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MONTEREY, CALIFORNIA

THESIS

**WHEN IS IT OKAY TO BE HIGH?
A GUIDE FOR LAW ENFORCEMENT OFF-DUTY USE
OF CANNABIS**

by

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March 2022

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A GUIDE FOR LAW ENFORCEMENT OFF-DUTY USE OF CANNABIS**

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ABSTRACT

This thesis explores policy options for allowing off-duty law enforcement to use cannabis, considering the potential decriminalization and legalization of recreational cannabis use and the high stress levels of first responders. Utilizing Bardach and Patashnik's eight-step method, this thesis discusses the mental and physical health problems that law enforcement officers face and then provides research on cannabis to determine whether cannabis could be a useful tool in curbing the stress of this occupation. Finally, policies on recreational use for other occupations and a sample from Canada are examined. Research shows that stress levels in the law enforcement occupation cause substantial mental and physical ailments for officers. Moreover, for those retired or outside law enforcement, cannabis has been used as treatment for some of these conditions. This thesis finds that given the potential of federal legalization, fit-for-duty policies that allow recreational, off-duty use are powerful and beneficial tools to mitigate stress-related ailments.

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LIST OF ACRONYMS AND ABBREVIATIONS

BAC	blood alcohol content
CBD	cannabidiol
PBT	portable breathalyzer testing
PTSD	post-traumatic stress disorder
SFST	Standardized Field Sobriety Testing
THC	tetrahydrocannabinol

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EXECUTIVE SUMMARY

The inevitability of police officer stress highlights the need for options to manage it. Given the health benefits of cannabis and increasing support for its legalized recreational use, gridlocking policy at a complete restriction of off-duty use will not be beneficial. The complexity of stress for law enforcement stems from multiple sources that compound one another. While organizational factors could improve some of the sources of stress, these changes would take long-term planning and execution. Additionally, stressors that are unique to law enforcement are growing constantly and taking a toll on the health of law enforcement personnel.

While first responders have unique operational stressors, they, too, experience stressors at the organizational level similar to other professions, and sometimes these pressures even supersede the risk to life and limb as a cause of stress. In addition to these stressors, law enforcement is affected by the public climate and sentiment, which are constantly shifting in favor of or against law enforcement as a whole.¹ Furthermore, efforts to lower police budgets hurt officers and cause added stress. Budget cuts lead to a lack of resources—including updated equipment, training, community policing/prevention, and competitive wages—for law enforcement.² Budget gaps ultimately lead to police departments' being unprepared to respond to any situation, which causes stress.³

In addition to organizational sources of stress, there are unique operational stressors related to the first responder field. These unique stressors include shift work, high-risk situations, and ever-growing public scrutiny. Shift work takes a toll in that police officers serve around the clock, straining sleep patterns and increasing fatigue.⁴ High-risk situations

¹ Donald R. McCreary, Ivy Fong, and Dianne L. Groll, "Measuring Policing Stress Meaningfully: Establishing Norms and Cut-Off Values for the Operational and Organizational Police Stress Questionnaires," *Police Practice and Research* 18, no. 6 (2017): 619, <https://doi.org/10.1080/15614263.2017.1363965>.

² Peter Finn and Julie E. Tomz, *Developing a Law Enforcement Stress Program for Officers and Their Families* (Washington, DC: Department of Justice, 1997), 6–7.

³ Finn and Tomz, 8.

⁴ "Officer Work Hours, Stress and Fatigue," National Institute of Justice, July 31, 2012, <http://nij.ojp.gov/topics/articles/officer-work-hours-stress-and-fatigue>.

present consistent exposure to deadly or potentially deadly situations, which also instill fear and ultimately the inability to relax, which can cause sleeplessness and anxiety, among other mental and physical health issues.

