of marijuana in the home is legal up to four ounces, in Washington, DC, two legal ounces, while Oregon, holding the most relaxed regulations, allows up to eight ounces for personal use. In the remaining states where recreational marijuana is legal, the possession of one ounce is the standard. Each of the eight states where

recreational marijuana is legal, allows a maximum cultivation of six plants, except Nevada, which allows up to 12 plants, Oregon just four plants, and the state of Washington none. For reference purposes, a chronic marijuana user is considered an individual who consumes more than two ounces per month (Schwartz, Hayden, & Riddile, 1985).

The legal application of medical and recreational marijuana varies per state, making the process of understanding the effects of the policy implementation less absolute and clear than expected. Table 2 and Table 3 address some of the differences in the implementation of medical and recreational marijuana policies, respectively, in states where marijuana is legal.

Table 2. Statewide Implementation Differences of Medical Marijuana Policies. Adapted from NORML (n.d.-b), ProCon (2016).

| State/ Territory | Passed | Implemented | Possession Limits | Home Cultivation | Allowed Dispensaries | Registered Patients |
|---|---|---|---|---|---|---|
| Alaska | 03-Nov-98 | 04-Mar-99 | 1 oz. | 6 plants | No | 1,465 |
| Arizona | 02-Nov-10 | 07-May-13 | 2.5 oz. | <12 plants | Yes | 99,740 adults 155 minors |
| Arkansas | 08-Nov-16 | TBD | NS | NS | max 40 | |
| California | 05-Nov-96 | 06-Nov-96 | NS | NS | Yes | 750k-1.13M |
| Colorado | 07-Nov-00 | 01-Jun-01 | 2 oz. | <6 plants | Yes | 102,283 adults 337 minors |
| Connecticut | 31-May-12 | 04-May-12 | 1 mo. supply | No | Yes | 12,795 |
| Delaware | 13-May-11 | 01-Jul-11 | 6 oz. | No | Yes | 1,752 |
| Florida | 08-Nov-16 | TBD | NS | No | Yes- NOP | |
| Hawaii | 14-Jun-00 | 08-Dec-00 | 4 oz. | <7 plants | Yes- NOP | 13,800 |
| Illinois | 17-Apr-13 | 01-Jan-14 | 2.5oz | No | Yes | 4,037 |
| Louisiana | 16-May-16 | TBD | 30 days' supply | No | <10 | |
| Maine | 02-Nov-99 | 22-Dec-99 | 2.5 oz. | <6 plants | <8 | 1,723 voluntary |
| Maryland | 08-Apr-14 | 01-Jun-14 | 30 days' supply | No | Yes | |
| Massachusetts | 06-Nov-12 | 01-Jan-13 | 10 oz. x 2 months | NS | Yes | 28,860 |
| Michigan | 04-Nov-08 | 04-Dec-08 | 2 .5 oz. | 12 plants | Yes | 182,000 |
| Montana | 02-Nov-04 | 02-Nov-04 | 1 oz. | 4 plants | No | 13,170 |
| Nevada | 07-Nov-00 | 01-Oct-01 | 2.5 oz. | 12 plants | Yes | 20,773 |
| New Hampshire | 23-Jul-13 | 23-Jul-13 | 2 oz. | No | <4 | Approx. 1,300 |
| New Jersey | 18-Jan-10 | 18-Jul-10 | 2 oz. x 1 month | No | Yes | 6,527 |
| New Mexico | 13-Mar-07 | 01-Jul-07 | 6 oz. | 16 plants | Yes | 18,000 |
| New York | 05-Jul-14 | 05-Jul-14 | 30 days' supply | No | <20 | 7,005 |
| North Dakota | 08-Nov-16 | TBD | 3 oz. | 8 plants | Yes- NOP | |
| Ohio | 08-Jun-16 | 08-Sep-16 | NS | No | Yes- NOP | |
| Oregon | 03-Nov-98 | 03-Dec-98 | 24 oz. | 6 plants | Yes | 71,094 |
| Pennsylvania | 13-Apr-16 | 13-May-16 | 30 days' supply | No | <50 NOP | |
| Rhode Island | 03-Jan-06 | 03-Jan-06 | 2.5 oz. | 12 plants | <3 | 11,881 |
| Vermont | 26-May-04 | 01-Jul-07 | 2 oz. | 9 plants | <4 | 2,542 |
| Washington | 03-Nov-98 | 03-Nov-98 | ** | 15 plants | No*** | 12,000 voluntary |

| State/ Territory | Passed | Implemented | Possession Limits | Home Cultivation | Allowed Dispensaries | Registered Patients |
|---|---|---|---|---|---|---|
| D.C. | 21-May-10 | 27-Jul-10 | 2 oz. | No | Yes | 3,948 |
| Guam | 04-Nov-14 | 17-Dec-16 | 1 oz. | | | |
| Puerto Rico | 28-Dec-15 | 28-Jan-16 | 1.5oz daily | No | Yes | NOP |

NOP: Not operational yet

NS: Not specified

NR: Not required

* California does not require patients to be registered

** Voluntary may possess 48oz of marijuana-infused product in solid form; 3 oz. of useable marijuana; 216 oz. of marijuana-infused product in liquid form, or 21 grams of marijuana concentrates.

*** No dispensaries, but retail providers may engage in the sale of medical marijuana.

Table 3. Statewide Implementation Differences of Recreational Marijuana Policies. Adapted from NORML (n.d.-b), ProCon (2016).

| State/ territory | Passed | Implemented | Max personal/ home possession | Max public possession allowed | Min sale or distribution | Max allowed Cultivation |
|---|---|---|---|---|---|---|
| Alaska | 04-Nov-14 | 24-Feb-15 | 1oz/ 4oz home | None | None | 6 plants |
| California | 08-Nov-16 | 09-Nov-16 | 1oz. | None | None | 6 plants |
| Colorado | 06-Nov-12 | 01-Jan-14 | 1 oz. | None | None | 6 plants |
| Massachusetts | 08-Nov-16 | 15-Dec-16 | 1oz. | None | None | 6 plants |
| Nevada | 08-Nov-16 | 01-Jan-17 | 1oz. | None | 1oz | <12 plants |
| Oregon | 04-Nov-14 | 01-Jul-15 | 8oz. | 1oz | None | 4 plants |
| Washington | 27-Nov-12 | 08-Jul-14 | 1oz. | None | None | No |
| D.C. | 04-Nov-14 | 26-Feb-15 | 2oz. | | 6 plants or less | 6 plants |

The legalization of marijuana has open the door to a creative industry, where new tools and methods of consumption are improving as demand grows, such as the dabber, bongs, vapes, and a great variety of edibles, additionally to the creation of synthetic marijuana. The marijuana culture is very opposite and dissimilar to the military, and by default, the military service members are generally not exposed to the latest inventions of the industry. In the face of this evolving industry, one of the main challenges for the military will be to maintain their personnel informed of the new forms of consumption (edibles, oils, and smoking alternatives) that might be mistaken for something legal, such as food or tobacco.

Additionally, with new technologies for marketing and consumption in place, the law enforcement authorities find themselves starving for methods to detect marijuana abuse while driving. A breathalyzer, similar to the alcohol detection one, exists but is currently on the patent-pending process (Hound Labs, n.d.). In states where marijuana is legal, the police can utilize a marijuana field sobriety test, the blood, breath or urine test, and the saliva drug swab test to identify an automobile driver under the influence (DIU). However, none of these methods is completely effective nor absolutely reliable (Bebinger, 2016). Since THC is fat-based, individuals can test positive for marijuana even if they are not high. To mitigate the error, in Colorado, for example, the maximum limit of active THC in the blood is five nanograms to be considered impaired driving (Colorado Department of Transportation, n.d.). The demand for these technologies, such as the breathalyzer, grows as legalization in the nation increases. In the event that legalization occurs at the federal level, understanding the capabilities and effective use of these technologies could benefit the military.

In the United States, the sales, distribution, possession and cultivation are only legal to adults 21 years or older. Legalization opens the question for change in availability, affordability, risk perception and approval of individuals of all ages. History has witnessed a generational shift in ideologies of tolerance and exposure to marijuana. The next section will explore social conduct and the public opinion through the decades, in order to narrow a future projection of social attitudes toward marijuana.

## E. PUBLIC OPINION: AGE AND THE GENERATIONAL FACTOR

The policy writer Jon Walker (2014) highlights the year 1950 as a watershed moment for marijuana reform. He mentions that people born before the 1950 were likely to have never tried marijuana in their youth. This is in consequence of the prohibition policies enacted by the previous generations.

The generation born right after the 1950 was in their upcoming adulthood by the late '60s through early '70s, when marijuana perception of harmfulness was barely starting to shift in the opposite direction from the prohibitionist generation. In a *Washington Post* article, Ingraham (2016) states that in 1969 the Gallup Poll first asked about legalization of marijuana in America, this survey revealed that only 12 percent of the population believed marijuana should be legalized. This number increased to 28 percent in the late 1970s, but decreased and remained in the low 20 percent during the '80s and '90s. The author reiterates that in the present, nearly 80 percent of 18-to-34-year-olds favor legalization. This number grew from 44 percent in 2003 and 2005 (see Figure 2 for visual reference). Similar to Walker's statement, Ingraham (2016) highlights the Gallup poll results: that Americans age 55 and older represent the only group where its majority disapproves legalization.


The Gallup Poll asked: Do you think the use of marijuana should be made legal or not?

Figure 2. Americans' Views on Legalizing Marijuana. Source: Swift (2016).

The Pew Research Center is another organization that conducts public opinion polling, which has also followed the public opinion on marijuana. It found that "millennials—those ages 18 to 35 in 2016—are more than twice as likely to support legalization of marijuana as they were in 2006 (71 percent today, up from 34 percent in 2006), and are significantly more likely to support legalization than other generations" (Geiger, 2016, para. 3). In contrast, the latest poll conducted in October 2016, by the Gallup Poll, reported that a 60 percent of Americans supported marijuana legalization (Swift, 2016).

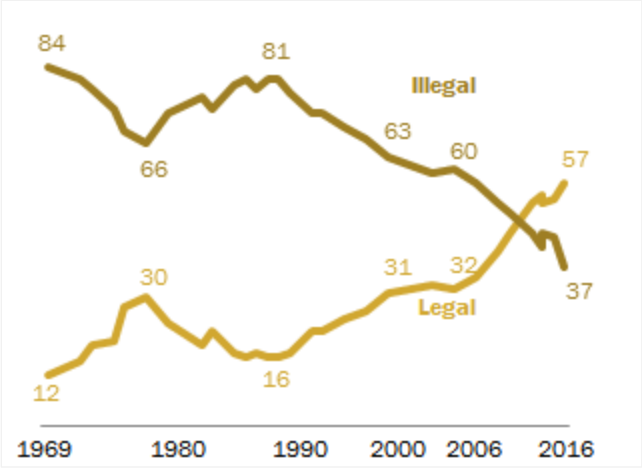
Table 4 shows that in 2015, 75 percent of the population had reached the voting age, and only 15 percent of the total were born before 1950. Therefore, the rest added up sums to 60 percent of the total population. This could easily be the same 60 percent represented that is currently driving the polls in favor of marijuana legalization.

Table 4. Age Distribution by Cohorts in the United States in 2015. Source: Keiser Family Foundation (2017).

| Age | 0-18 | 19-25 | 26-34 | 35-54 | 55-64 | 65+ | Total |
|---|---|---|---|---|---|---|---|
| Year born | 1997-2015 | 1990-1996 | 1981-1989 | 1961-1980 | 1951-1960 | < 1950 | |
| Total population | 78,181,900 | 30,474,600 | 38,959,600 | 82,570,800 | 41,135,100 | 47,546,500 | 318,868,500 |
| Percentage | 25% | 10% | 12% | 26% | 13% | 15% | 100% |

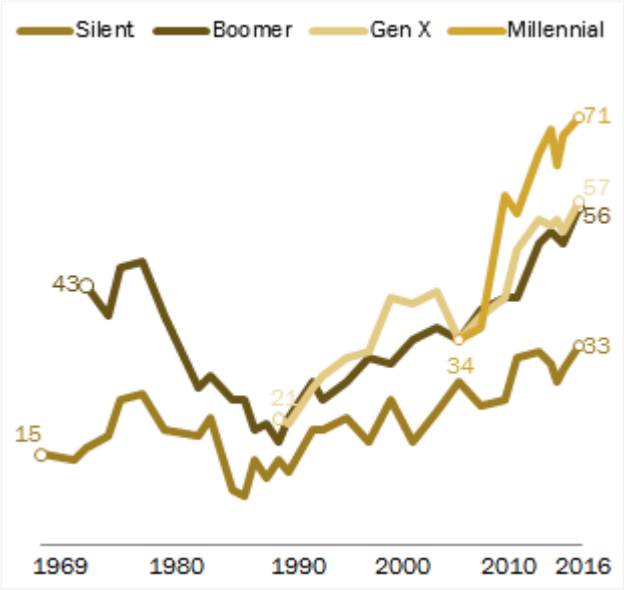
However, the United States Census collected data from November 2014 of the age of voters for this year's elections, and found that the largest group of voters, within its age cohort, are those between 65 and 74 years old, with a total of 61.2 percent (United States Census Bureau, 2015). It also reported that the registered group with the least amount of votes is 18–24-year-olds, with a 17.1 percent. Those that registered and voted between the ages of 18 to 64 add up to a total of 194.3 million, while those who registered and voted, older than 65 years old sum up to a total of 45.6 million. This means that, even though the bulk of the voting population is between 18 and 64 years old, the highest turnaround of voters for their age group are those older than 65 years old. However, this only counts for a 24 percent of the votes.

Figure 3 represents the polling results from the public opinion on legalization of marijuana since 1969. Figure 4 depicts those who believed marijuana should be legalized by generational group, and Figure 5 explores the demographics of those who participated on the poll.




Question in survey asked: Do you think the use of marijuana should be made legal? Numbers in percentages. Survey conducted August 23–September 2, 2016.

Figure 3. Opinion on Legalizing Marijuana, 1969–2016.
Source: Geiger (2016).




Survey conducted August 23–September 2, 2016.

Figure 4. Percentage Saying Marijuana Should be Legal by Generation.
Source: Geiger (2016).

| | Legal % | Illegal % | DK % |
|---|---|---|---|
| Total | 57 | 37 | 5=100 |
| Men | 60 | 34 | 5=100 |
| Women | 55 | 40 | 5=100 |
| White | 59 | 36 | 5=100 |
| Black | 59 | 37 | 4=100 |
| Hispanic | 46 | 49 | 5=100 |
| Millennial (18-35) | 71 | 25 | 5=100 |
| Generation X (36-51) | 57 | 38 | 5=100 |
| Baby Boomer (52-70) | 56 | 40 | 4=100 |
| Silent (71-88) | 33 | 59 | 8=100 |
| Postgrad | 60 | 33 | 7=100 |
| College grad | 59 | 37 | 4=100 |
| Some college | 63 | 32 | 5=100 |
| HS or less | 53 | 42 | 5=100 |
| Republican | 41 | 55 | 5=100 |
| Conservative Rep | 33 | 62 | 5=100 |
| Mod/Lib Rep | 63 | 35 | 3=100 |
| Independent | 63 | 33 | 5=100 |
| Democrat | 66 | 30 | 4=100 |
| Cons/Mod Dem | 55 | 39 | 5=100 |
| Liberal Dem | 78 | 19 | 3=100 |

Figures may not add to 100 percent because of rounding. Whites and blacks include only those who are not Hispanics; Hispanics are of any race. Survey conducted August 23–September 2, 2016.

Figure 5. Percentage Saying Use of Marijuana Should be Legal or Illegal. Source: Geiger (2016).

The polling results from the Pew Research Center (Geiger, 2016) also support Walker's statement related to the generational gap: that the post 1950s generation is more favorable towards marijuana use. However, the voting habits of the younger generation versus the oldest, account for the policy changes pace toward marijuana, meaning that even when the younger generation is more likely to favor marijuana legalization, it is also less likely to stand up and vote for it. If the voting pattern remains similar, as the years move forward, one generation will naturally replaces the other, and each generation has its own character and opinions.

### 1. Adolescent Use: Monitoring the Future

Since 1975, the NIDA has been funding a project from the University of Michigan known as Monitoring the Future (MTF). The study consists of a survey that measures adolescent attitudes toward drugs, alcohol and tobacco in public and private schools across the nation. The research collects yearly data from over 50,000 students from $8^{th}$, $10^{th}$ and $12^{th}$ grade on use, perception of risk, approval and availability of the substances. This study is also known as the National High School Senior survey (Monitoring the Future, 2016).

Among 12th graders, the study found that following a boost in annual marijuana usage from the 1960s, 51 percent use was reported in 1979 as the highest point recorded (Johnston, O'Malley, Miech, Bachman, & Schulenberg, 2016). After reaching its peak, the annual use of marijuana started to decline until 1992, when it reached 22 percent. This suggests the efficacy of policies that intend to deter drug use through the war on drugs policy of the 1980s. Between 1996 and 1997 usage increased again to almost 40 percent, it has fluctuated up and down ever since (see Figure 6). The perception of marijuana as a harmful drug decreased and never recovered. In 1996, California was the first state to legalize medical marijuana. Marijuana, now as a legal drug, could have possibly influenced the decrease in risk perception from the adolescent's perspective.