All these stressors affect the bodies and minds of police officers and other first responders. According to research conducted by the Ruderman Family Foundation, rates of depression and post-traumatic stress disorder were far more prominent in law enforcement officers than among the general public.⁵ Physical impacts of fatigue caused by lack of sleep include reduced hand–eye coordination, weight gain, body pain, restlessness, gastrointestinal issues, and cardiovascular problems.⁶

Physical and mental health issues are often accompanied by substance abuse as a way to cope with pain, stress, and sleeplessness. In an effort to find relief from the high stress levels, law enforcement officers often utilize alcohol and prescription medications to mask mental and physical health–related issues.⁷ Substance abuse can be traced to stress from public safety careers, leading to a downward spiral from substance dependence that either alleviates or creates mental health issues. Given the recent increase in suicides among law enforcement, officers need stress-relief measures to better cope with daily pressures. The recreational use of alcohol and abuse of prescribed pain medications have proven to be problematic. Treatment options need to offer some therapeutic value for a variety of physical and psychological conditions but, at the same time, must not create unreasonable risk.

The historical use of cannabis throughout the world for its wide range of therapeutic effects far surpasses historical use of any other herbs or recreational substances such as alcohol, which has mixed historical uses for pain relief and anesthesia. More recently, cannabis has been used to assist with anxiety disorders and pain relief for issues such as

⁵ Miriam Heyman, Jeff Dill, and Robert Douglas, *The Ruderman White Paper on Mental Health and Suicide of First Responders* (Newton, MA: Ruderman Family Foundation, 2018), 12.

⁶ National Institute of Justice, “Officer Work Hours, Stress and Fatigue.”

⁷ “Substance Abuse among Police,” American Addiction Centers, December 6, 2021, <https://americanaddictioncenters.org/police>.

back pain, an ailment common to those in first responder careers.⁸ However, cannabis can affect both motor and psychomotor skills, cause short-term memory loss, and temporarily affect neurotransmitters involved in thinking, concentration, and coordination.⁹

Ultimately, as found in this thesis, cannabis is an extremely useful substance in the treatment of many conditions that effect law enforcement officers through physical and psychological injury. Cannabis does impact cognitive functions such as decision-making and memory, which can ultimately lead to accidental injuries or death. To this notion, alcohol impacts the brain similarly, and like cannabis, its effects are typically temporary, thus rendering use of both of these intoxicants viable only if they are used recreationally or under the supervision of a medical professional—and not while on duty. Such utility suggests the inclusion of cannabis in the arsenal of tools available for medical practitioners and its recognition as a viable option as a recreational substance—which obviously presents the need for a strategy built on proactive thinking about a potential shift to legalization.

With the future in mind, agencies would be wise to employ strategic planning in regard to employee issues surrounding legalized cannabis use, given the increase in laws permitting recreational use at the state level and the push for federal legalization. In the 2018 annual crime report published by the U.S. Army, tetrahydrocannabinol (THC) accounted for 68 percent of positive drug tests among service members.¹⁰ This report explains that even the U.S. Army has seen a rise in cannabis use in states that have legalized its recreational consumption. Some other occupations allow recreational cannabis use so long as employees are not intoxicated while working; however, there is no explicit allowance measure for THC levels. For example, the blood alcohol content (BAC) limit for airline pilots is .04 percent, which is half the typical legal driving limit (.08 percent) in

⁸ Philip Robson, “Therapeutic Aspects of Cannabis and Cannabinoids,” *British Journal of Psychiatry* 178, no. 2 (February 2001): 107–15, <https://doi.org/10.1192/bjp.178.2.107>.

⁹ “Prescription Opioids DrugFacts,” National Institute on Drug Abuse, June 2021, <https://www.drugabuse.gov/publications/drugfacts/prescription-opioids>.

¹⁰ Office of the Provost Marshal General, *FY2018 Army Crime Report* (Washington, DC: U.S. Army, 2019), <https://www.documentcloud.org/documents/6523607-FY2018ArmyCrimeReport-Copy.html>.

most states.¹¹ It is reasonable to assume that since low levels of alcohol in the blood are tolerated in these professional contexts, the increasing legalization of cannabis will also need to be considered, especially given its therapeutic value.