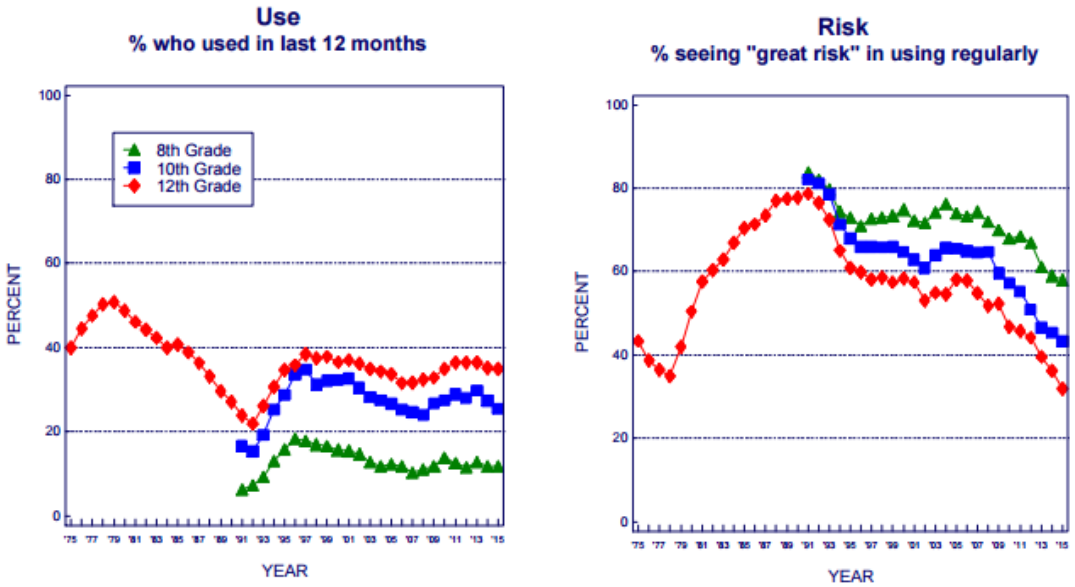



Figure 6. Trends in Annual Use and Risk Perception of Marijuana. Source: Monitoring the Future (2016).

The perception of risk was low in the late ‘70s;, only around 35 percent of the 12th graders saw marijuana as a harmful drug. The perception of risk spiked up during the ‘80s through the early ‘90s, when almost 80 percent of the adolescents saw using marijuana regularly as something hazardous. However, soon after 1992, the perception of harmfulness commenced to decline, continuing until 2015 (last year of data collected), where it reached its lowest point. Perceived risk has continued a steep decay since then, while usage remains on the rise. Disapproval and availability, as presented in Figure 7, show less volatility, both could be attributed as “constraining factors offsetting the effects of risk” (Johnston et al., 2016, p. 11).

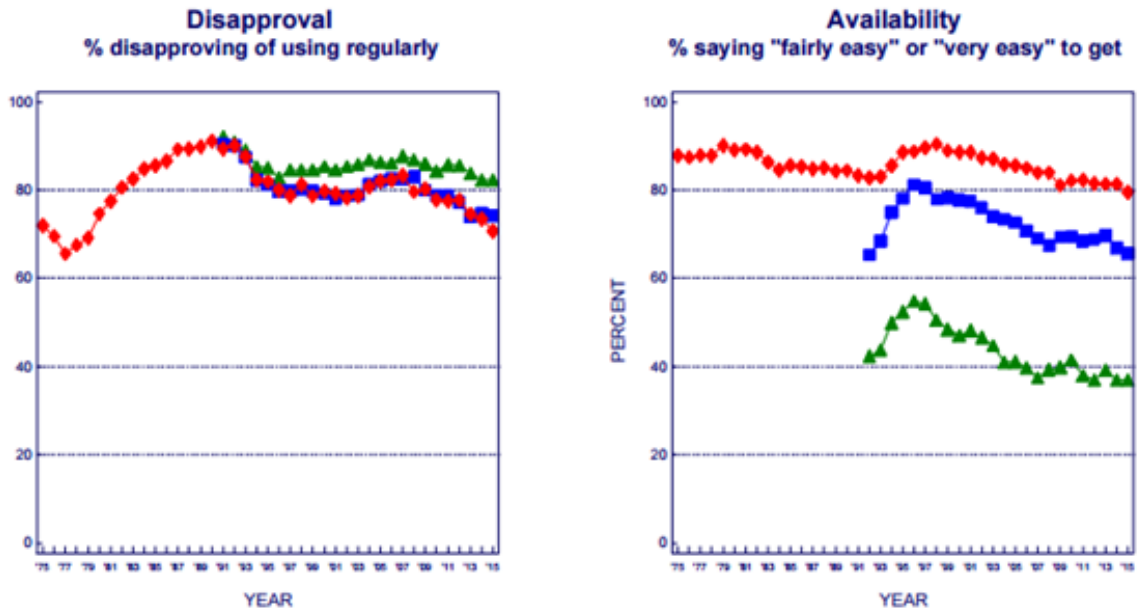



Figure 7. Disapproval and Availability of Marijuana for Adolescents. Source: Monitoring the Future (2016).

Disapproval of using marijuana regularly has behaved more steadily than use, and perception of risk, even though it follows a congruent pattern similar to risk. On the contrary, according to the survey results, marijuana has been fairly or very easy to get. Sustaining that availability of the drug has never been an issue that affects consumption or drug perception.

Additionally, the study found that teens are more likely to use e-cigarettes than cigarettes (Johnston, O'Malley, Miech, Bachman, & Schulenberg, 2015). Despite the fact that the question was related to cigarettes rather than marijuana, traditionally marijuana has been smoked in rolled cigarettes (joints), cigars (blunts), or in pipes or water pipes (bongs) (Office of the National Drug and Control Policy, 2004). E-cigarettes are a new technology for the recreational purpose of smoking that can also be used with marijuana. This technology seems more attractive to adolescents than the old-conventional cigarette.

Lastly, synthetic marijuana, also known as spice, k-2, genie, or Yucatan fire, produces a similar high to that of marijuana; it has been in the market since 2004 (Johnson, Johnson, & Alfonso, 2011). In 2011, the DEA scheduled as category I most of

the widely known chemicals used to make synthetic marijuana. However, since the drug is made in a laboratory, the producers continue to manipulate the chemicals to avoid legal control (Johnston et al., 2016). The MTF survey started asking about synthetic marijuana in 2011, and it found that it was the second most used drug after marijuana, reaching an annual prevalence of use of 11.4 percent among 12$^{th}$ graders. From 2011 to 2015, its use has declined to around five percent, while the perception of risk has increased.

Spice also represents a challenge for the military, due to its availability and difficulty to detect. The Armed Forces adopted a specific language of administrative measures in 2010 to decrease the continuous reinvention of rules followed by the dodging of the law by drug designers (Johnson et al., 2011). In 2012, the FDA Safety and Innovations Act, expanded the list of all synthetic cannabinoid compounds and synthetic amphetamines to 11, these are now Schedule 1 illicit drugs. (Office of the Under the Secretary for Personnel and Readiness [OSD P&R], n.d.-b). In response, the Navy included the testing of synthetic cannabinoids to the standard drug testing panel in 2013 (Department of the Navy [DON], 2013). Among the synthetic cannabinoids that can be tested, the following compounds can be found: spice, genie, blaze, dream, ex-ses, spark, fusion, dark knight, Yucatan fire and K2 (Department of the Navy [DON], 2010).

Table 5 helps to visualize how adolescents' consumption of marijuana has changed through the years. It highlights these changes every five years since 1995, and it also shows the highest peak for marijuana experimentation to be in 1997, while 2007 was the lowest.

Table 5. Marijuana Usage among 8th, 10th and 12th Graders Combined. Adapted from Monitoring the Future (2016).

| Year | Used marijuana at least once in the last year | Used marijuana at least once in the last 30 days | Used marijuana daily in the last 30 days |
|---|---|---|---|
| 1995 | 26.1 | 15.6 | 2.7 |
| 2000 | 27.2 | 16.3 | 3.5 |
| 2005 | 23.4 | 13.4 | 2.9 |
| 2010 | 24.5 | 14.8 | 3.4 |
| 2015 | 23.7 | 14.0 | 3.3 |
| Highest percentage | 30.1 (1997) | 17.9 (1997) | 3.7 (2001) |
| Lowest percentage | 21.4 (2007) | 12.4 (2007) | 2.7 (2007) |

Numbers shown in percentages.

### 2. Marijuana Use among the U.S. Population: SAMHSA Surveys

In 1992, the U.S. Congress established the Substance Abuse and Mental Health Services Administration (SAMHSA), a federal agency within the U.S. Department of Health and Human Services that provides accessibility to information, services and research on substance use and mental disorder (SAMHSA, 2016). SAMHSA is the organization that administers the National Survey on Drug Use and Health (NSDUH).

In 2015, SAMHSA surveyed 267.64 million people million people 12 years old and older, of those, 117.87 reported to have used marijuana at least once in their lifetime. This equals to 44 percent of the total population surveyed. From this percentage, 36 million (31 percent) reported to have used marijuana during the past year, and 22 million (19 percent) during the last month (Substance Abuse and Mental Health Services Administration [SAMHSA], 2015).

The 2015 SAMHSA study found the highest prevalence of marijuana use among the age group of 35 years or older, as shown in Table 6. However, this group contains a wider range of ages than the other three groups combined. Since the maximum age to join the U.S. Navy is 34 years old, this group will be of little interest when looking at the

effect of marijuana policies on recruiting. The second group with the highest percentage of marijuana usage is the young adults between the ages of 18–25 years old. Table 7 shows a sub-division of the 18 to 20 years old, and the 21–25 years old. From these two groups, those between 21 to 25 years old were more tolerant to marijuana usage than those from 18 to 22 years old.

Table 6. Marijuana Use by Age Group. Adapted from SAMHSA (2015).

| Age | Lifetime use | Past year | Past month |
|---|---|---|---|
| Total | 117,865 | 36,043 | 22,226 |
| | 100% | 100% | 100% |
| 12-17 | 3,912 | 3,137 | 1,752 |
| | 3.30% | 8.70% | 7.90% |
| 18-25 | 18,392 | 11,246 | 6,921 |
| | 15.60% | 31.20% | 31.10% |
| 26-34 | 21,187 | 7,902 | 4,933 |
| | 17.90% | 21.90% | 22.20% |
| 35 or older | 74,374 | 13,758 | 8,619 |
| | 63.10% | 38.80% | 38.80% |

Numbers are in thousands

Table 7. Marijuana Use among 18-to-25-Year-Olds. Adapted from SAMHSA (2015).

| Age | Lifetime use | Past year | Past month |
|---|---|---|---|
| Total | 18,392 | 11,246 | 6,921 |
| 18-20 | 6,026 | 4,378 | 2,661 |
| | 32.70% | 38.90% | 38.40% |
| 21-25 | 12,363 | 6,868 | 4,260 |
| | 67.20% | 61.00% | 61.50% |

Numbers are in thousands

### 3. U.S. Navy Age Demographics

This section describes the U.S. Navy demographics in order to compare the U.S. population of marijuana users, since the All Voluntary Force aspires to be a representation of the U.S. population. Additionally, it will help observe the most affected group by legalization policies within the service. In 2104, the U.S. Navy had 380,853 Active duty and Ready Reserve force as illustrated in Table 8 (Department of Defense [DOD], 2014).

Table 8. Age Groups of Service Members in FY14. Adapted from DOD (2014).

| Age group | Total | Percentage |
|---|---|---|
| 25 or younger | 148,012 | 39% |
| 26 to 30 | 85,412 | 22% |
| 31 to 35 | 59,413 | 16% |
| 36 or older | 88,016 | 23% |
| Total Navy Force | 380,853 | |

The largest age group in the U.S. Navy is those 25 year old or younger, adding up to a 39 percent of the population. Similar to the second largest group that reported marijuana consumption in the civilian population. This comparison is only intended to address that in the civilian sector, the age group most inclined to consume marijuana is actually the same age group that dominates the U.S. Navy population. The importance of this observation is that the 25 or younger age group is the most susceptible to policy changes toward legalization due to exposure. Additional, outside of working hours, individuals are more inclined to spend time with other individuals of the same age group. Since marijuana is legal in states with a vast population of sailors, the exposure to marijuana increases within the age group.

## F. MARIJUANA IN THE MILITARY

The 1970s represented an era of anti-establishment in the nation. Marijuana was just starting to be widely used as a recreational drug without any legal repercussion, therefore, the punitive policies that we know today were far from real at that time in society and in the military. According to a historical timeline of the military drug program from the Office of the Under Secretary for Personnel and Readiness (OSD P&R), in the 1960s, marijuana and heroin use was common in the military. The historical timeline highlights that during the Vietnam War, 42 percent of the military personnel that returned home, reported to use of opioids at least one time, and approximately half of these individuals reported dependency on drugs. Later in 1971, President Nixon ordered a military drug testing program for rehabilitation purposes; the results found that 16,000 military members suffered from drug abuse problems (OSD P&R, n.d.-b).

Later in 1981, the aircraft carrier, USS Nimitz, witnessed an accident where and EA-6B aircraft failed to land in the centerline of the flight deck, while attempting to land, the aircraft hit a SH-3 helicopter and a fighter bomber. The accident resulted in an explosion on the flight deck, costing near $200 million. Fourteen service members died and 48 were injured. The reason was not directly related to marijuana, but marijuana metabolites were found on the bodies of the flight deck's victims during the autopsy ("Navy Reports," 1981). This event triggered the punitive actions and administrative separations from the service due to drug use, known as the U.S. Navy's Zero Tolerance policy. Additionally, the drug testing in the service became randomized, and within the years it became stricter. The U.S. Navy Zero Tolerance and drug testing policy changes drastically decreased the consumption of drugs within the military personnel. For marijuana, the cutoff level for the THC metabolite in the urine decreased in order to improve the accuracy of the test (see Table 9). Today the THC cutoff level is 50ng/mL for detection and remains 15ng/mL for positive confirmation (see Appendix C).

Table 9. Use of Illegal Drugs in the Military by Year. Adapted from OSD P&R (n.d.-b).

| Year | 1980 | 1985 | 1992 | 1995 | 1998 |
|---|---|---|---|---|---|
| Percentage | 27.60% | 8.90% | 3.40% | 3.00% | 2.70% |
| THC cutoff | 75ng/mL | 20ng/ML | 15ng/ML | 15ng/ML | 15ng/ML |

In 1987, United State Code (USC) Title 10 section 978 initiated a mandatory drug testing for new accessions into the Armed Forces, and authorized denial of entry for those who tested positive. If a positive test is received, the individual shall be referred to civilian treatment. A drug test within 72 hours of enlisting was mandated by law in 1989 (Armed Forces, 2017).

USC Title 10, section 912a art. 112a of the Uniform Code of Military Justice (UCMJ) authorizes punitive action and separation from the service to any Service member that uses, possesses, distributes and transports illicit drugs, including marijuana.

> Any person subject to this chapter who wrongfully uses, possesses, manufactures, distributes, imports into the customs territory of the United States, exports from the United States, or introduces into an installation, vessel, vehicle, or aircraft used by or under the control of the armed forces a substance described in subsection (b) shall be punished as a court-martial may direct.
>
> (b) The substances referred to in subsection (a) are the following:
>
> (1) Opium, heroin, cocaine, amphetamine, lysergic acid diethylamide, methamphetamine, phencyclidine, barbituric acid, and marijuana and any compound or derivative of any such substance. (Uniform Code of Military Justice [UCMJ], 2017)

### 1. Drug Testing in the Navy

Drug testing in the Navy follows the DOD Instruction 1010.01, which is the Military Personnel Drug Abuse Testing Program (MPDATP) instruction. This instruction is written in accordance with the United States Code Title 10, which mandates a drug testing program for the service. The DOD 1010.01 was released in September 2012, superseding the old version from 1994. This instruction delineates responsibilities to higher authorities and commands to comply with drug testing requirements to detect and deter drug misuse among service members (Department of Defense [DOD], 2012a). The instruction establishes a mandatory drug test to all new DEP accession within 72 hours of entering program, as well as all new military accessions, including the Reserve Component and the Military Academy (DOD, 2012a).

Additionally, the DOD 1010.1 instruction authorizes the collection of demographic data, excluding personal identification, for test that resulted positive to illicit drugs use. The purpose of collecting this data is to assess the level of drug abuse in the military. The instruction also establishes that all active duty members and pre-accessions must be tested for at least the following six drugs: marijuana, cocaine, and amphetamines (including methamphetamine, MDMA and MDA) (DOD, 2012a).

In January 1988, MEPS commenced testing for marijuana and cocaine only (OSD P&R, n.d.-b). At the end of 2016, new DEP accessions into the service were only tested for marijuana, cocaine and amphetamines. In contrast, active duty and reserve component are exposed to the testing of 26 different illicit drugs through a random urinalysis test, which includes synthetic marijuana. See Appendix C for list of new drugs tested. From February 2017, new accessions into DEP were integrated in the new drug testing panel which tests for these 26 different drugs as well (DOD, 2017). This change emerged, among other reasons, as response to the availability, diversity and use of new drugs in the civilian sector. Army Colonel Martin (as cited in Ferdinando, 2017) emphasizes that approximately 279,400 new applicants join the military service yearly. These individuals are tested for drugs upon accession. From these tests around 2,400 of the results return positive for drugs use. Col. Martin states that the new drug testing panel estimates that another 450 candidates will add up to this list (Ferdinando, 2017).

The DOD instruction 1010.16 establishes the technical procedures for the military personnel drug abuse testing program. This instruction delineates the specifics for drug testing responsibilities, specimen collection, laboratory requirement, equipment and procedures. Appendix B includes the drug testing panel from the 2012 version of the DODI 1010.16. Appendix C presents the new updates from the changes of February 2017. In instances, the initial screen detection cutoff level and the confirmation levels are presented. However, Appendix C introduces the new drugs being tested and changes in their cutoff level (DOD, 2012b; DOD, 2017). The updated DOD instruction 1010.16 also establishes that prior accession into the service candidates who test positive for drug use are, under certain circumstances and upon service branch discretion, given a second chance to reapply after 90 days (Ferdinando 2017).

The Zero Tolerance policy is very characteristic of the U.S. Navy, in comparison with other military branches. The Zero Tolerance policy is applicable to both: new accessions to the service, and active duty and reserve component members. It establishes that "all Navy personnel determined to be unlawfully using, possessing, promoting, manufacturing, or distributing drugs and/or drug abuse paraphernalia shall be disciplined, as appropriate, and processed for administrative separation" (DON, 2010, para. 3).

Per the NAVADMIN 108/10 message, all U.S. Navy commands are required to test 15 percent of total command personnel every month, and the random drug testing should be made four times per month. According to the NAVADMIN 108/10 message, "the Navy separated 1,374 Sailors as a result of drug abuse in FY09 and 303 during the first quarter of FY10" (DON, 2010). Furthermore, 15,500 service members (Total Force) tested positive for drug in FY14 (Martin, 2015).

### 2. Drug Demand Reduction Program (DDRP)

The DDRP, founded in 1981, operates under the Office of Personnel Risk Reduction. Its main purpose is to deter drug abuse of illegal and prescribed substances within DOD personnel. The DDRP focuses primarily in developing random drug testing for pre-accession into the DOD (military and civilian) and mandatory testing after accession or employment. The DDRP also develops the punitive actions in case of misuse

or abuse of drugs. The program is in charge of the anti-drug training and education on the implications of the use and misuse of drugs and its possible consequences (OSD P&R, n.d.-a).

The DOD Drug Policy Advisory Committee and the Biochemical Testing Advisory Committee, are two groups of exclusively selected DOD personnel that establish the guidelines and maintain the DOD up-to-date in the subject of drugs. The Drug Policy Advisory Committee and the Biochemical Testing Advisory Board meet semiannually, as required by instruction (DOD, 2017).

According to the DOD Drug Demand Reduction Program (DDRP), in comparison with all the drugs tested in the DOD drug panel, marijuana ranks number one. As shown in Figure 8, in FY 14, 4,498 service members tested positive for marijuana. However, the numbers for positive marijuana testing have been decreasing. The goal established by the DDRP, is to maintain this number under two percent every year for military personnel and one percent for civilian (OSD P&R, n.d.-a). Figure 9 shows the positive drug test distribution inside the service, where active duty positive test continues to decrease below one percent. The Reserve Component, National Guard and Military applicants continue to decrease as well. Figure 10 illustrates the dramatic decrease of military drug use in the ‘80s, and how the drug testing program has maintained the numbers low.

| Unique Active Duty Positive Service Members | 2009 (12,368) | 2010 (10,790) | 2011 (8,988) | 2012 (8,837) | 2013 (8,948 ) | 2014 (7,948 ) |
|---|---|---|---|---|---|---|
| Marijuana | 8,472 | 6,937 | 5,535 | 5,454 | 5,000 | 4,498 |
| Cocaine | 2,864 | 2,309 | 2,025 | 1,714 | 1,195 | 1,120 |
| d-Amphetamine | 993 | 976 | 971 | 973 | 899 | 752 |
| d-methamphetamine | 624 | 502 | 507 | 478 | 439 | 384 |
| MDMA (Ecstasy) | 804 | 751 | 415 | 154 | 150 | 148 |
| MDA (Adam) | 410 | 334 | 204 | 101 | 98 | 91 |
| PCP | 4 | 3 | 0 | 0 | NT | NT |
| Codeine (39% testing in FY 2012) | 118 | 104 | 104 | 144 | 209 | 158 |
| Morphine (39% testing in FY 2012) | 140 | 165 | 174 | 194 | 237 | 169 |
| Oxycodone (35% testing in FY 2012) | 250 | 402 | 305 | 485 | 775 | 439 |
| Oxymorphone (35% testing in FY 2012) | 485 | 746 | 604 | 840 | 1,368 | 784 |
| Hydrocodone (39% testing in FY 2012) | NT | NT | NT | 187 | 554 | 285 |
| Hydromorphone (39% testing in FY 2012) | NT | NT | NT | 232 | 622 | 334 |
| Heroin | 108 | 104 | 136 | 118 | 122 | 115 |
| α-hydroxy-alprazolam (23% testing in FY 2013) | NT | NT | NT | NT | 40 | 120 |
| Lorazepam (23% testing in FY 2013) | NT | NT | NT | NT | 13 | 63 |
| Nordiazepam (23% testing in FY 2013) | NT | NT | NT | NT | 33 | 90 |
| Oxazepam (23% testing in FY 2013) | NT | NT | NT | NT | 134 | 351 |
| Temazepam (23% testing in FY 2013) | NT | NT | NT | NT | 92 | 256 |

Figure 8. Positive Drug Distribution from 2009 to 2014. Source: Martin (2015).

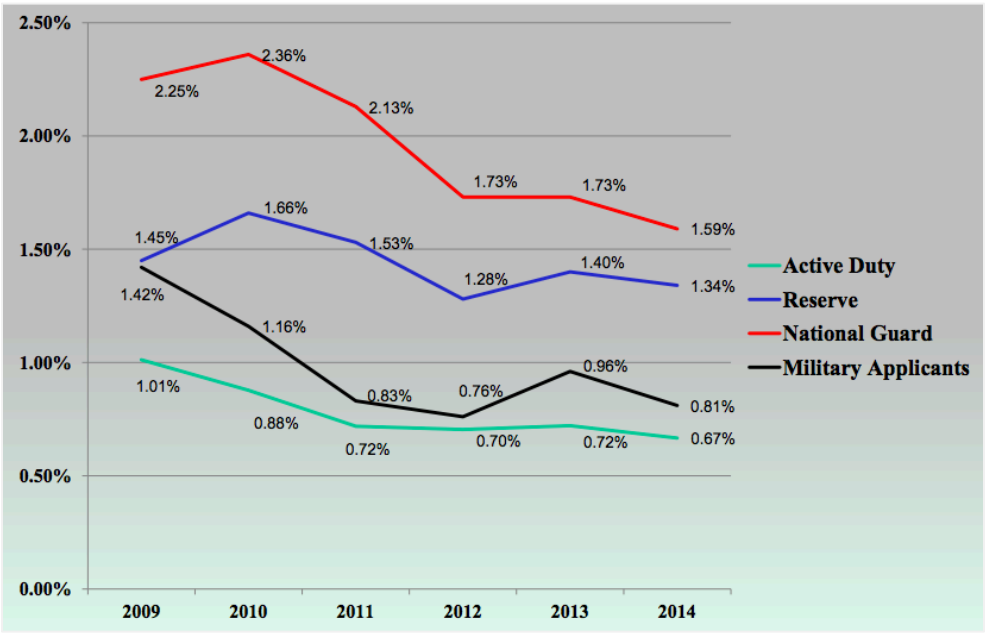



Figure 9. Overall Military Positive Rate. Source: Martin (2015).

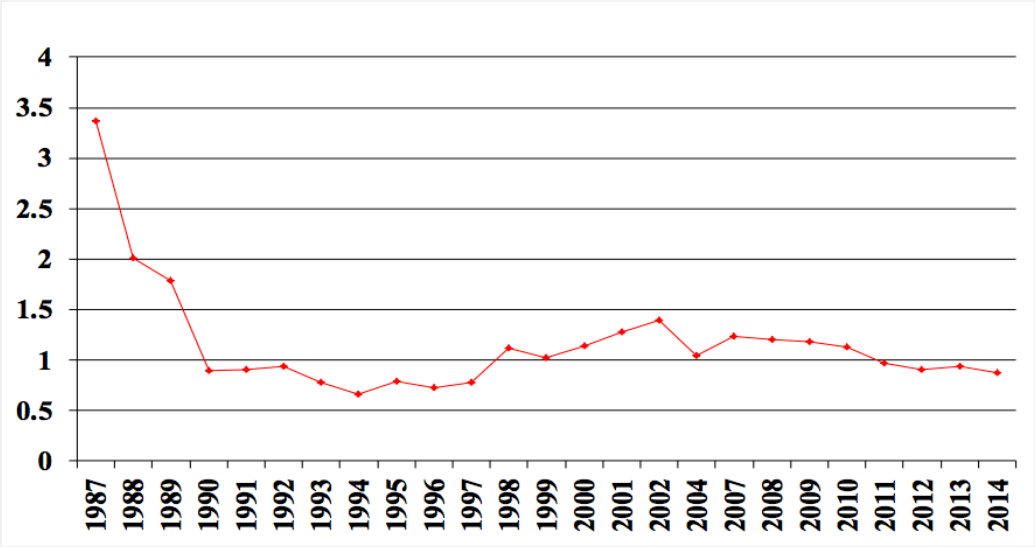



Figure 10. Positive Rate by Component. Source: Martin (2015).

## G. CONDUCT WAIVERS

### 1. Military Entry Processing Stations

Any individual who intends to join the military has to go through the recruiting process first; during this process, an initial interview takes place to answer any military-related question the candidate might have, and basic enlisting requirements are evaluated to prepare them for a successful recruiting milestone. The second step is to ensure the individual is physically and mentally qualified to join the service. This takes place in the regional Military Entrance Processing Station (MEPS), where an aptitude test known as the Armed Services Vocational Aptitude Battery (ASVAB) is given to every prospective candidate to determine job selection according to the score. A background screening, career counseling and a physical exam also take place at the MEPS. If the individual successfully passes through these evaluation phases, they get to swear in the Oath of Enlistment (or Officer) and join the military service. Depending on the job availability, time and other factors, the new recruit will either go directly to basic training. If there is no immediate availability, the individual will enter the Delay Entry Program (DEP). Those in the DEP will have to wait for their ship out date to commence training.

If an individual has ever used marijuana and wants to join the U.S. Navy, an opportunity to self-admit to usage without repercussions is granted during the recruiting and screening process. Any individual who self-admits drug use, who is additionally screened as a qualified candidate, and is judged positively within the *whole person* concept, will have the opportunity to join the service with a conduct waiver. Conduct waivers are granted for civil offenses, drug, and/or alcohol abuse (United States Navy [U.S. Navy], 2016).

### 2. The Navy Recruiting Manual-Enlisted

The Navy Recruiting Manual (COMNAVCRUITCOMINST 1130.8) has five volumes that provide all the necessary guidelines for the recruitment of civilian personnel into the Navy. The volume II describes the eligibility requirements of the prospective naval candidates. Chapter 2, section 9 addresses the drug and alcohol screening requirement, and chapter 3 addresses the waivers.

During the Navy recruiting process, an individual who has previously used drugs, including marijuana, can be granted a conduct waiver pending approval authority and that they clearly understand and commit to the U.S. Navy Zero-Tolerance policy. The statement of understanding dictates that,

> Prior to induction, every officer and enlisted accession shall be briefed on the objectives of OPNAV 5350/1 or DD 1966, Record of Military Processing - Armed Forces of the United States (and shall be required to read and sign it.) This statement describes Navy's Zero Tolerance policy for drug abuse, urinalysis procedures for detecting drug abuse, and consequences if drug abuse is detected after entry. (Department of the Navy (DON], 2009, p. 18)

Self-admitting drug use during the recruiting or screening process, could result in the granting of a conduct waiver upon approval. Conduct waivers are recommended only when the prospective candidate shows: "(1) highly favorable traits or mitigating circumstances exist which outweigh the reason for disqualification; and (2) the enlistment/reenlistment is clearly in the best interests of the Navy" (U.S. Navy, 2016, p. 235). In order to conclude with the recommendation, a whole person concept is evaluated, to determine the two requisites.

According to the Navy Recruiting Manual, the whole person concept means that "an applicant's qualifications are compared with past performance with the intent of calculating potential effectiveness in the Navy" (U.S. Navy, 2016, p. 236). Additionally, any individual who is granted a conduct waiver (drug, alcohol, or civil violation) will not be able to serve overseas their first duty assignment. The manual also singles out that "the single most important aspect of a waiver request is the commanding officer's recommendation" (U.S. Navy, 2016, p. 245). Additionally, any applicant with a conduct waiver is not allowed to perform the duties of a Master-at-arms (MA), nor a Mine-man (MN).

### 3. Conduct Waiver Authority

According to the most recent version of the Navy Recruiting Manual (version 1130.8K), released in July 2016, an individual who confess previous use of marijuana up to 10 times does not require a waiver. However, if the individual used 11 times or more, the person will require approval of the NRD CO. Additionally, in order to be approved, last time use must be have been more than 90 days before shipping to basic training, otherwise, the waiver will not be authorized.

Figure 11 illustrates in red the waiver codes and authority level code regarding pre-service use of marijuana. These codes are entered in the DD Form 1966 item 17h/18f. (See Appendix A). FBB means that that the waiver authority was the level of the Commanding Officer (CO) of the Naval Recruiting Command (NRC), and FBE means that the waiver authority was higher: at the CO of the Naval Recruiting Command District (NRD) level.

| 1966 CODE | PRIDE and CIRIMS CODE | DEFINITION | NOTES |
|---|---|---|---|
| ECB | ECB | Lost time waiver granted by NRC | |
| ECE | ECE | Lost time waiver granted by District | |
| EDB | EDB | Prior service EPTS physical disability waived by NAVCRUITCOM | |
| EEB | EEB | Prior service skill requirement waived by NAVCRUITCOM | |
| EEE | EEE | Prior service skill requirement waived by NAVCRUITDIST | |
| FAB | FAB | Alcohol abuse waived by NRC | |
| FAE | FAE | Alcohol abuse waived by District | |
| FBB | FBB | Marijuana abuse waived by NRC | |
| FBE | FBE | Marijuana abuse waived by District | |
| FCB | FCB | Other drug abuse waived by NRC | |
| FCE | FCE | Other drug abuse waived by District | |
| FDA | FDA | Positive DAT waived by CNP | |
| HAB | HAB | Prior service height waiver granted by NAVCRUITCOM | |
| HCB | HCB | Medical/physical standard waiver granted by NAVCRUITCOM | |

Figure 11. Portion of Waiver Code Table Illustrating the Waiver Authority for Marijuana Use. Source: U.S. Navy (2016).

In the previous version, the 1130.8J from May 2011, the waiver authority is consistent with the newest version 1130.8K, in not requiring a waiver for marijuana use from one to ten times. However, if the individual used marijuana 11 to 100 times, the waiver authority falls under the NRD CO. Furthermore, if the prospective candidate consumed marijuana 101 times or more, the waiver authority used to be higher, falling under Command Naval Recruiting Command (CNRC N32). By the time this later instruction was updated, Colorado had not yet legalized recreational marijuana. In the newest recruiting manual of 2016, the waiver authority decreased. This change could suggest an increase on requests to approve marijuana waivers, which could indicate an increase in use of marijuana even before recreational marijuana was even legal.

Additionally, the eligibility determination authority for the ratings and programs for applicants with alcohol and drug abuse have also decreased, while the consumption times allowed have increased. Figure 12 compares a small section of the 1130.8J and the 1130.K version of the recruiting manual that indicate how recruiting policies reflect changes in society's behavior.

**EXHIBIT 020903. RATING/PROGRAM ELIGIBILITY DETERMINATIONS FOR APPLICANTS WITH ALCOHOL AND DRUG ABUSE**

| Program or Rating | Alcohol/Drug Abuse | Eligibility Determination Authority |
|---|---|---|
| Block A<br><br>**Nuclear Field Program (NF)** | Use of Marijuana. | 3 times or less-NAVCRUITDIST CO (Notes 1 and 2).<br>4 to 10 times-COMNAVCRUITCOM (N33).<br>11 or more times, or if any other Nuclear Field program eligibility is required-DCNO (N133D) (Note 3)<br>Note: Shipping must not occur until 90 days have elapsed since last use. |
| | Convicted of 1 Marijuana offense.<br>Convicted of any other drug abuse offense. | DCNO (N133D)<br><br>Ineligible. |
| | All other drug abuse or alcohol dependency. | Ineligible. |
| | Marijuana use while in DEP. | DCNO (N133D) NF Type 2 (Note 5). |



**EXHIBIT 020903. RATING/PROGRAM ELIGIBILITY DETERMINATIONS FOR APPLICANTS WITH ALCOHOL AND DRUG ABUSE**

| Program or Rating | Alcohol/Drug Abuse | Eligibility Determination Authority |
|---|---|---|
| Block A<br><br>**Nuclear Field Program (NF)** | Use of Marijuana. | 1 to 10 times-COMNAVCRUITCOM (N313).<br>11 or more times, or if any other Nuclear Field program eligibility is required-DCNO (N133D) (Note 3)<br>Note: No use in last 6 months. |
| | Convicted of 1 Marijuana offense.<br>Convicted of any other drug abuse offense. | DCNO (N133D)<br><br>Ineligible. |
| | All other drug abuse or alcohol dependency. | Ineligible. |
| | Marijuana use while in DEP. | Ineligible. No waivers authorized. |

Figure 12. Comparison Example of Changes in Versions 1130.8J and 1130.8K of the Eligibility Determination Authority for Moral Waivers for the Nuclear Field Program. Source: U.S. Navy (2011), U.S. Navy (2016).

Before the 1130.8J version of the Navy Recruiting Manual of 2011, the 1130.8H version (2008) established the recruiting parameters. In the 1130.8H version, if the applicant self-admitted, or received adverse adjudication for the use marijuana 101 to 250 times, the waiver authority fell under the Naval Recruiting Region Commanding Officer, but if the use was 251 times or more, the ultimate authority for recommendation fell under CNRC (N32). The first 1 to 100 times authority remained similar, as well as the 90 days- time lapse (U.S. Navy, 2008).

The application time for marijuana use has been shifting through the years in response to social behavior and the Navy's need. If an individual tested positive for marijuana prior accession into the service, the individual was allowed to re-apply in 180 days. In May 2000, the Secretary of Defense reduced the reapplication time to 45 days for applicants who tested positive (OSD P&R, n.d.-b). Then, in 2002, the Assistant Secretary of Defense mandated prospective recruits in the DEP to be drug tested within 72 hours of accession into the service. (OSD P&R, n.d.-b).

## H. SUMMARY

The history of marijuana in the United States is a conflictive and moral one. One side argues that the marijuana industry generates millions of dollar utilized for education and social support, that it also has reduced incarceration due to minor drug felonies, decreased the illegal drug traffic problem, and that it has been medically beneficial for some. The other side counter argues that legalization increases consumption among the youth, that it has no medical value, and that it increases medical admission treatments for drug abuse. Both arguments are valid and research on the subjects continues to increase as more data becomes available after states have adopted legalization policies. However, since the legalization policies are relatively recent (especially for recreational marijuana), it is too soon to conclude the true effect of its legalization.

This chapter addresses how the public opinion is changing in favor of marijuana, reflecting a generational shift in society as well. As the younger generation replaces the older one, marijuana becomes more accepted, while its perception of harmfulness continues to decrease. This younger generation, more tolerant to marijuana, is the same

age group where the Navy recruits the majority of it candidates. Similarly, as the population becomes more tolerant, the government at the state level responds by understanding that these candidates are coming from an environment that is more accepting of marijuana, by doing so, the Navy anti-drug policies have no choice but to become stricter. It is clear that the Navy is required to be a drug free environment for safety reasons and traditional values.

The legalization of marijuana seems to be following the historical path of alcohol prohibition in the early 1900s. If the pro-marijuana changes observed in the past 20 years in the United States continue the current trends, the argument about legalization at the national level must be considered. New technologies being developed will help to identify if an individual is under the influence of marijuana at the moment. The effect of such technologies must be studied as a tool available for military drug detection programs. Additionally, since data becomes more available each day, the performance of marijuana users in the workplace should become a topic of interest, by researching the short and long term effect of consumption. Raising this type of question before legalization occurs, would help identify an unbiased response to the real effect of marijuana in the workplace. The argument is that since marijuana is stored in the fatty acids it can be detected in the body for weeks, this does not mean that the individual is intoxicated. The same individual can consume marijuana and go to work the next day, similar to alcohol and tobacco. The question should consider changes in efficiency and performance of these users.