Unlike the U.S. military, the Canadian Armed Forces can freely consume cannabis while off duty.¹² The policies of Canada's National Defense provide strict guidelines as to acceptable circumstances for cannabis use.¹³ Moreover, the legalization of cannabis at the federal level allows police officers to consume cannabis while off duty, as with alcohol. Indeed, Canadian officers abide by what is called a "fit for duty" policy, which means that officers cannot be intoxicated while on duty.¹⁴ This policy allows supervisors to send an officer home if he or she appears to be intoxicated. The fit-for-duty provision is absolute and also applies to medical need.

One of the main issues that arises during legalization discussions is the lack of a numerical value for THC in the blood to indicate a level of intoxication. This level is especially important because THC can stay in the body for days or weeks, unlike alcohol, which is metabolized and flushed at a rate of approximately .015 per hour.¹⁵ This rate becomes a concern when officers or employees either are tested randomly or exhibit possible intoxication indicators, and the current level of intoxication must be distinguished from residual signs of past use. In 2005, an expert international panel on driving under the influence of cannabis published its collective findings—including the conclusion that the

¹¹ "Alcohol, the Pilot, and the FAA," Aviation Medical Services, accessed August 27, 2020, <http://www.airspacedoc.com/alcohol-the-pilot-and-the-faa/>.

¹² Canadian Department of National Defence, *Use of Cannabis by CAF Members*, DAOD 9004-1 (Ottawa: Canadian Department of National Defence, 2019), <https://www.canada.ca/en/department-national-defence/corporate/policies-standards/defence-administrative-orders-directives/9000-series/9004/9004-1-use-cannabis-caf-members.html#pbosc>.

¹³ Canadian Department of National Defence.

¹⁴ "Marijuana OK'd for Off-Duty Canadian Cops," PoliceOne, October 10, 2018, <https://www.policeone.com/canada/articles/marijuana-okd-for-off-duty-canadian-cops-y0nN7LDj0G6kkMUG/>.

¹⁵ "Alcohol Metabolism," Bowling Green State University, accessed January 19, 2022, <https://www.bgsu.edu/recwell/wellness-connection/alcohol-education/alcohol-metabolism.html>.

effects of cannabis on driving subside within four hours of ingesting through smoking.¹⁶ The report likens a .04 percent BAC to 4 ng/mL of THC.¹⁷ The panel recommends a per se limit of 7–10 ng/mL when measuring blood serum or plasma or 3.5–5 ng/mL when measuring whole blood. Consideration must be given for chronic users who normally have 0–2 ng/mL of THC at any given time because these users are not currently intoxicated at such levels.¹⁸

Like the general population, police officers also turn to recreational use of intoxicants such as alcohol to decompress after a long day or as a way to bond in a social setting with work friends. Another thing that distinguishes the general population from law enforcement personnel is the public's ability and law enforcement's inability to use cannabis recreationally. While cannabis, the second-most-used intoxicant, has a therapeutic value in addition to its intoxication effects, alcohol, the most-used intoxicant, does not. This disparity in intoxicant use and the therapeutic benefits should be considered when creating cannabis-use policies. As such, fit-for-duty policies allow for the therapeutic benefits of recreational cannabis use but do not allow for intoxication while on duty from any intoxicant.

¹⁶ Franjo Grotenhermen et al., *Developing Science-Based Per Se Limits for Driving under the Influence of Cannabis (DUI): Findings and Recommendations by an Expert Panel* (Semantic Scholar, 2005), <https://www.semanticscholar.org/paper/Developing-Science-Based-Per-Se-Limits-for-Driving-Grotenhermen-Leson/785622b64cd2d9b662596f5564ae70afac6bceee>.

¹⁷ Franjo Grotenhermen et al., “Developing Limits for Driving under Cannabis,” *Addiction* 102, no. 12 (December 2007): 6, <https://doi.org/10.1111/j.1360-0443.2007.02009.x>.

¹⁸ Grotenhermen et al., “Developing Limits for Driving under Cannabis.”