In conclusion, this chapter briefly discussed the historical changes in perception and uses of medical and recreational marijuana in the United States, by exploring the differences in the policy implementation process. It addressed the age factor and the generational shift in opinion towards legalization with the purpose of identifying some characteristics and trends of the upcoming generation, which is also the generation that is volunteering to serve. Finally, the chapter identified some of the policy changes within the U.S. Navy that are clear indicators that marijuana, and drugs in general, continue to challenge the military order and discipline; among these are changes to the Navy Recruiting Manual, and optimization and expansion of the drug testing panel.

# III. LITERATURE REVIEW

This chapter is divided into three sections: the first will explore various studies that analyzed the effect of legalization of medical marijuana on consumption, particularly among the youth. The second section contrasts the changes in consumption of marijuana among military service members before and after joining service. The observations were compared with the civilian sector: before and after entering the labor market. The third and last section looks at studies that analyzed the performance of U.S. Navy sailors who entered the service with conduct drug waivers. For the purpose of this thesis, a conduct waiver and a moral waiver refer to the same concept. There has not yet been a study focused specifically on the effect of marijuana legislation on prospective military candidates; therefore the findings from the literature review chapter will serve as a foundation to better understand the behavior of prospective military candidates when faced toward marijuana legalization, military policies, and their performance after joining the military service. Additionally, the second and third sections of the literature review are limited to consumption of illegal recreational marijuana, contrary to the first section, which focuses on medical marijuana exclusively. The subject of recreational marijuana was not explored due to lack of proper studies, since the policies were recently implemented in the affected states.

## A. THE IMPACT OF LEGALIZATION ON CONSUMPTION

### 1. Medical Marijuana Laws on Consumption

Choo, Benz, Zaller, Warren, Rising, and McConnell (2014) observed changes in consumption of marijuana among adolescents in states were medical marijuana laws (MML) have been implemented. Their study utilized data from the Youth Risk Behavior Survey (YRBS) from 1991 to 2001. A difference-in-difference model was employed by the authors to follow a sample population of 11,703,100 students that analyzed the policy effect on each of these individuals. The author's model observed for states fixed effects, and two-cycle term from the time when marijuana legislation was implemented. Their model also compared neighboring states with different policies: one with MML vs one

with no MML, such as New York-Vermont, Utah-Nevada, Idaho-Montana, etc. (Choo et al., 2014).

The regression also controlled for individual-level covariates; it found that the use of marijuana did not increase in those states that have legalized medical marijuana after the policy was implemented. This result only reflects those who self-admitted consuming in the past 30 days of the survey. This result does not apply to the Utah-Nevada, and Idaho-Montana comparisons. In both cases, legalization of medical marijuana resulted in decreased probability of usage in the legal state (Choo et al., 2014). For this study, marijuana use was measured in two different categories: lifetime use, and past 30–day use. The amount of marijuana used within each category was not specified, however, both categories help to narrow marijuana experimentation vs regular usage.

The authors found that marijuana is widely used among students, with lifetime use of 37.3 percent and of 20.9 percent for past-month use, the regression analysis also exhibited no effect on increasing reporting of marijuana use after medical marijuana law was implemented (Choo et al., 2014). They also concluded that "states with the medical marijuana law had a significantly higher percentage of students reporting past month marijuana use and a significantly lower percentage of nonwhite students" (Choo et al., 2014, p. 162). A similar study also found that, among adolescents, "the impact of legalizing medical marijuana on the probability of marijuana use in the past 30 days is no larger than 0.8 percentage points" (Anderson, Hansen, & Rees, 2014). Another study published in 2012, differs from these findings: it concluded "that states that legalized marijuana use for medical purposes have significantly higher rates of marijuana use and of marijuana abuse and dependence" (Cerdá, Wall, Keyes, Galea & Hasin, 2012, p. 6).

Cerdá et al. (2012) study utilized data from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC): this is a yearly survey that collects two waves of data through a face to face interview. Data from the NSDUH was also collected. Both sources generated 34,635 valid observations from the year 2004–2005. However, the only time variable was the last 12 month use, which was defined as marijuana use and marijuana use disorder. The study controlled for individual and state level covariates (Cerdá et al., 2012). The differences in results between both studies aforementioned,

could be attributed to the data selection, number of observations, and methodology applied.

However, an agreement exists between both studies: adolescent's use of marijuana is higher in states with MML than is states where is not legal. These results bring up the next question: when did marijuana consumption increased, before or after the policy was implemented? The question was answered by another study conducted among adolescents between 12 and 17 years old. This study found that despite adolescent's consumption of marijuana being higher in states with MML than in states with no medical marijuana policies, "in the years prior to MML passage, there was already a higher prevalence of use and lower perceptions of risk in those states compared to states that have not passed MML" (Wall et al., 2011, p. 714). These results might suggest that it is initially the social behavior that incites policy development and implementation, rather than policy implementation being the primary driver of social conduct. This social behavior that reflects a higher prevalence of use and lower perception of risk could be attributed to the culture of the state, since some states are more welcoming to change than others. It is important to notice that in states with MML, public health departments are responsible to regulate the amount of consumption, distribution and allowance for home cultivation of medical marijuana. Marijuana is acquired through physicians or dispensaries, as applicable by state, and is only legal to sell to individuals older than 21 years old, except in special circumstances. When these implementation differences across states are taken into consideration, the findings from these studies suggest that consumption among the youth is not necessarily a legalization problem but an implementation one. The next section explores how consumption varies when the multiple aspects of marijuana policies are implemented differently per state.

### 2. Policy Implementation

In 2015, the J*ournal of Policy Analysis and Management* published a study that analyzed the particular characteristics of the implementation phase of MML exclusively. The authors of the study recognized the different legal provisions inside the marijuana policies for cultivation, distribution, and permissible amount in possession for every state

that implemented MML. Therefore, it treated MML in each state as heterogeneous laws. The study utilizes two data sets; the Treatment Episode Data Set (TEDS) and the National Longitudinal Survey Year 97 (NLSY97). The TEDS data set contains the admissions to substance abuse programs and primary to tertiary substance reported, additional to demographics, and other treatment characteristics available. This data set observed admissions to treatment where marijuana was the primary substance of abuse, it was also selected as the outcome variable for the analysis from 1992–2011 (Pacula, Powell, Heaton, & Sevigny, 2015). This thesis is not interested in the medical treatment and addiction to marijuana, however, this information is relevant because it observes an area where changes in consumption can be measured, after particular areas of the medical marijuana policies take effect.

The NLSY97 dataset utilizes surveys from 1997–2011 on the U.S. population of 12–17 years old, with detailed information on past 30-days use of marijuana and alcohol. This study considers a heavy user, someone who, in the past 30 days, consumed the substance more than 20 days total. The NLSY97 "estimates probit regression models of self-reported marijuana use and heavy use as a function of medical marijuana policies, state fixed effects, individual-level controls, and state-level time-varying covariates" (Pacula et al., 2015, p. 17).

The study observed two groups separately; the overall U.S. population, and the youth (under 21). The findings will be divided in four areas of the policy; overall policy adoption, medical registration, allowance for dispensaries, and home cultivation (Pacula et al., 2015).

After employing a difference-in-difference model that includes state and year fixed effects in all regressions, the study did not find any significant correlation between the legality of marijuana and use in 30 days, or heavy use among the youth (Pacula et al., 2015). Additionally, it found that "adoption of a MML reduces marijuana treatment admission by about 14 percent" (Pacula et al., 2015, p. 19). It is important to consider that some states allow for possession of a limited amount of marijuana, and most of the referrals to treatment are due through court to enforce policies. This could be a reason why the number of admissions is lower in states with MML. However, in states where

admissions to treatment are not referred by court, “states with mandatory patient registries have 18 percent lower rates (18 percent) of marijuana treatment admissions than medical marijuana states without registries” (Pacula et al., 2015, p. 19). For the group of 21 and younger, medical marijuana registries are associated with increased annual use, use in the last 30 days, and heavy use.

Secondly, some states protect the dispensaries as a mean for distribution control of marijuana. In states that dispensaries are protected by law, the study found that the probability of use in the overall U.S. population increases by 2.0 percentage point in comparison to those states that do not have dispensaries (Pacula et al., 2015). Increase in use was also observe in the younger than 21 population.

And lastly, the study found “that states that allow home cultivation of medical marijuana have fewer treatment admissions on average than states without legal allowances” However, “home cultivation increases the likelihood of use by 1.8 percentage points and the probability of heavy use by about 1 percentage point” (Pacula et al., 2015, p. 20). In contrast, in the younger than 21 population, home cultivation has a consistently negative effect on use.

The take-away from this study is that legalization itself is not the main driver for change, but how the policy is implemented. Understanding the heterogeneous effect of the implementation of marijuana policies within the different states, will help to discern why some states are more susceptible to marijuana-friendly recruits than others.

This section challenges the hypothesis that the legalization of marijuana increases consumption, especially among the youth. As mentioned previously, no significant change in marijuana consumption was found after MML were implemented. However, it is important to recognize that states with MML have a higher incidence of marijuana consumption than states with no MML, even before the policy was implemented. This statement suggests that social conduct has a larger effect on legislation rather than otherwise. Additionally, it is imperative to understand that when dissecting the differences of policy implementation in the states, by analyzing consumption, distribution and cultivation separately, the results vary by state. This section highlights that

consumption was higher in states with MML, even before the policies were implemented. But the absence of medical marijuana registries and the allowance for dispensaries increase the probability of consumption in those states, while home cultivation has the minimum impact on increased consumption.

## B. MARIJUANA CONSUMPTION: BEFORE AND AFTER THE MILITARY

Civilian behavior and tolerance towards marijuana is essential for the understanding of this thesis, since the recruiting candidates are selected from the civilian population. These candidates are governed by federal and states laws, contrary to military service members, who are ruled by federal laws and the Uniform Code of Military Justice (UCMJ). The medical marijuana legalization boom commenced in the late 1990s, since then, there has been little research done on the effect of marijuana legislation on military service members. Nonetheless, some studies have focused on the behavior of marijuana users before and after the service, while others compared solely military and civilian employee's marijuana consumption. Although time has passed since then, some of these studies have found that the service members are less likely to use marijuana after joining the service and less likely to consume marijuana in comparison with the civilian counterpart. The UCMJ enforcement and random urinalysis testing help to remove marijuana users from the system.

Bachman, Freeman-Doan, O'Malley, Johnston, and Segal (1999) examined patterns in drug use before and after young adults enter the military. Every year from 1975 to 1995, 17,000 high school seniors were surveyed in five cohorts of four graduating class, a follow up survey was made to a random selection of 2,400 of them a year or two after the original survey.

The authors of this study found that the prevalence of marijuana use decreased dramatically after military enlistment (Bachman et al., 1999). The illicit drug use, especially marijuana use, declines among young men who enlist the military service during the 1980s, a time when such use also declined for the population as a whole. At the same time, the study considers two important factors that might influence the results;

military recruits are more likely to underreport past and present illicit drug use, and during the 1980s, random urinalysis testing became more aggressive in the military.

The study contrasts the marijuana user versus the tobacco user. It found that marijuana users were, for the most part, able to stop such use if they entered the armed forces, while "74 percent of tobacco users return to use within 90 days of basic training" (Bachman et al., 1999, p. 677). A limitation of this study is that it does not examine service-specific substance use policies and their impact.

Bray, Marsden and Peterson (1991) conducted a comparison analysis to observe for the prevalence of alcohol, drugs and tobacco on military and civilian personnel of age 18 to 55, between the years of 1980 and 1982. They identified that young adults between the ages of 18 to 25 years old are at higher risk of drug use. According to the authors, the prevalence of alcohol and drug use among civilian and military personnel was similar in 1982; however, the military personnel showed a significant decrease in marijuana and cocaine use, but an increase in alcohol consumption (Bray et al., 1991). This change could be attributed to the random urinalysis testing that initiated in 1981,[1] suggesting two things; the effectiveness of the implementation of the drug testing program, and that alcohol could be a substitute for other drugs, the same way that marijuana substituted alcohol during the prohibition years.

If alcohol was considered a substitute for other drugs, the study found that "the prevalence of any drinking among all military personnel is about 8 percentage points higher than among all civilians and the prevalence of heavy drinking among all military personnel is about 10 percentage points higher than that among all civilians" (Bray et al., 1991, p. 867). While, according to the study, the rate of military personnel drug consumption is 15.7 percent lower than civilian (Bray et al., 1991). A caveat of this study is that the term *drug* does not separate marijuana from cocaine, heroin, inhalants, hallucinogens, and psychotherapeutic drugs. Therefore, the consumption cannot be

[1] In 1981, the Deputy Secretary of Defense authorized, under memorandum #62884 punitive actions and separation from service to those who tested positive for drugs, including marijuana, cocaine and amphetamines.

measured accurately in terms of marijuana; however, it does reflect a pattern of behavior towards drug use in the service.

A more recent study, released by the *Journal of Analytical Toxicology* in 2008, observed for the prevalence of marijuana use among military service members. The study looked at the positive drug test results from Active Duty and Reserve personnel from FY05-FY07. From 11.28 million samples collected, 6 percent tested positive for the marijuana metabolite THC-COOH above the cutoff level of 15ng/mL. In FY05 13,804 samples tested positive for marijuana, while in FY06 the number decreased 8.5 percent to 12,631, and later increased again in FY07 to 13,097 (Jemionek, Copley, Smith. & Past, 2008). This study suggests that despite the great efforts to promote a zero tolerance environment, military service members are still susceptible to consume marijuana.

In comparison with the civilian counterpart, Jemionek et al. (2008) points out that in 2005 a DOD survey found that 1.3 percent of the military personnel self-admitted marijuana use in the last 30 days (data collected from DOD Survey of Health Related Behavior), and 19.8 percent of $12^{th}$ graders also self-admitted use (Monitoring the Future survey). In 2006, SAMHSA reported a 6.8 percent and 16.6 percent past 30-day marijuana use among youths aged 12–17 and 18–25, respectively (Jemionek et al., 2008).

The relevance of these studies relies in the analysis of behavior from prospective candidates and actual military service members towards drugs and marijuana use. In particular, the 18 to 25 years old population; the age of the largest recruiting pool for the military. Even though none of the studies are Navy-specific, they all suggest that even when marijuana (and other drugs) is less common among the military service members than the civilians, they are still present in the service, despite the anti-drug policies in place. In contrast, the studies suggest that alcohol use is substantially higher in the military in comparison with the civilian sector, implying a possible substitution effect.

## C. PERFORMANCE AND ATTRITION OF U.S. NAVY SAILORS WITH CONDUCT WAIVERS

If a prospective military candidate has consumed marijuana previously, they will need to request a moral, or conduct waiver, where they self-admit usage and commit to not do it again. The last section of the literature review will explore previous studies that focused on the relationship performance and attrition of Sailors moral drug waivers.

Bowers (2015) observed moral waivers as one of the determinant factors for performance and retention of Sailors, where he utilized accession data from FY01-FY09 followed until FY13 from PRIDE and DMDC. Even though he was interested particularly in the population of Hispanics, he also observed for the entire US. Navy enlisted population, with a total of 348,330 observations. He found that individuals who self-admit pre-service abuse of alcohol or drugs and are granted a moral waiver to join the U.S. Navy, are less likely to attrite and more likely to promote to E-5 during the first term. He attributed the beneficial characteristics of self-disclosure as non-observed personal traits in his model, which reflects these individual's level of honesty, enhancement of new opportunities, and their sense of responsibility (Bowers, 2015).

Not all studies that observe for attrition have been consistent with Bowers' results. Huth (2007) found that recruits with moral waivers are more likely to attrite and less likely to remain in the service in the long term. Another study by Hall in 1999 produced similar results; it found that individuals with moral waivers are more unsuitable for the Navy than those who joined without moral waivers. However, Huth and Hall only analyzed a total of two-year cohorts each, from 2003 to 2004, and 1995 to 1996 respectively, while Bowers observed for 12 years. In both cases, such as in Bowers', the variables did not separated marijuana waivers from other drugs. This thesis, in contrast, considers marijuana waivers only.

In his study, Bowers created three models for retention: one for four, one for five and one for six years of service commitment, and a model for promotion in less than four years with an alcohol and drug waiver. The results for the four and five year model were statistically significant, for the six year model was not. The four-year and five year model found that, 54.44 and 55.81 percent of the retention eligible enlistees, retained in the

Navy past 59 and 71 months, respectively. This means that possession of an *alcohol or drug waiver* (as he categorized the waivers in the study) at the time of enlistment has the unexpected result of increasing retention by 3.5 and 5.4 percentage points respectively (Bowers, 2015). The promotion model found that "enlisting with an alcohol or drug waiver increases the likelihood of fast-track promotion by 0.3 percentage points" (Bowers, 2015, p. 92). Three decades before, another study compared retention of marijuana users and non-marijuana users, it found that after two and a half years, 81 percent of the THC-negative and 57 percent of the THC-positive group were still in the Navy (Blank & Fenton, 1989).

Despite the fact that Bower's study was recent, the observations for alcohol and drug waivers are grouped within the same variable, making the effect of marijuana-specific waivers impossible to observe. Additionally, the granting of alcohol and drug waivers only measures for consumption, not for distribution or possession. The last two, when considered a minor offense, can be measured within the group of civil waivers.

Jones and Fedak (2006) analyzed the profile of the active duty member with moral drug waiver. The data for this study contained individuals with drug abuse waivers who remained in service from up to 1999, but the observation cohort only ranged from 2000 to 2004. The individuals from this cohort that remained in active duty summed up to 2,720. The study observed Navy recruits who tested positive for drugs while at MEPS, and were allowed to enlist with a moral drug waiver (Jones & Fedak, 2006). It is important to observe that this study, similar to the ones before in this section, do not separate marijuana from other drugs. But it is the closes description that could be found to associate the profile of a pre-service marijuana user.

Jones & Fedak's (2006) study found that within the individuals with moral drug waivers, 92.6 percent were males, while 7.4 percent were females. The majority, 79.2 percent had twelve years of education, while 11.8 percent had less than twelve years, and 4.6 percent had more than twelve. However, only 79.2 percent were high school graduates with a diploma. The mean AFQT score for this group was 59.6 (SD=17.2). Such score would be categorized as an AFQT Cat IIIA, a score for an above average intellectual capacity. The performance mark average was 3.57, suggesting that E-5 and

above performance standards are acceptable in comparison with their peers. Additionally, 79 percent of E-5 or above have recommendation for advancement, this is distributed as follows: 29 percent Early Promotion (EP), 50 percent Must Promote (MP), 13.5 percent Promote (P), and 14.5 percent Significant Problem (SP), and 6.5 percent Non-Observed (NOB). The top three rates with most drug waivers were Airman (AN) with 5.7percent of the total, Operation specialist Seaman (OSSN) with 4.1 percent, and Airman Apprentice (AA) with 3 percent (Jones & Fedak, 2006).

The study also found that the main reason for separation during first term was completion of term, which represents 3.9 percent of total attritions, followed by pattern of misconduct with 1.1 percent (Jones & Fedak, 2006). This suggests that individuals with moral drug waivers are more likely to complete their contracts rather than attrite for moral reasons. However, 40.2 percent of those who attrite for moral reasons were later separated for drug related reasons. The total attrite (n = 2028) "account for 46.9 percent of the entire population; therefore, 53.1 percent of the (n = 4320) Sailors accepted for enlistment with a drug waiver remain on active duty" (Jones & Fedak, 2006).

In general, the study from Bowers, and Jones and Fedak strongly suggests that individuals with moral drug waivers are inclined to join the service, and can have great potential to succeed. Therefore, if in the upcoming years, more states continue to implement laws that make marijuana more accessible, a surge in granting marijuana drug waivers is a rational assumption. A major caveat on these studies is that there has not been a clear disassociation between marijuana waivers and drug abuse waivers as a whole. These findings can only provide an idea of the characteristics, performance and attrition of those with drug abuse waivers, but the weight of marijuana usage is unable to be measured within the overall drug waiver group available in these studies.

## D. SUMMARY

Existing data has established marijuana as the most commonly used drug among adolescents and young adults in the United States. According to the MTF survey of 2015, "the percentage seeing great risk of smoking marijuana regularly is at the lowest point ever recorded in the study—58, 43, and 32 percent in grades 8, 10, and 12, respectively"

(Johnston et. al, 2015, p. 5). The author highlights that while the perception of harmfulness continues to decline, 23.7 percent of high schoolers reported to have used marijuana in the past year. The trend is inclining toward more states legalizing marijuana in a medical or recreational form. As consequence, marijuana is expected to become more popular among the youth, which represents the U.S. Navy prospective recruiting pool. In FY13, California- a state where medical marijuana has been legal since 1996, recruited the highest number of accessions to the service, adding up to 11.6 percent of the total Department of Defense recruits (Bender et al., 2014). In 2016, the ballot for recreational marijuana passed on the elections in California.

This chapter concludes that research on the topic of marijuana use and its effects is becoming more common as legalization occurs. Adolescent use of marijuana has been found to be higher in states with MML. However, it has also been determined that consumption was higher in these states before the policy was implemented. Understanding the multiple variations of marijuana policies can help identify the strengths and weakness in social behavior after legalization laws are in place. The second section of this chapter addressed studies that observed for marijuana consumption before and after the military. The studies found that marijuana consumption decreased drastically after admission into the service, while alcohol consumption remains higher among military personnel than in the civilian sector. This section summarizes the importance and effectiveness of the drug deterrence efforts and policies in the service.

The third section of this chapter highlights that even though marijuana consumption decreases drastically after joining the service, 40.2 percent of the attritions for moral reasons are for drug related causes (Jones et al., 2008). This percentage raises the question of the effectiveness of the military waiver program, and the quality of these recruits. Other studies have proven dissimilar results, Blank and Felton (1989) demonstrated that enlisted Sailors with moral waivers tend to be successful in the service, despite the fact that a 43 percent of them attrite before the 2.5-year mark. However, none of these studies separated marijuana from the other drugs when observing at moral drug waivers and performance.

# IV. DATA DESCRIPTION AND METHODOLOGY

The first section of this chapter describes the raw data set and all the requested variables for this study. It continues by guiding the reader through the modifications applied to the data in order to create the variables that best fitted into the desired econometric model. The second section describes the source of data acquisition, the reason for selection, and the waiver variable code. The third section explains the limitations of the data set, and the last section describes the models selected for the analysis and its variations.

## A. DATA DESCRIPTION

The raw data set contains 212,259 observations from U.S. Navy's enlisted accessions from October 2010 until January 2017. Each observation represents one accession into the U.S. Navy. The data set contains monthly data of every accession with a conduct waiver code, from the 50 states, Washington, DC, Guam, Puerto Rico, the Virgin Islands, Marshall Islands, Micronesia, American Samoa, and the Northern Mariana Islands. From the 212,259 observations, 419 were dropped due to lack of state identification. From those 419 observations, only one contained a marijuana waiver code.

Prior to analyzing the data, each of the 212, 259 observations for accessions were collapsed into monthly groups by state. A total of 76 months were assigned to each state and U.S. territory. After the collapse, the number of observations was reduced to 4,176 observations. Since Micronesia and the Marshall Islands only had one recruit each during the whole period observed, their data was grouped with American Samoa, Northern Mariana Island and all other U.S. territories in one group called 'OT.' None of these U.S. territories grouped have legalized medical or recreational marijuana. The U.S. territories in 'OT' group accounted for a total of 74 observations. Since Puerto Rico, Guam and the Virgin Islands had a greater number of observations, they maintained their own separate state variable.

## B. DATA SOURCE

The data for this study was acquired from Naval Recruiting Command (NRC) in Millington, Tennessee. The variables for conduct waivers requested were specifically taken from the DD Form 1966 (Record of Military Processing–Armed Forces of the United States). This form contains the individual's pre-accession information from the recruiting and screening process while in MEPS. In the DD Form 1966, items 17h and 18f are designated for the waiver codes granted to each individual who accessed the DEP, this applies to every branch of the military service. For this study in particular, the data acquired pertains to U.S. Navy accessions only. The codes in item 17h are used for DEP enlistment data, and the codes in item 18f are used for accession. These codes belong to the pre-accession data from the Personalized Recruiting for Immediate and Delayed Enlistment Modernization (PRIDE MOD) system. The PRIDE system collects data from Navy recruits during the recruiting and accession process. This data includes personal information, test scores, and characteristics of the applicant. The information assists to the applicant's job selection process, based on the Navy's needs and the applicant's job desire. Among the information collected from the applicant, is the approved conduct waiver code. Table 10 identifies the codes requested for conduct waivers granted. This thesis groups the FBB and FBE codes, since the study's interest is on marijuana behavior only. The rest of the codes are grouped together to represent the total number of recruits without marijuana waivers. When FBB, FBE and the new group are added together, the number adds up to the total Navy recruits for the period observed.

Table 10. PRIDE Code and Waiver Description. Adapted from U.S. Navy (2016).

| PRIDE Code | Variable name |
|---|---|
| YYY | No waivers granted |
| FBB | Marijuana abuse waived by NRC |
| FBE | Marijuana abuse waived by District |
| FAB | Alcohol abuse waived by NRC |
| FAE | Alcohol abuse waived by District |
| FCB | Other drug abuse waived by NRC |
| FCE | Other drug abuse waived by District |

The waiver variable, as described previously, was divided between two groups: marijuana waiver granted, and total recruits. Total recruits included those with other conduct waivers and those who accessed the U.S. Navy with no waivers. Additionally, two new variables were created for policy implementation: one for medical marijuana, and another for recreational marijuana. These variables were coded as "1" for legal, and "0" for not legal. The number "1" was assigned to the exact month and immediately after when the policy was implemented for every state applicable. Table 11 illustrates the summary of these variables after the coding.

Table 11. Summary of Variables after the Data Was Collapsed

| Variable | Observations | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| state_num | 4176 | 27.98827 | 15.86902 | 1 | 55 |
| time | 4176 | 201347.5 | 183.9091 | 201010 | 201701 |
| mj_waiver | 4176 | 0.3670977 | 0.9130116 | 0 | 13 |
| tot_recruits | 4176 | 50.72366 | 70.60824 | 0 | 550 |
| med_legal | 4176 | 0.3721264 | 0.4834297 | 0 | 1 |
| rec_legal | 4176 | 0.0337644 | 0.1806437 | 0 | 1 |

## C. LIMITATIONS OF THE DATA

Data on conduct waivers is only archived by NRC for approximately six years. Therefore, data on conduct waivers requested from 1996 until 2010 was not collected for this study. The absence of these numbers does not allow to observe for the impact in consumption of marijuana of prospective recruits during the first fourteen years that medical cannabis was legalized in the U.S. However, data after 2010 is counted for. The non-observed year data only affects the following states: Alaska (99'), California (96'), Colorado (01'), Hawaii (00'), Maine (99'), Michigan (08'), Montana (04'), Nevada (01'), New Mexico (07'), Oregon (98'), Rhode Island (06'), Vermont (07'), and Washington (98').[2] Since recreational marijuana was first legalized in 2012, the full years-effect is available for analysis.

The data set only contains observations for enlisted active duty accessions into the U.S. Navy. In FY16, for example, the Navy recruited 30,986 enlisted sailors on active duty (NRC, 2017). Additionally, NRC does not archived data on individuals whose conduct waivers were not approved. This data set only reflects the individuals whose conduct waivers were approved and accessed into the Navy. Therefore, for those who requested a marijuana conduct waiver and it was not approved, although not being qualified, the total number for conduct waivers requested could not be captured by this study. This implies that the numbers of applicants interested in serving the U.S. Navy, who have previously self-admitted marijuana use are not accounted for. The importance

[2] Parentheses indicate the year that medical marijuana law was implemented.

of this information is that its availability would have provided a better estimate of consumption of marijuana in the civilian sector from those individuals who are inclined to join the service.

The possibility of measurement error cannot be ignored when analyzing the process of requesting a marijuana waiver. There is a chance that prospective recruits lie during the recruiting process about ever consuming marijuana, or about the amount of times it was consumed for fear of retribution. From a different perspective, a recruiter could also be the reason of inaccuracy of these numbers if the proper waiver process was obviated by the recruiter for improper work ethics.

## D. METHODOLOGY

This thesis analyzes the impact of legalization of marijuana at the state level on recruiting for the U.S. Navy, by measuring changes in the granting of marijuana conduct waivers by state and month of accession, before and after the policy was implemented. The analysis utilizes two main difference-in-difference models: the first model observes the impact of the policy implementation in states where medical and recreational marijuana has been legalized.

It looks at the nation-wide difference between the granting of marijuana waivers prior joining the military in all the states where marijuana has been legalized (treatment group), compared to those states where marijuana remains illegal (control group). The second model looks at the effect that these legalization policies have had on the total number of recruits for the U.S. Navy. The two models will vary by controlling for year fixed effects and state fixed effects.

A variable to identify if a marijuana policy is in place will characterize the difference between the treatment and the control group. The first model is represented by the following equation,

$$MW_{it} = \alpha + \beta ML_{it} + Time_t + State_i + \varepsilon_{it} \qquad (1)$$

where $MW_{it}$ is the total number of marijuana waivers in state *i* in year *t*. $ML_{it}$ is a binary indicator variable equal to 1 if marijuana is legalized in state *i* in year *t*, and 0 otherwise. The $ML_{it}$ variable in equation 1 represents either medical or recreational marijuana law, since the effect of both is observed separately on this study. $Time_t$ is the time effects from yearly dummy variables, $State_i$ is the individual state effects, and $\varepsilon_{it}$ is a white noise error term. $\beta$ is the coefficient of interest in this equation. If $\beta$ is less than zero, then the estimates indicate that marijuana legalization has a negative effect on the number of marijuana waivers. If $\beta$ is greater than zero, then the estimates indicate that marijuana legalization has a positive effect on the number of marijuana waivers.

The following three equations are variations of equation 1. Each model is analyzed with no controls for time and state fixed effects - represented in equation 2; controlling for time fixed effects only- represented in equation 3; controlling for state fixed effects only- represented in equation 4; and lastly, controlling for time and state fixed effects as described by the original model represented in equation 1.

$$MW_{it} = \alpha + \beta ML_{it} + \varepsilon_{it} \quad (2)$$

$$MW_{it} = \alpha + \beta ML_{it} + Time_t + \varepsilon_{it} \quad (3)$$

$$\mathrm{MW_{it}} = \alpha + \beta \mathrm{ML_{it}} + \mathrm{State_i} + \varepsilon_{it} \quad (4)$$

Equation 5 is similar to equation 1, except for a change in the outcome variable. The outcome variable, $R_{it}$ is the total number of total recruits in state *i* in year *t*. The rest of the variables in the right side of the equation remain the same.

$$R_{it} = \alpha + \beta ML_{it} + State_i + Time_t + \varepsilon_{it} \quad (5)$$

The three following equations are variations of equation 5. Each model is analyzed with no controls for time and state fixed effects—represented in equation 6; controlling for time fixed effects only—represented in equation 7; controlling for state

fixed effects only—represented in equation 8; and controlling for time and state fixed effects as described by the original model represented in equation 5.

$$R_{it} = \alpha + \beta ML_{it} + \varepsilon_{it} \quad (6)$$

$$R_{it} = \alpha + \beta ML_{it} + Time_t + \varepsilon_i \quad (7)$$

$$R_{it} = \alpha + \beta ML_{it} + State_i + \varepsilon_{it} \quad (8)$$

THIS PAGE INTENTIONALLY LEFT BLANK

# V. RESULTS

The data available was applied to the difference-in-difference models described in Chapter IV. In summary, there were 4,176 observations, representing the 50 states, and U.S. territories for each month from October 2012 until January 2017. The maximum number of marijuana conduct waivers granted in a month in any of the states or territories was 13, while the minimum was zero. The 13 marijuana conduct waivers pertained to California on February 2016. As for states with recreational marijuana laws, the maximum number of waivers granted was one in any applicable month. Consequently, the maximum number of recruits in a month during the observed period belongs as well to California in September 2013, with 550 recruits. Table 12 summarizes the variables' mean, standard deviation, minimum and maximum number of each.

Table 12. Summary of Variables

| Variable | Mean | Standard Deviation | Minimum | Maximum |
|---|---|---|---|---|
| Marijuana waiver | 0.3671 | 0.913 | 0 | 13 |
| Total recruits | 50.7237 | 70.608 | 0 | 550 |
| State with MML | 0.3721 | 0.4834 | 0 | 1 |
| State with recreational marijuana law | 0.1806 | 0.1806 | 0 | 1 |

## A. RATIO OF TOTAL RECRUITS AND MARIJUANA WAIVERS PER STATE

California, Texas and Florida, are the states that recruited more U.S. Navy candidates during the observed period for this analysis. During this time, California recruited 27,113 sailors, and granted 224 marijuana conduct waivers. This equals to a 1:121 ratio. The conduct waivers granted are for approved accession of individuals that self-admitted marijuana use 11 times or more. Texas followed with 23,203 recruits and 77 marijuana waivers: with a 1:301 ratio. The third state who provided more Navy recruits during this period was Florida with 16,360 sailors, and 229 marijuana waivers.

This represents a 1:71 ratio. Table 13 also shows that Oregon, a state with enacted MML and recreational marijuana laws, have a 1:34 ratio for marijuana waivers granted, being the state with the closer recruit-to-marijuana waiver ratio. Oregon was followed by North Dakota with a 1:49 ratio, then by Idaho and Alabama with a 1:59 ratio each.

Table 13. Ratio of Marijuana Waivers Granted and Total Number of Recruits per State from October 2010 to January 2017

| State | Total recruits | Marijuana waivers granted | Ratio |
|---|---|---|---|
| AK | 500 | 5 | 1 : 100 |
| AL | 3446 | 58 | 1 : 59 |
| AR | 1762 | 4 | 1 : 440 |
| AZ | 4946 | 16 | 1 : 309 |
| CA | 27113 | 224 | 1 : 121 |
| CO | 4087 | 52 | 1 : 79 |
| CT | 1798 | 8 | 1 : 224 |
| DC | 115 | 1 | 1 : 115 |
| DE | 464 | 1 | 1 : 464 |
| FL | 16360 | 229 | 1 : 71 |
| GA | 9267 | 80 | 1 : 116 |
| GU | 365 | 0 | 1 : 0 |
| HI | 1037 | 9 | 1 : 115 |
| IA | 1531 | 13 | 1 : 118 |
| ID | 1472 | 25 | 1 : 59 |
| IL | 7686 | 56 | 1 : 137 |
| IN | 3903 | 25 | 1 : 156 |
| KS | 1439 | 25 | 1 : 58 |
| KY | 2129 | 5 | 1 : 426 |
| LA | 3074 | 8 | 1 : 384 |
| MA | 2741 | 12 | 1 : 228 |
| MD | 4056 | 9 | 1 : 451 |
| ME | 833 | 15 | 1 : 56 |
| MI | 5922 | 38 | 1 : 156 |
| MN | 2205 | 28 | 1 : 79 |
| MO | 3942 | 56 | 1 : 70 |
| MS | 1796 | 7 | 1 : 256 |
| MT | 628 | 3 | 1 : 209 |
| NC | 6811 | 48 | 1 : 141 |

| State | Total recruits | Marijuana waivers granted | Ratio |
|---|---|---|---|
| ND | 147 | 3 | 1 : 49 |
| NE | 1070 | 16 | 1 : 67 |
| NH | 760 | 8 | 1 : 95 |
| NJ | 4421 | 18 | 1 : 246 |
| NM | 1103 | 10 | 1 : 110 |
| NV | 2105 | 11 | 1 : 191 |
| NY | 9836 | 36 | 1 : 273 |
| OH | 7572 | 27 | 1 : 280 |
| OK | 2624 | 8 | 1 : 328 |
| OR | 2792 | 82 | 1 : 34 |
| OT | 72 | 0 | 1 : 0 |
| PA | 7057 | 15 | 1 : 470 |
| PR | 790 | 9 | 1 : 88 |
| RI | 484 | 2 | 1 : 242 |
| SC | 3624 | 6 | 1 : 604 |
| SD | 392 | 1 | 1 : 392 |
| TN | 4960 | 35 | 1 : 142 |
| TX | 23203 | 77 | 1 : 301 |
| UT | 1337 | 10 | 1 : 134 |
| VA | 6675 | 41 | 1 : 162 |
| VI | 120 | 0 | 1 : 0 |
| VT | 218 | 1 | 1 : 218 |
| WA | 5022 | 33 | 1 : 152 |
| WI | 2967 | 15 | 1 : 198 |
| WV | 780 | 8 | 1 : 98 |
| WY | 283 | 1 | 1 : 283 |

## B. DEPENDENT VARIABLE: MARIJUANA CONDUCT WAIVERS

The difference-in-difference model in equation 1 was first utilized, with the binary variable *MLit* representing medical marijuana, to observe the policy effect of medical marijuana laws on the granting of conduct waivers. The first variation (equation 2) did not controlled for states or time fixed effects; it found that on average, states with MML grant .0292 more marijuana waivers that states with no MML. However, the result was not statistically significant at any reasonable level. The model

was then utilized controlling for state fixed effects (equation 3), and time fixed effects (equation 4), and a last model controlling for both: state and time fixed effects (equation 1). None of the coefficients were significant at any of the standard levels. Table 14 shows the results of each variation of the model.