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I. INTRODUCTION

Although cannabis has successfully ameliorated conditions and symptoms commonly experienced by law enforcement officers, its use remains illegal at the federal level and prohibited both recreationally and therapeutically for government personnel even in states where its use has otherwise been legalized. Although some states have legalized recreational marijuana, first responders, including law enforcement professionals, are prohibited from its use.¹ Like the U.S. military, law enforcement agencies are facing declining recruitment and considering easing past marijuana usage policies, which limited recruitment of those who have used cannabis, to hire the necessary personnel.² Given marijuana's increasingly compelling track record as a therapeutic substance in both medical and recreational contexts, the United States may be moving toward legalization at the federal level. This authorization, in turn, will require the consideration of cannabis's therapeutic value in determining policies and regulations for law enforcement's appropriate use of cannabis recreationally.

In considering this policy shift, policymakers must understand that law enforcement is a stressful and dangerous profession, which ultimately affects officers both physically and mentally. Officers witness abuse, violence, and tragic crime scenes; endure grueling shifts and physical and internal stressors; and interact with a public that is increasingly critical and distrustful of them, all the while putting their lives on the line to protect the communities they serve. The actions of a small number of police officers have cast the entire occupation in a negative light, causing protests and a lobbying effort to empower civilian authority to oversee police forces. Reactions have not been limited to

¹ "Recreational Marijuana Legality by State," Britannica ProCon, March 2, 2022, <https://marijuana.procon.org/legal-recreational-marijuana-states-and-dc/>. As of this writing, 18 states—Alaska, Arizona, California, Colorado, Connecticut, Illinois, Maine, Massachusetts, Michigan, Montana, Nevada, New Jersey, New Mexico, New York, Oregon, Vermont, Virginia and Washington—have legalized recreational cannabis use.

² Tom Vanden Brook, "Army Is Accepting More Low-Quality Recruits, Giving Waivers for Marijuana to Hit Targets," *USA Today*, October 11, 2017, <https://www.usatoday.com/story/news/politics/2017/10/10/army-accepting-more-low-quality-recruits-giving-waivers-marijuana-hit-targets/750844001/>.

peaceful protest and lobbying, so when discontent spirals into rioting and looting, police officers themselves are tasked with restoring order.

Unfortunately, these stressors have led to many suicides and, at times, abuse of alcohol and prescription medication among law enforcement. In 2017 alone, 140 police officers committed suicide because of mental illnesses including depression, post-traumatic stress disorder (PTSD), and other stress-induced conditions.³ In 2019, this number increased to 238 police officers.⁴ This trend has caused a decrease in morale among police officers, which in turn has impaired their effectiveness in performing day-to-day duties and impacted their lives while off duty.⁵ For instance, mental and physical fatigue, which usually occurs with rotating shifts, in addition to the noted stressors, has led to a rise in divorce and suicide rates in law enforcement.⁶ Thus, an already stressful work environment, coupled with the onset of recent lobbying, threatens law enforcement with an increase in both physical and mental health issues.

For civilians, turning to cannabis for relief from stress is a viable option in states where use is legal; otherwise, many use it illicitly. In other contexts, cannabis has been used as medicine for conditions such as chronic pain and insomnia, which police officers often face during their careers.⁷ Likewise, doctors often prescribe cannabis to retired police officers and military veterans for a wide range of ailments including pain and stress management, PTSD treatment, and other work-related illnesses.⁸ A study by Paul Smith et al. on a group of veteran military and police patients suffering from PTSD showed

³ Miriam Heyman, Jeff Dill, and Robert Douglas, *The Ruderman White Paper on Mental Health and Suicide of First Responders* (Newton, MA: Ruderman Family Foundation, 2018).

⁴ “The Numbers: Officer Suicide Statistics,” Blue H.E.L.P., accessed May 1, 2021, <https://bluehelp.org/the-numbers/>.

⁵ Doug Wyllie, “P1 Research: De-policing and Police Morale Are Troubling Trends Post-Ferguson and Dallas,” PoliceOne, April 23, 2017, <https://www.policeone.com/major-event-impact/articles/p1-research-de-policing-and-police-morale-are-troubling-trends-post-ferguson-and-dallas-2wJWLl6xD5Ntlkfz/>.

⁶ Heyman, Dill, and Douglas, *The Ruderman White Paper*.

⁷ Peter Grinspoon, “Medical Marijuana,” *Harvard Health Blog*, January 15, 2018, <https://www.health.harvard.edu/blog/medical-marijuana-2018011513085>.

⁸ Paul A. Smith et al., “Medical Cannabis Use in Military and Police Veterans Diagnosed with Post-Traumatic Stress Disorder (PTSD),” *Journal of Pain Management* 10, no. 4 (2017): 397–405.

examples of such use.⁹ This study concluded that 59 percent of patients using cannabis experienced a lessening of PTSD symptoms and a 50 percent drop in the use of psychological medications administered for the same symptoms. The study further reported a 65 percent improvement in marital and family life.¹⁰ Given the use of cannabis in PTSD treatment, a possible option is presented for the reduction of stress-related ailments and for first responders.

A. RESEARCH QUESTIONS

1. Should cannabis become federally legalized, how should the potential benefits of cannabis for law enforcement inform development of policy affecting off-duty use?
2. If policy does not effectively prohibit cannabis use for law enforcement, how should agencies craft policy related to off-duty cannabis use that ensures officers are fit for duty?

B. LITERATURE REVIEW

This literature review explores the scholarly debates on the effects and implications of marijuana use in lowering stress levels, addressing mental health issues, and increasing or decreasing substance abuse. Although scant literature exists on the use of recreational marijuana by first responders, some literature discusses the effects of this drug's use on other groups such as military and police veterans, patients with anxiety disorders, and those suffering from PTSD.

Most research in this realm regards cannabis as a gateway drug that causes many negative impacts on mental health, which explains why so many government agencies maintain a conservative stance on cannabis use.¹¹ However, this research appears to have been conducted before people were diagnosed with mental health problems or their stress

⁹ Smith et al.

¹⁰ Smith et al.

¹¹ Varuni Asanka de Silva, Nicholas Jayasekera, and Raveen Hanwella, "Cannabis Use among Navy Personnel in Sri Lanka: A Cross Sectional Study," *BMC Research Notes* 9, no. 174 (2016), <https://doi.org/10.1186/s13104-016-1988-4>.

levels assessed and proper medical marijuana use considered. For example, Schaub explains that marijuana can lead to negative cognitive effects and increases the likelihood of other drug use later in life.¹² Goldenberg's work, cited by Schaub, finds that marijuana use can lead to increased risk of suicide and depression.¹³ The World Health Organization supports this conclusion in stating that repeated use can lead to dependency and other negative effects such as cognitive impairment, mental health disorders, and suicidal ideation.¹⁴ This work concludes that marijuana has ill effects on cognition and mental health but does not consider the possible therapeutic benefits.

However, because people with underlying psychological disorders have a higher incidence of nonmedical cannabis dependence, their representation may have skewed the findings and created the perception of harm.¹⁵ By the same token, studies also suggest that individuals with anxiety, attention-deficit/hyperactivity disorder, and other psychiatric conditions have a higher rate of nonmedical cannabis dependence.¹⁶ The World Health Organization, for example, posits that nonmedical use might be due to undiagnosed mental health issues or might be a treatment in itself for these problems.¹⁷ In these ways, people with psychological disorders may be driven to use cannabis and, thus, more apt to become dependent on it than the normal population.

In contrast, other scholars and subject-matter experts argue that when used therapeutically, cannabis can be beneficial to mental and physical health. In this regard, Daniel Rees at the University of Denver has found that marijuana legalization has

¹² Michael P. Schaub, "Legal Weed: A Lifesaver?" (master's thesis, Naval Postgraduate School, 2019), 83, <http://hdl.handle.net/10945/62290>.

¹³ Sol Goldenberg, "Decriminalization of Marijuana: Gateway to Substance Abuse?," *AMT Events* 34, no. 1 (March 2017): 4.