Table 14. The Effect of Legalization of Medical Marijuana on the Granting of Marijuana Waivers during Accession to the U.S. Navy

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Marijuana legal | 0.0074 | 0.0292 | 0.0272 | 0.0213 |
| | (.0464) | (.030) | (.0296) | (.0408) |
| State Fixed Effects | Yes | No | No | Yes |
| Time Fixed Effects | Yes | No | Yes | No |
| Observations | 4176 | 4176 | 4176 | 4176 |

The symbols means that the coefficient are: * statistically significant at the 10 percent level, ** statistically significant at the five percent level, and *** statistically significant at the one percent level.

The same difference-in-difference model was then applied to states that legalized recreational marijuana, represented by the $ML_{it}$ variable. When controlling for state and time fixed effects, the model found that the number of conduct waivers granted in states that legalized recreational marijuana decreases by .2 in comparison with states where recreational marijuana remains illegal. The findings are significant at the five percent level of significance. Additionally, when controlling for state fixed effects, the number of conduct waivers granted also decreases by .2 in comparison with the non-legal states. The results were significant at the five percent level of significance as well. Table 15 shows these results.

Table 15. The Effect of Legalization of Recreational Marijuana on the Granting of Marijuana Waivers during Accession to the U.S. Navy

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Marijuana legal | -0.2017 | -0.0056 | 0.0150 | -0.2161 |
| | (.0886)** | (.0613) | (.0647) | (.0855)** |
| State Fixed Effects | Yes | No | No | Yes |
| Time Fixed Effects | Yes | No | Yes | No |
| Observations | 4176 | 4176 | 4176 | 4176 |

The symbols means that the coefficients are: * statistically significant at the 10 percent level, ** statistically significant at the five percent level, and *** statistically significant at the one percent level.

## C. DEPENDENT VARIABLE: TOTAL NUMBER OF RECRUITS

Lastly, a difference-in-difference model was employed to observe the effect of the implementation of medical marijuana policies in the United States on the total number of recruits. The model did not find any statistically significant results as shown in Table 16.

Table 16. The Effect of Legalization of Medical Marijuana on Total Numbers of Recruits for the U.S. Navy

| | (5) | (6) | (7) | (8) |
|---|---|---|---|---|
| Medical legal | .9307 | -3.5560 | -3.4918 | .0599 |
| | (1.5006) | (2.3688) | (2.4299) | (1.4015) |
| State Fixed Effects | Yes | No | No | Yes |
| Time Fixed Effects | Yes | No | Yes | No |
| Observations | 4176 | 4176 | 4176 | 4176 |

The symbols means that the coefficients are: * statistically significant at the 10 percent level, ** statistically significant at the five percent level, and *** statistically significant at the one percent level.

The model represented by equation 5 was employed again, but this time controlling for state fixed effects and time fixed effects for the policy treatment of recreational marijuana on the total number of recruits. The model found that for every state that legalized recreational marijuana, the total number of recruits per month increases by 4.8805 recruits in comparison with non-legal states, and it's significant at

the five percent level. When the model was employed with no controls, or controlling for state or time fixed effects, it did not find any statistically significant results. These results are presented in Table 17.

Table 17. The Effect of Legalization of Recreational Marijuana on the Total Number of Recruits for the U.S. Navy

| | (5) | (6) | (7) | (8) |
|---|---|---|---|---|
| Recreational legal | 4.8805** | -6.0411 | -5.0463 | 2.5866 |
| | (2.4155) | (5.7741) | (5.7772) | (2.3339) |
| State Fixed Effects | Yes | No | No | Yes |
| Time Fixed Effects | Yes | No | Yes | No |
| Observations | 4176 | 4176 | 4176 | 4176 |

The symbols means that the coefficients are: * statistically significant at the 10 percent level, ** statistically significant at the five percent level, and *** statistically significant at the one percent level.

## D. SUMMARY

The difference-in-difference models utilized in equation 1 did not provide any statistically significant results on the granting of conduct waivers in states where medical marijuana laws have been implemented. When the model was employed for states with recreational marijuana laws, the model found that the granting of marijuana waivers decreases by a total .2 waivers per month in states where recreational marijuana is legal. The result is only valid when controlling for state and time fixed effects altogether, and when controlling for state fixed effects only. These results were statistically significant at the five percent level.

The results of this analysis reflect that legalization of medical marijuana has not had a significant effect in recruiting, or in the granting of marijuana waivers. As described previously in Chapter II, medical marijuana is regulated by physicians; the sales and distribution are relatively strictly controlled and policies are implemented differently in every state. These might be some of the reason why the effect is not as significant as expected. It is also possible that in states where medical marijuana is legal,

the overall concept of marijuana is generally accepted as a medical resource rather than recreational.

However, when the effect of the policy implementation of recreational marijuana is observed, the granting of waivers decreases by .2 waivers per month in states where recreational marijuana is legal. This could indicate that as availability and acceptance increases in the civilian sector, individuals who smoke marijuana could be less inclined or less qualified to join the Navy. Recreational marijuana policies were legally implemented at the state level for the first time in 2014; the results suggest that the effect observed from the policies implemented in the past three years is mild. If recreational legalization continues to expand through the nation, the results could grow exponentially in the same direction, or shift to the other direction, however, it is too soon to tell.

Equation 5 was employed to observe the impact these laws might have on the total number of U.S. Navy recruits. The study found an increase of five recruits per month on average in states with recreational marijuana policies in comparison with states without marijuana policies. This result is statistically significant at the five percent level. There are multiple reasons outside the marijuana use factor that affects recruiting for the Navy, therefore, attributing the increment of monthly recruits to changes in marijuana policies would be an incomplete assumption. The coefficient, however, could indicate that the recruiting efforts in states with recreational marijuana laws are greater than in states with non-recreational marijuana laws. It could also mean that since the pro-recreational marijuana states are known to be more liberal than the rest, the segregation of personalities and lifestyle of marijuana users from non-marijuana users could help the recruiters identify those groups that are more inclined to join the Navy. Therefore, the analysis can conclude that, when utilizing the employed difference-in-difference model with the existent data: legalization of marijuana is not affecting recruiting for the Navy negatively.

THIS PAGE INTENTIONALLY LEFT BLANK

# VI. CONCLUSION AND RECOMMENDATIONS

## A. SUMMARY

This thesis explored the historical role of marijuana and the shifts in policies from the seventeenth century until the most recent changes in the United States. The background chapter emphasized the evolution of America's public opinion, which is associated with the replacement of the generations through time. It identified the U.S. population of young adults of 18 to 25 years old as the most vulnerable group with the highest marijuana consumption numbers. This same age group also represents the largest recruiting pool for the U. S. Navy.

The thesis continued to identify the military policies in place to deter and detect drug abuse among its service member. The continuous changes to improve drug detection were highlighted, indicating that the Navy has been up to date with the constant developments of new drugs and innovations of the drug industry. The DDRP, responsible for great part of this effort, has improved its efficiency by maintaining a below one percent positive drug testing results among service members. Another military policy highlighted was the Navy Recruiting Manual's change from 2008 to 2016. The changes reflect a decrease in rank in the authority to grant marijuana waivers and an increase in the times allowed to consume marijuana before requiring a pre-accession conduct waiver, which suggested a possible increase in requests for waivers from prospective recruits.

Chapter III, the literature review chapter, had three sections: the first looked at previous research that studied the impact of medical marijuana laws on consumption, and how consumption changed across states where the policies for possession, cultivation and distribution were implemented differently. The second section explored marijuana use before and after the military. The last section looked at previous studies that addressed the performance and attrition of Navy sailors with moral waivers. Even though these studies looked at sailors with moral waivers, none of them specified on the performance and attrition of sailors with marijuana conduct waiver exclusively.

Chapter IV introduced the data on conduct waivers and its source, as well as the methodology for the models employed. The analysis utilizes two main difference-in-difference models: the first model observed the impact of the marijuana implementation policies in states where medical and recreational marijuana has been legalized. The second model analyzed changes in recruiting numbers after marijuana policies were implemented. Both models were design to control for state and time fixed effects.

Chapter V presented the final results of this thesis. The first difference-in-difference model did not provide any statistically significant result on the granting of conduct waivers in states where medical marijuana laws have been implemented. When the model was employed for states with recreational marijuana laws, the model found that the granting of marijuana waivers decreases by a total .2 waivers per month in states where recreational marijuana is legal. An additional model that analyzed the effect of these policies on recruiting numbers for the Navy found an increase of five recruits per month on average in states with recreational marijuana policies in comparison with states without marijuana policies. All these results were statistically significant at the five percent level.

## B. CONCLUSION

The latest changes in the Navy's recruiting and anti-drug policies are clear indicators that marijuana (and synthetic marijuana) usage is increasing in society; legalization and the new developments of the industry are forcing the Navy to adapt to social trends. The models employed in this study captured a small and significant negative change in the approval of marijuana waivers requested after marijuana was legalized in the affected states, and a positive change in recruiting numbers post marijuana legalization.

This thesis commenced from a journey to answer the question of whether marijuana legalization is changing the attitude and behavior of individuals interested in joining the U.S. Navy. The thesis assumed that if the legalization trends continue the current path, nearby in the future marijuana could be legalized at the national level. If this is the case, what are the current trends indicating in respect to consumption, social

behavior and recruiting for the Navy? Are individuals who consume marijuana inclined to join the service? These questions were intended to be answered in the primary and secondary research questions.

### 1. Primary Research Question

> Has marijuana use increased among prospective U.S. Navy recruits, particularly since medical and recreational legalization policies were implemented in the affected states?

This question addresses the changes in the interest and tolerance that prospective recruits have towards marijuana after legalization. The results of this study did not find any statistically significant change in the granting of marijuana conduct waivers after medical marijuana policies were implemented in the affected states. However, when looking at changes in approved marijuana waivers for states with recreational marijuana policies, the study found that the number of approved marijuana waivers decreases by .2 waivers granted per month per state. This result is statistically significant in two occasions: when controlling for state fix effect only, and when controlling state and time fixed effects. As mentioned in Chapter V, this could indicate that as availability and acceptance increases in the civilian sector, individuals who smoke marijuana could be less inclined or less qualified to join the Navy. It could also indicate that with legalization, a clear segregation of marijuana users versus non users facilitates the recruiters an easy identification of the average prospective recruit.

These results do not represent the causal effect of changes in marijuana waivers granted after legalization took pace. There are two caveats to these results: first, individuals choose to self-admit pre-service marijuana usage, and the amount of time they used it. If an individual self-admit previous use of marijuana less than 11 times, a marijuana waiver is not required. This number was not measured or addressed in this study due to lack of existing documentation. Second, the data available on conduct waivers only included the approved waivers for individuals who accessed the U.S. Navy in the period observed. Data on the number of waivers requested and denied was not available since NRC does not archive this type of data. The inability to analyze this data represents a limitation for the study; this numbers would have provided a better insight of

the impact of the implementation of marijuana policies on individuals interested in joining the Navy, despite not being qualified. Additionally, recreational marijuana policies have only been implemented since 2014, therefore, there is not enough time to observe for the causal effect of legalization on society or recruiting, however, this limited time allows for a primary behavioral path to develop. Although, it is important to note that the aforementioned results are statistically significant, indicating that there is an effect and it should not be ignored.

The small decrease in waivers granted in states with recreational marijuana policies could also indicate that as recreational marijuana use is becoming more popular, the contrast between marijuana use and the military service becomes more distinguishable as well. As evidence to this statement, the second difference-in-difference model employed found that the numbers of recruits increased after recreational legalization policies were implemented. In the model, for the total number of recruits as the dependent variable there was only one statistically significant result; for every state that legalized recreational marijuana, the total number of recruits per month increases to five recruits per month per state in comparison with non-legal states, significant at the 5 percent level. Even though these results do not present a causal effect of recreational legalization on the numbers of recruits, these numbers indicate that legalization of marijuana is not affecting recruiting for the U.S. Navy in a negative manner.

### 2. Secondary Research Question

Will changes in marijuana acceptance, or pre-service use by recruits, be expected to affect the Navy's recruiting, enlistment screening, or personnel policies?

Chapter II presented clear evidence that the increase of marijuana use in the civilian sector and the development of new drugs are currently affecting the Navy's recruiting and drug testing policies. As marijuana tolerance and consumption increases in the United States population, the DOD continues to increment its efforts to detect and deter drugs abuse among prospective candidates and its Service members. According to Ferdinando's article (2017), "279,400 applicants are processed for entry into military service each year, with roughly 2,400 of them testing positive for drugs." This efforts

have shown the efficacy of the drug detection programs by maintaining the positive drug test under one percent as expected (OSD P&R, n.d.-a).

In February 2017, the DOD updated the instruction for the drug abuse testing program. Previously, new accessions were only tested for six drugs during the accession process into the service. The new instruction mandates new accessions to be tested with the same drug testing panel which military personnel gets tested. This panel includes 26 drugs, including the variations of synthetic marijuana. The U.S. Navy's Zero Tolerance policy remains unchangeable but strict and clear; as the marijuana industry continues to grow in the nation, the Navy is expected to stay up to date with these changes to maintain a drug-free environment.

Assuming that in the long term, marijuana becomes legal at the national level, consumption is expected to increase among the population as demonstrated by previous research. The DOD remains firm in maintain a drug-free environment. The results from the data available imply that the DOD policies in place to regulate the quality of recruits and the amount of waivers granted are providing the expected results for the Navy.

## C. RECOMMENDATIONS

### (1) Consider the possibility that marijuana legalization might occur at the national level sooner than later

The difference-in-difference model employed in this study suggests a small but significant decrease in marijuana waivers approved after recreational marijuana policies were implemented in the affected states. Despite the negative indications of consumption among prospective recruits, the Navy should consider evidence from the existing trends, which indicate that the use of marijuana will continue to increase among the population. The models of Oregon and Colorado have been slowly replicated across the nation in the last five years. Similar to the increment of pro-medical marijuana states after California voted to legalize marijuana in 1996. As the generations with a more liberal standing towards marijuana approach the ballots and replace the present generations, the common perception of marijuana as a harmful drug will continue to decay.

The debate of legalization of marijuana at the federal level might seem unreal at this stage. However, at some point in history issues like alcohol prohibition, equal opportunity or civil rights seemed unattainable as well. It was not until a majority in the population raised their voice and Congress changed the rules. Eventually the military responded to the national demand and within its own set of regulations, blended with society in most of the instances.

This thesis does not advocate for marijuana legalization or any particular stand. However, it intends to bring the question to the table, by presenting the current trends and providing recruiting numbers to contribute to the informed decision-making process of policies in the event that national legalization of marijuana becomes more plausible.

In the first difference in difference model from this thesis, medical marijuana did not show any significant effect on changes in conduct waivers after the policy being implemented for at least 20 years. Therefore, legalization of medical marijuana has not shown any measurable trend in the recruiting process for the Navy. Legalization at the national level could possibly imply (and be considered first) as marijuana use at the federal level for medical purposes exclusively. As previously explained in Chapter II, the cannabis plant also provides anti-inflammatory benefits without the psychoactive effects. One of the delays to the legalization process is the release of medically convenient results from clinical trials approved by the FDA. Upon FDA approval, marijuana could be allowed to be used medically without its psychoactive alterations if found beneficial for the service.

When individuals come from households and environments were marijuana is normally used, despite their motivation and performance, these individuals will see marijuana as something normal. This thesis exhorts policy-makers to consider legalization of marijuana as a possibility in the near future, doing so will help to identify and remediate the challenges at an early stage with a preventive approach, rather than treating its negative effects when it’s too late. The author of this thesis also understands that the high pace and dangerous environment of the military service requires individuals to be sober and alert for safety purposes. Before national level legalization takes place, this thesis recommends conducting a cost benefit analysis of the use of medical marijuana

for veterans, the use recreational marijuana during off-duty hours and the impact the marijuana use might have on safety in the workplace for the best interest of the Navy.

**(2) Consider the benefits of new innovations in the marijuana industry**

The U.S. Navy has maintained the positive drug test results relatively low, emphasizing on the efficacy of its drug testing program. However, as the industry continues to develop, new tools, edibles, intellectual property, and forms of marijuana will also continue to evolve. These new innovations will be made available to sailors in a form or another outside their working hours. This thesis recommends continuing training within the service members on the scope of the industry's development and how these particular inventions go against Navy's principles and regulations, in order to avoid separation from service for lack of knowledge.

On the contrary, some of these new tools might seem beneficial to the Navy. Chapter II introduced the marijuana breathalyzer, a similar object to the alcohol breathalyzer that is able to detect present marijuana consumption up to 5 nanograms. However, this tool is in testing phase by legal enforcement authorities in states where recreational marijuana is legal. As the thesis recommends the Navy to stay up to date with new inventions for marijuana use, it also recommends observing for detection tools. Assuming that the breathalyzer provides reliable results, if national legalization eventually occurs, the breathalyzer is an example of a tool to detect and control for drug abuse in the workplace. Even if marijuana remains illegal at the federal level, the breathalyzer could help detect marijuana use during working hours, especially when drug testing is random and does not necessarily happens daily, weekly, or sometimes even within months.

**(3) Observe for measurable changes**

Two primary indicators motivated this study: changes in the authority to grant conduct waivers reflected in the Navy Recruiting Manual, and improvements to the DOD drug testing panels throughout the years. If changes in military policies become stricter within the years, and legalization continues to expand in the United States, it is possible that new trends of availability, consumption and perception are developing. This thesis

recommends that if such changes continue to appear, a similar study should be realized in the upcoming years. It takes time to measure the true effect of social change and the effect of policy implementation. It is possible that the true effect of legalization of marijuana measured by marijuana waivers was not captured due to the time factor: perhaps it is too soon to see the full effect. Other patterns that can be taken in consideration are the number of attritions due to marijuana reasons, and if those happened in states with marijuana laws exist.

The Navy's medical field is encouraged to conduct surveys on the topic. These surveys should include questions that answer accessibility to marijuana and perception of harmfulness within service members, along with questions of marijuana use after being in the service. The results will provide a direct insight of how the policies at the state level are influencing the perception of service members in contrast with the training provided within the commands. The survey is recommended to be anonymous to avoid measurement error bias by lying for fear of disciplinary action. Another important variable that the survey should consider is the age; measuring the results by age will provide a better insight of generational trends in contrast with the rest of the U.S. population.

## D. FUTURE RESEARCH

As briefed throughout the thesis, the trends indicate that marijuana legalization will continue to expand throughout the nation. The results of this study indicated no effect from medical marijuana policies, but some effect post recreational marijuana policies were implemented in the affected states. In order to understand the importance of social trends at such an early stage in the legalization process, the author recommends further research on the following:

### (1) Marijuana waivers requested versus marijuana waivers approved

In the event that future research is considered on the subject, it should analyze the numbers of marijuana conduct waivers requested that were not approved prior joining the service, instead of just the approved waivers. This number will include observations of unqualified candidates, but would indicate if individuals who consume marijuana are

inclined to join the service. The results will provide a more accurate frame of pre-service marijuana use and legalization. If marijuana becomes legal at the national level, within the years, the exposure number is expected to increase. This thesis exclusively analyzed approved waivers from individuals that self-admitted marijuana use after a minimum amount of time as required by the relevant instruction on the year of accession into the Navy. This does not mean that the other accessions have never experimented with marijuana, or accounts for those who lied at the screening phase.

### (2) Performance and attrition of sailors with marijuana conduct waivers exclusively

As previously presented in Chapter III, previous studies have analyzed the performance and attrition of U.S. Navy sailors with conduct waivers. None of the studies aforementioned separated marijuana waivers from drug waivers. These studies provided an overview of the profile of sailors with conduct waiver, but did not specified on the quality of recruits who enter the service with marijuana conduct waivers.

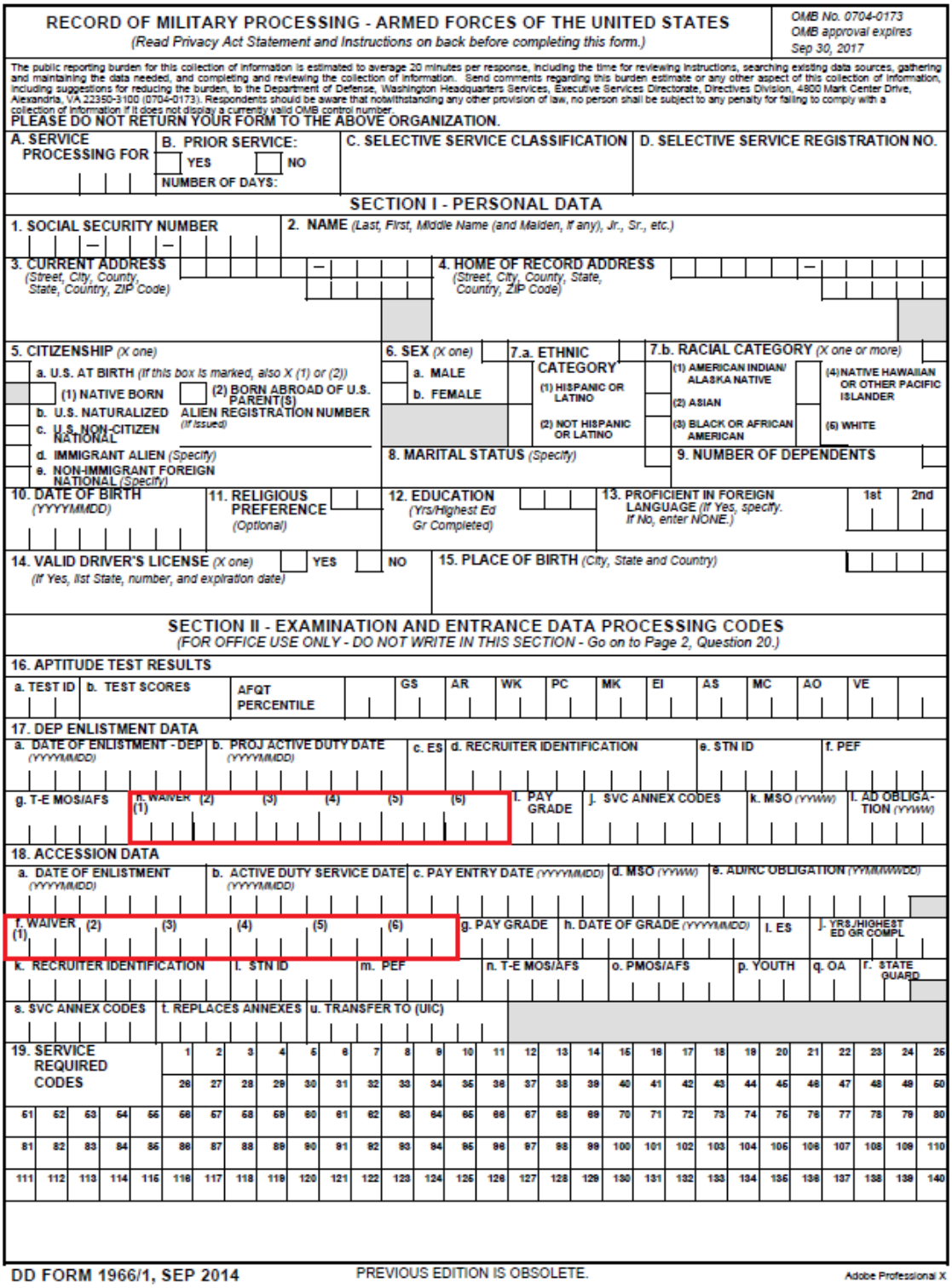
As legalization of marijuana continues to increase throughout the nation, previous studies suggest that the likelihood of consumption and availability will increase within the population of the affected states. Analyzing the characteristics and performance of pre-service marijuana users exclusively will provide better insight on the quality of these recruits. Raising the question could result in acknowledging that these individuals are either likely to be beneficial or detrimental to the Navy. The results could also contribute to improve the efficiency of the conduct waiver policy by aiding to identify and select better candidates.

Future research is also recommended in the analysis of attritions due to marijuana use. It is suggested that the study looks at attrition for marijuana reasons of those who entered the service with marijuana waivers, as well as those who did not entered with marijuana waivers. The results would provide an estimate of the honesty level of those who self-admit pre-service use of marijuana, those who lied about previous use, and those who decide to experiment after joining the service. The results would aid to observe for marijuana- specific behaviors and patterns inside the military service.

### (3) Marijuana use in the workplace

Research on the use and performance of marijuana in the workplace is recommended. The concept workplace in this section is used to identify work environments that allow marijuana use outside of working hours. As more states legalize medical and recreational marijuana, some organizations permit its use outside the working place and hours. Marijuana has been classified a schedule I drug since 1970. Since it recently became medically and recreationally legal in several states, and previous research was not authorized, this section recommends further research on the short and long term performance of regular marijuana users in the civilian sector. The results will help prognosticate the effect of marijuana consumption in the workplace. It will show if productivity either increases, decreases or does not gets affected. If federal regulations ever favor marijuana legalization, observing these trends at the early stage of legalization would provide the right guidance and informed decisions to policy-makers.

# APPENDIX A. DD FORM 1966



RECORD OF MILITARY PROCESSING - ARMED FORCES OF THE UNITED STATES

(Read Privacy Act Statement and Instructions on back before completing this form.)

OMB No. 0704-0173
OMB approval expires
Sep 30, 2017

The public reporting burden for this collection of information is estimated to average 20 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to the Department of Defense, Washington Headquarters Services, Executive Services Directorate, Directives Division, 4800 Mark Center Drive, Alexandria, VA 22350-3100 (0704-0173). Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ORGANIZATION.

A. SERVICE PROCESSING FOR

B. PRIOR SERVICE: YES NO
NUMBER OF DAYS:

C. SELECTIVE SERVICE CLASSIFICATION

D. SELECTIVE SERVICE REGISTRATION NO.

SECTION I - PERSONAL DATA

1. SOCIAL SECURITY NUMBER

2. NAME (Last, First, Middle Name (and Maiden, if any), Jr., Sr., etc.)

3. CURRENT ADDRESS (Street, City, County, State, Country, ZIP Code)

4. HOME OF RECORD ADDRESS (Street, City, County, State, Country, ZIP Code)

5. CITIZENSHIP (X one)
a. U.S. AT BIRTH (If this box is marked, also X (1) or (2))
(1) NATIVE BORN (2) BORN ABROAD OF U.S. PARENT(S)
b. U.S. NATURALIZED
c. U.S. NON-CITIZEN NATIONAL
ALIEN REGISTRATION NUMBER (If issued)
d. IMMIGRANT ALIEN (Specify)
e. NON-IMMIGRANT FOREIGN NATIONAL (Specify)

6. SEX (X one)
a. MALE
b. FEMALE

7.a. ETHNIC CATEGORY
(1) HISPANIC OR LATINO
(2) NOT HISPANIC OR LATINO

7.b. RACIAL CATEGORY (X one or more)
(1) AMERICAN INDIAN/ ALASKA NATIVE
(2) ASIAN
(3) BLACK OR AFRICAN AMERICAN
(4) NATIVE HAWAIIAN OR OTHER PACIFIC ISLANDER
(5) WHITE

8. MARITAL STATUS (Specify)

9. NUMBER OF DEPENDENTS

10. DATE OF BIRTH (YYYYMMDD)

11. RELIGIOUS PREFERENCE (Optional)

12. EDUCATION (Yrs/Highest Ed Gr Completed)

13. PROFICIENT IN FOREIGN LANGUAGE (If Yes, specify. If No, enter NONE.) 1st 2nd

14. VALID DRIVER'S LICENSE (X one) YES NO
(If Yes, list State, number, and expiration date)

15. PLACE OF BIRTH (City, State and Country)

SECTION II - EXAMINATION AND ENTRANCE DATA PROCESSING CODES

(FOR OFFICE USE ONLY - DO NOT WRITE IN THIS SECTION - Go on to Page 2, Question 20.)

16. APTITUDE TEST RESULTS

| a. TEST ID | b. TEST SCORES | AFQT PERCENTILE | GS | AR | WK | PC | MK | EI | AS | MC | AO | VE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | |

17. DEP ENLISTMENT DATA

| a. DATE OF ENLISTMENT - DEP (YYYYMMDD) | b. PROJ ACTIVE DUTY DATE (YYYYMMDD) | c. ES | d. RECRUITER IDENTIFICATION | e. STN ID | f. PEF |
|---|---|---|---|---|---|
| | | | | | |

| g. T-E MOS/AFS | h. WAIVER (1) | (2) | (3) | (4) | (5) | (6) | i. PAY GRADE | j. SVC ANNEX CODES | k. MSO (YYWW) | l. AD OBLIGATION (YYWW) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | |

18. ACCESSION DATA

| a. DATE OF ENLISTMENT (YYYYMMDD) | b. ACTIVE DUTY SERVICE DATE (YYYYMMDD) | c. PAY ENTRY DATE (YYYYMMDD) | d. MSO (YYWW) | e. ADJRC OBLIGATION (YYMMWWDD) |
|---|---|---|---|---|
| | | | | |

| f. WAIVER (1) | (2) | (3) | (4) | (5) | (6) | g. PAY GRADE | h. DATE OF GRADE (YYYYMMDD) | i. ES | j. YRS/HIGHEST ED GR COMPL |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |

| k. RECRUITER IDENTIFICATION | l. STN ID | m. PEF | n. T-E MOS/AFS | o. PMOS/AFS | p. YOUTH | q. OA | r. STATE GUARD |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

| s. SVC ANNEX CODES | t. REPLACES ANNEXES | u. TRANSFER TO (UIC) |
|---|---|---|
| | | |

19. SERVICE REQUIRED CODES

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
| 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 |
| 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 |

DD FORM 1966/1, SEP 2014 PREVIOUS EDITION IS OBSOLETE. Adobe Professional X

THIS PAGE INTENTIONALLY LEFT BLANK

# APPENDIX B. DOD ILLICIT DRUG TESTING PANEL 2012

| Drug Class | Cutoff Concentration nanograms/milliliter (ng/mL) |
|---|---|
| Amphetamines | 500 |
| Cannabinoids | 50 |
| Cocaine Metabolites | 150 |
| Designer Amphetamines | 500 |
| Opiates (Codeine/Morphine/Hydrocodone/Hydromorphone) | 300 |
| Heroin (6-monacetylmorphine (6AM)) | 10 |
| Opioids (Oxycodone/Oxymorphone) | 100 |

Confirmation Cutoff Concentrations

| Initial Presumptive Positive Test | Confirmation Drug/ Metabolite | Cutoff (ng/mL) | Reported Drug Use |
|---|---|---|---|
| Amphetamines | d-amphetamine | 100 | d-amphetamine |
| | d-methamphetamine | 100 | d-methamphetamine |
| Designer Amphetamines | Methylenedioxymethamphetamine | 500 | MDMA |
| | Methylenedioxyamphetamine | 500 | MDA |
| Cannabinoids | Tetrahydrocannabinol-carboxylic acid | 15 | THC |
| Cocaine Metabolite | Benzoylecgonine | 100 | Cocaine |
| Opiates (Opioids) | Morphine | 4,000 | Morphine |
| | Codeine | 2,000 | Codeine |
| | 6-monoacetylmorphine | 10 | Heroin |
| | Oxycodone | 100 | Oxycodone |
| | Oxymorphone | 100 | Oxymorphone |
| | Hydrocodone | 100 | Hydrocodone |
| | Hydromorphone | 100 | Hydromorphone |

THIS PAGE INTENTIONALLY LEFT BLANK

# APPENDIX C. DOD ILLICIT DRUG TESTING PANEL 2017

*Initial Screen Test Cutoff Concentrations*

| *Drug Class* | *Cutoff Concentration (ng/mL)* |
|---|---|
| *Amphetamines* | *500* |
| *Benzodiazapines* | *200* |
| *Cannabinoids (Marijuana)* | *50* |
| *Synthetic Cannabinoids* | *10* |
| *Cocaine Metabolites* | *150* |
| *Designer Amphetamines* | *500* |
| *Opiates (Morphine/Codeine)* | *2,000* |
| *Opioid (6-monoacetylmorphine)* | *10* |
| *Opioid (Oxycodone / Oxymorphone)* | *100* |
| *Opioid (Hydrocodone / Hydromorphone)* | *300* |

*Confirmation Cutoff Concentrations*

| *Initial Presumptive Positive Test* | *Confirmation Drug/Metabolite* | *Cutoff (ng/mL)* | *Reported Drug Use* |
|---|---|---|---|
| *Amphetamines* | *Amphetamine* | *100* | *d-Amphetamine* |
| | *Methamphetamine* | *100* | *d-Methamphetamine* |
| *Designer Amphetamines* | *Methylenedioxymethamphetamine* | *500* | *MDMA* |
| | *Methylenedioxyamphetamine* | *500* | *MDA* |
| *Benzodiazepines* | *Lorazepam* | *100* | *Lorazepam* |
| | *Nordiazepam* | *100* | *Nordiazepam* |
| | *Oxazepam* | *100* | *Oxazepam* |
| | *Temazepam* | *100* | *Temazepam* |
| | *α - hydroxy-alprazolam* | *100* | *α - hydroxy-alprazolam* |
| *Cannabinoids* | *Tetrahydrocannabinol-carboxylic acid* | *15* | *THC* |
| *Synthetic Cannabinoids* | *Synthetic Cannabinoid Compounds resulting in excretion of:* | | |
| | *JWH-018-N-pentanoic acid* | *1.0* | *SYCAN* |
| | *JWH-073-N-butanoic acid* | *1.0* | *SYCAN* |
| | *UR-144-N-pentanoic acid* | *1.0* | *SYCAN* |
| | *5-fluoro-PB22-3-carboxyindole* | *1.0* | *SYCAN* |
| | *MAM-2201-N-pentanoic acid* | *1.0* | *SYCAN* |
| | *AB-Chminaca metabolite* | *1.0* | *SYCAN* |
| | *AB-Fubinaca metabolite* | *1.0* | *SYCAN* |
| | *AB-Pinaca metabolite* | *1.0* | *SYCAN* |
| *Initial Presumptive Positive Test* | *Confirmation Drug/Metabolite* | *Cutoff (ng/mL)* | *Reported Drug Use* |
| *Cocaine Metabolites* | *Benzoylecgonine* | *100* | *Cocaine* |
| *Opiates* | *Morphine* | *4,000* | *Morphine* |
| *Codeine/Morphine* | *Codeine* | *2,000* | *Codeine* |
| *Heroin* | | | |
| *6-monacetylmorphine* | *6-monacetylmorphine* | *10* | *Heroin* |
| *Opioid* | | | |
| *Oxycodone/* | *Oxycodone* | *100* | *Oxycodone* |
| *Oxymorphone* | *Oxymorphone* | *100* | *Oxymorphone* |
| *Hydrocodone/* | *Hydrocodone* | *100* | *Hydrocodone* |
| *Hydromorphone* | *Hydromorphone* | *100* | *Hydromorphone* |

THIS PAGE INTENTIONALLY LEFT BLANK

# LIST OF REFERENCES


Agricultural Act, 7 USC § 590 (2014).

Anderson, D. M., Hansen, B. & Rees, D. I. (2014). *Medical marijuana laws and teen marijuana use*. Cambridge, MA: National Bureau of Economic Research. Retrieved from http://www.nber.org/papers/w20332.pdf

Armed Forces, 10 USC § 978 (2017).

Bachman, J. G., Freeman-Doan, P., O'Malley, P. M., Johnston, L. D., and Segal, D. R. (1999). Changing patterns of drug use among military recruits before and after enlistment. *American Journal of Public Health*, *89*(5), 672–677. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1508737/pdf/amjph00005-0032.pdf

Baker, Z. S. (2014). *Shifting drug policy: The politics of marijuana in the 21st century* (master's thesis). Retrieved from Calhoun http://calhoun.nps.edu/bitstream/handle/10945/41347/14Mar_Baker_Zathan.pdf?sequence=1&isAllowed=y.

Bebinger, M. (2016). No widely accepted way to test marijuana impairment in drivers. Retrieved from http://www.wbur.org/morningedition/2016/12/13/marijuana-driver-impairment-testing

Bender, J., Kiersz, A. & Rosen, A. (2014). Some states have much higher enlistment rates than others. Retrieved from http://www.businessinsider.com/us-military-is- not-representative-of-country-2014-7

Blake, D., & Finlaw, J. (2014). Marijuana legalization in Colorado: Learned lessons. *Harvard Law and Policy Review*, 8, 359–471. Retrieved from http://harvardlpr.com/wp-content/uploads/2014/08/HLP204.pdf

Blank, D. L, & Fenton, J. W. (1989*).* Early employment testing for marijuana: Demographic and employee retention patterns. In S. W. Gust & J. M. Walsh (Eds.), *Drugs in the workplace: Research and data evaluation* (pp. 139–150). Washington, DC: U.S. Government Printing Office. Retrieved from https://archives.drugabuse.gov/pdf/monographs/91.pdf#page=146

Bray, R. M., Marsden, M. E., and Peterson, M. R. (1991). Standardized comparison of the use of alcohol, drugs, and cigarettes among military personnel and civilians. *American Journal of Public Health*, *81*(7), 865–869. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1405176/pdf/amjph00207-0043.pdf

Bowers, R. W. (2015) *Pre-accession factors in the performance and retention of Hispanic enlistees* (master's thesis). Retrieved from Calhoun http://calhoun.nps.edu/bitstream/handle/10945/45164/15Mar_Bowers_Ryan.pdf?sequence=1&isAllowed=y

Caulkins, J. P., Kilmer, B., MacCoun, R. J., Pacula, R. L., & Reuter, P. (2010). *Altered state? Assessing how marijuana legalization in California could influence marijuana consumption and public budgets*. Santa Monica, CA: RAND.

Caulkins, J. P., Kilmer, B., Kleiman, M. A., MacCoun, R. J., Midgette, G., Oglesby, P., Pacula R. L., and Reuter, P. H. (2015). *Options and issues regarding marijuana legalization*. Santa Monica, CA: RAND. Retrieved from http://www.rand.org/pubs/perspectives/PE149.html

Caulkins, J. P., Kilmer, B., & Kleiman, M. A. (2016). *Marijuana legalization: What everyone needs to know* (Second Ed.). New York, NY: Oxford University Press.

Cerdá, M., Wall, M. M., Keyes, K. M., Galea, S. & Hasin, D. (2012). Medical marijuana laws in 50 states: Investigating the relationship between state legalization of medical marijuana use, abuse and dependence. *Drug and Alcohol Dependence, 120*(1-3), 22–27. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3251168/pdf/nihms-339685.pdf

Choo, E. K., Benz, M., Zaller, K. J., Warren, O., Rising, K. L. & N. McConnell. (2014). The impact of state medical marijuana legislation on adolescent marijuana use. *Journal of Adolescent Health*, *55*, 160-166. Retrieved from http://www.jahonline.org/article/S1054-139X(14)00107-4/pdf

Colorado Department of Transportation. (n.d.) Marijuana and driving. Retrieved March 7, 2017 from https://www.codot.gov/safety/alcohol-and-impaired-driving/druggeddriving/marijuana-and-driving

Department of Defense (DOD). (2012a). *Military personnel drug abuse testing program (MPDATP)* (DOD Instruction 1010.01). Washington, DC: Author. Retrieved from http://www.dtic.mil/whs/directives/corres/pdf/101001p.pdf

Department of Defense. (2012b). *Technical procedures for the military personnel drug abuse testing program (MPDATP*) Washington, DC: Author.

Department of Defense. (2014). *2014 demographics, profile of the military community*. Washington, DC: Office of the Deputy Assistant Secretary of Defense. Retrieved from http://download.militaryonesource.mil/12038/MOS/Reports/2014-Demographics-Report.pdf

Department of Defense. (2017). *Technical procedures for the military personnel drug abuse testing program (MPDATP*) incorporating change 1 (DODI 1010.16). Washington, DC: Author. Retrieved from http://www.dtic.mil/whs/directives/corres/pdf/101016p.pdf

Department of the Navy. (2009). *Navy alcohol and drug abuse prevention and control.* (OPNAVINST 5350.4D). Washington, DC: Author.

Department of the Navy. (2010). *Drug abuse zero tolerance policy and prohibition on possession of certain substances.* NAVADMIN 108/10. Washington, DC: Author. Retrieved from http://www.public.navy.mil/bupers-npc/reference/messages/Documents/NAVADMINS/NAV2010/NAV10108.txt

Department of the Navy. (2013). *Inclusion of synthetic cannabinoids to the standard drug testing panel-guidance.* (NAVADMIN 334/13). Washington, DC: Author. Retrieved from http://www.public.navy.mil/bupers-npc/reference/messages/Documents/NAVADMINS/NAV2013/NAV13334.txt

Donohue, J. J., Ewing, B., & Peloquin, D. (2011). *Rethinking America's illegal drug policy*. Cambridge, MA: National Bureau of Economic Research. Retrieved from http://www.nber.org/papers/w16776.pdf

Drug Enforcement Administration [DEA]. (n.d.). *Drug scheduling*. Retrieved March 3, 2017, from https://www.dea.gov/druginfo/ds.shtml

Drug Policy Alliance. (n.d.). A brief history on the drug war. Retrieved February 20, 2017, from http://www.drugpolicy.org/facts/new-solutions-drug-policy/brief-history-drug-war-0

Ferdinando, L. (2017). DOD implements expanded drug testing for military applicants. Retrieved from https://www.defense.gov/News/Article/Article/1108009/dod-implements-expanded-drug-testing-for-military-applicants

Food and Drug Administration. (2016). FDA and marijuana. Retrieved from http://www.fda.gov/NewsEvents/PublicHealthFocus/ucm421163.htm

Geiger, A. (2016). Support for marijuana legalization continues on the rise. Retrieved from http://www.pewresearch.org/fact-tank/2016/10/12/support-for-marijuana-legalization-continues-to-rise/

Golub, A. L., & Johnson, B. D (2001). *The rise of marijuana as the drug of choice among youthful adult arrestees*. Retrieved from https://www.ncjrs.gov/pdffiles1/nij/187490.pdf

Hall, L. D. (1999). *Analyzing success of Navy enlistees with moral waivers* (master's thesis). Retrieved from Calhoun http://calhoun.nps.edu/bitstream/handle/10945/13679/99Sep_Hall.pdf?sequence=1&isAllowed=y

History. (2010). 18th and 21st amendments. Retrieved from http://www.history.com/topics/18th-and-21st-amendments

Hound Labs. (n.d.) Marijuana breathalyzer technologies. Retrieved March 7, 2017, from http://houndlabs.com/

Huth, R. A. (2007). *The effect of moral waivers on the success of navy recruits* (master's thesis). Retrieved from Calhoun http://calhoun.nps.edu/bitstream/handle/10945/3287/07Sep_Huth.pdf?sequence=1&isAllowed=y

Ingraham, C. (2016). Gallup: Support for marijuana legalization surges to new highs. *The Washington Post*, October 19. Retrieved from https://www.washingtonpost.com/news/wonk/wp/2016/10/19/gallup-support-for-marijuana-legalization-surges-to-new-highs/?utm_term=.1a5dc638d1e4

Jemionek, J. F., Copley, C. L., Smith, M. L. & Past, M. R. (2008). Concentration distribution of the marijuana metabolite Delta9-tetrahydrocannabinol-9-carboxylic acid and the cocaine metabolite benzoylecgonine in the Department of Defense urine drug-testing program. *Journal of Analytical Toxicology*, *32*(6), 408–416.

Johnson, L. A., Johnson, R. L., Alfonso, C. (2011). Spice: A legal marijuana equivalent. *Military Medicine*, *176*(6), 718–720. Retrieved from http://militarymedicine.amsus.org/doi/pdf/10.7205/MILMED-D-10-00356

Johnston, L. D., O'Malley, P. M., Miech, R. A., Bachman, J. G., & Schulenberg, J. E. (2015). *Use of ecstasy, heroin, synthetic marijuana, alcohol, cigarettes declined among U.S. teens in 2015.* Ann Arbor, MI: University of Michigan. Retrieved from http://www.monitoringthefuture.org/pressreleases/15drugpr_complete.pdf

Johnston, L. D., O'Malley, P. M., Miech, R. A., Bachman, J. G., & Schulenberg, J. E. (2016). *Monitoring the Future national survey results on drug use, 1975–2015: Overview, key findings on adolescent drug use.* Ann Arbor, MI: Institute for Social Research, University of Michigan. Retrieved from http://www.monitoringthefuture.org/pubs/monographs/mtf-overview2015.pdf

Jones, L. A., Fedak, G. E. (2006). *A brief analysis of pre-service drug abuse waiver attrition*. Millington, TN: Bureau of Naval Personnel. Retrieved from http://oai.dtic.mil/oai/oai?verb=getRecord&metadataPrefix=html&identifier=ADA456783

Keiser Family Foundation. (2017). Population distribution by age. Retrieved from http://kff.org/other/state-indicator/distribution-by-age/?currentTimeframe=0&selectedDistributions=children-0-18--adults-19-25--adults-26-34--adults-35-54--adults-55-64--65-total&selectedRows=%7B%22wrapups%22:%7B%22united-states%22:%7B%7D%7D%7D#

Leaf Science. (n.d.). CB1 / CB2 receptors. Retrieved March 3, 2017, from http://www.leafscience.com/endocannabinoid-system/works/cb1-cb2-receptors/#tab-2

Library of Congress. (n.d.). Immigration. Retrieved March 3, 2017, from https://www.loc.gov/teachers/classroommaterials/presentationsandactivities/presentations/immigration/mexican4.html

Mandal, A. (2014). What are cannabinoids? Retrieved from: http://www.news-medical.net/health/What-are-Cannabinoids.aspx

Marion, N. E. (2014). *The medical marijuana maze: policy and politics.* Durham, NC: Carolina Academic Press.

Marion, N. E., & Hill, J. B. (2016). *Legalizing marijuana: A shift in policies across America*. Durham, NC: Carolina Academic Press.

Martin, T. (2015). Drug Testing Advisory Board meeting [Power Point slides]. Retrieved from https://www.samhsa.gov/sites/default/files/meeting/dod-drug-demand-reduction-martin.pdf

Monitoring the Future. (2016). *Monitoring the future, a continuing study of American youth*. Ann Arbor, MI: University of Michigan. Retrieved from http://www.monitoringthefuture.org/

National Institute on Drug Abuse [NIDA]. (2015). *Marijuana: facts for teens* (Revised May 2015 Ed.). Bethesda, MD: National Institute on Drug Abuse, National Institutes of Health. Retrieved from https://teens.drugabuse.gov/sites/default/files/mj_factsforteens.pdf

National Institute on Drug Abuse [NIDA]. (2016a). What is marijuana? Retrieved from https://www.drugabuse.gov/publications/drugfacts/marijuana

National Institute on Drug Abuse [NIDA]. (2016b). NIDA's role in providing marijuana for research. Retrieved from https://www.drugabuse.gov/drugs-abuse/marijuana/nidas-role-in-providing-marijuana-research

National Organization for the Reform of Marijuana Laws [NORML]. (n.d.-a). Marijuana law reform timeline. Retrieved March 3, 2017, from http://norml.org/shop/item/marijuana-law-reform-timeline

National Organization for the Reform of Marijuana Laws [NORML]. (n.d.-b). United States. Retrieved March 3, 2017, from http://norml.org/states

National Organization for the Reform of Marijuana Laws [NORML]. (2013). 25 years ago: DEA's own administrative law judge ruled cannabis should be reclassified under federal law. Retrieved from http://norml.org/news/2013/09/05/25-years-ago-dea-s-own-administrative-law-judge-ruled-cannabis-should-be-reclassified-under-federal-law

Navy Recruiting Command [NRC]. (2017). Navy recruiting facts and statistics. Retrieved from http://www.cnrc.navy.mil/pages-nrc-links/nrc-facts-stats.htm

Navy reports of 6 of 14 killed aboard Nimitz had used marijuana. (1981). *The New York Times*, June 19. Retrieved http://www.nytimes.com/1981/06/19/us/navy-reports-6-of-14-killed-aboard-nimitz-had-used-marijuana.html

Office of the National Drug and Control Policy. (2004). *The challenge in higher education: confronting and reducing substance abuse on campus*. Darby, PA: Diane Publishing. Retrieved from https://www.ncjrs.gov/ondcppubs/publications/pdf/challenge_higher_ed.pdf

Office of the Under Secretary for Personnel and Readiness. (n.d.-a). About the Drug Demand Reduction Program (DDRP). Retrieved March 3, 2017, from http://prhome.defense.gov/Military-Deputy/PRRO/DDRP/

Office of the Under Secretary for Personnel and Readiness [OSD P&R]. (n.d.-b). Military drug program historical timeline. Retrieved March 3, 2017, from http://prhome.defense.gov/Military-Deputy/PRRO/DDRP/Timeline/

Pacula, R. L., Grossman, M., Chaloupka, F. J., O'Malley, P. M., Johnston, L. D., Farrelly, M. C. (2000). *Marijuana and youth*. Cambridge, MA: National Bureau of Economic Research. Retrieved from http://www.nber.org/papers/w7703.pdf

Pacula R. L., Powell, D., Heaton, P. & Sevigny, E .L. (2015). Assessing the effects of medical marijuana laws on marijuana use: the devil is in the details. *Journal of Policy Analysis and Management, 34*(1) 7–31. Doi: 10.1002/pam.21804

Pollack, H. (2013). The most embarrassing graph in American drug policy. *The Washington Post*, May 29. Retrieved from https://www.washingtonpost.com/news/wonk/wp/2013/05/29/the-most-embarrassing-graph-in-american-drug-policy/?utm_term=.cc03005cc4b6

ProCon. (2016). 23 legal medical marijuana states and DC. Retrieved from http://medicalmarijuana.procon.org/view.resource.php?resourceID=000881

Reed, J. K., & Colorado Division of Criminal Justice Office of Research and Statistics. (2016). *Marijuana legalization in Colorado, early findings: A report pursuant to senate bill 13–283*. Denver, CO: Colorado Department of Public Safety, Division of Criminal Justice, Office of Research and Statistics. Retrieved from https://cdpsdocs.state.co.us/ors/docs/reports/2016-SB13-283-Rpt.pdf

Rothman, L. (2015). Here's what people called pot in the 1940s. *Time Magazine.* Retrieved from http://time.com/3815347/jazz-marijuana-history/

Saad, L. (2013). In U.S. 38% have tried marijuana, little changed since '80s. http://www.gallup.com/poll/163835/tried-marijuana-little-changed-80s.aspx

Substance Abuse and Mental Health Services Administration [SAMHSA] (2015). Results from the 2015 national survey on drug use and health: Detailed tables. [Data set tables 1.1A-1.16B]. Retrieved from https://www.samhsa.gov/data/sites/default/files/NSDUH-DetTabs-2015/NSDUH-DetTabs-2015/NSDUH-DetTabs-2015.htm#lotsect1pe

Substance Abuse and Mental Health Services Administration [SAMHSA]. (2016). Who are we? Retrieved from https://www.samhsa.gov/about-us/who-we-are.

Schwartz, R.H., Hayden, G.F. & Riddile, M. (1985*).* Laboratory detection of marijuana use. Experience with a photometric immunoassay to measure urinary cannabinoids. *American Journal of Diseases of Children* 139 (11) 1093–6. Retrieved from: https://www.ncbi.nlm.nih.gov/pubmed/3904404

Swift, A. (2013). For first time, Americans favor legalizing marijuana. Retrieved from http://www.gallup.com/poll/165539/first-time-americans-favor-legalizing-marijuana.aspx

Uniform Code of Military Justice, 10 USC § 912a. Article 112a (2017).

United States Census Bureau. (2015). Voting and registration in the elections of 2014. (U.S. Census Bureau report number P20-577). Retrieved from https://www.census.gov/data/tables/time-series/demo/voting-and-registration/p20-577.html

United States Navy [U. S. Navy]. (2008). *Navy recruiting manual: Enlisted (CRUITMAN-ENL 1130.8H).* Millington, TN: Navy Recruiting Command.

United States Navy [U. S. Navy]. (2011). *Navy recruiting manual: Enlisted* (CRUITMAN-ENL 1130.8J). Millington, TN: Navy Recruiting Command.

United States Navy [U. S. Navy]. (2016). *Navy recruiting manual: Enlisted* (CRUITMAN-ENL 1130.8K). Millington, TN: Navy Recruiting Command.

United States Office of National Drug Control Policy. (2008). *Marijuana*. Washington, DC: Office of National Drug Control Policy, Executive Office of the President. Retrieved from https://www.ncjrs.gov/pdffiles1/ondcp/221371.pdf

United States Office of National Drug Control Policy. (2010). *What Americans need to know about marijuana*: *important facts about our nation's most misunderstood illegal drug* [Fact sheet]. Washington, DC: Executive Office of the President of the U.S., Office of National Drug Control Policy. Retrieved from https://www.ncjrs.gov/ondcppubs/publications/pdf/mj_rev.pdf

Walker, J. (2014). *After legalization: Understanding the future of marijuana policy in America.* Washington D.C.: FDL Writers Foundation

Wall, M. M., Ernest, P., Cerdá, M., Keyes, K. M., Galea, S. & Hasin, D.S. (2011). Adolescent marijuana use from 2002–2008: higher in states with medical marijuana laws, cause still unclear. *National Institute of Health: Annals of Epidemiology*, *21*(9) 714–716. Retrieved from http://www.annalsof epidemiology.org/article/S1047-2797(11)00178-5/pdf

# INITIAL DISTRIBUTION LIST

1. Defense Technical Information Center
   Ft. Belvoir, Virginia

2. Dudley Knox Library
   Naval Postgraduate School
   Monterey, California