¹⁴ Wayne Hall, Maria Renstrom, and Vladimir Poznyak, eds., *The Health and Social Effects of Nonmedical Cannabis Use* (Geneva: World Health Organization, 2016), https://www.who.int/substance_abuse/publications/msbcannabis.pdf.

¹⁵ Mark Anderson, Daniel I. Rees, and Joseph J. Sabia, *High on Life? Medical Marijuana Laws and Suicide*, IZA DP No. 6280 (Bonn, Germany: Institute for the Study of Labor, 2012), 1–2, <http://ftp.iza.org/dp6280.pdf>.

¹⁶ Hall, Renstrom, and Poznyak, *Effects of Nonmedical Cannabis Use*, 4–5.

¹⁷ Hall, Renstrom, and Poznyak.

correlated with a 5–9 percent reduction in suicide rates for ages 20–39.¹⁸ Similarly, in analyzing data from the Centers for Disease Control and Prevention, Anderson et al. conclude that medical marijuana has led to improvements in mental well-being in younger individuals, which have resulted in fewer suicides.¹⁹ Thus, some correlational evidence seems to contradict the argument that cannabis harms mental health and causes other negative effects.

Many people who support the use of cannabis do so because some studies have promoted its use for pain and certain mental health conditions. For example, a cross-sectional study by Corroon et al. reveals that substituting cannabis for prescription medications is most common in individuals experiencing pain, anxiety, and depression.²⁰ Studies conducted by Smith et al. have also shown that first responders and military personnel who use medical cannabis significantly reduce their use of prescription medication for anxiety disorders.²¹ The Corroon et al. study consisted of a survey of 2,774 individuals who reported using cannabis within the last 90 days. Of this number, 46 percent used cannabis as a substitute for prescription drugs including narcotics/opioids (pain management), anxiolytics/benzodiazepines (anxiety management), and anti-depressants.²² These studies validate the use of cannabis as a prescription substitute.

Studies suggest that cannabis is effective at treating anxiety-related ailments. For example, Dawson’s clinical research suggests that traditional treatment is not always effective for military and police veterans who have been exposed to traumatic events, but medicinal cannabis might be a successful alternative treatment for PTSD or assist in reducing suicide risk.²³ Smith et al. find that patients with PTSD are more likely to seek

¹⁸ Anderson, Rees, and Sabia, *High on Life? Medical Marijuana Laws and Suicide*.

¹⁹ Anderson, Rees, and Sabia.

²⁰ James M. Corroon, Laurie K. Mischley, and Michelle Sexton, “Cannabis as a Substitute for Prescription Drugs—A Cross-Sectional Study,” *Journal of Pain Research* 10 (2017): 989–98, <https://doi.org/10.2147/JPR.S134330>.

²¹ Smith et al., “Medical Cannabis Use in Military and Police Veterans.”

²² Corroon, Mischley, and Sexton, “Cannabis as a Substitute for Prescription Drugs.”

²³ Jim Dawson, “Fighting Stress in the Law Enforcement Community,” *NIJ Journal*, no. 281 (November 2019): 1–6.

medical marijuana to cope with their symptoms.²⁴ In reviewing historical medical charts using the clinician-administered PTSD scale, Smith et al. found that out of 100 PTSD patients sampled, 80 showed a 75 percent or better reduction in symptoms after using medical cannabis.²⁵ This converging data suggest cannabis may serve as an alternative medication and treatment for PTSD and suicide risks common to first responders.

Although limited, research does support the use of marijuana as a substitute for prescription medications and has led to substantial improvements in social and family environments.²⁶ Legalization of marijuana in some states has spurred policymakers to anticipate changes that might follow federal legalization. Erik Baker covers this potential legalization in his thesis, “Marijuana, the Straight Dope: Guidance for Federal Policy Reform,” in which he discusses the increasing state legislation of cannabis use that clashes with current federal laws.²⁷ Although Baker covers possible policy reform and the reclassification of drug schedules relating to cannabis, his thesis does not address the therapeutic benefits of cannabis for first responders. Given the stresses that law enforcement faces, marijuana may present an option to mitigate issues that lead to various mental and physical health problems and may even assist in bettering the family life of these officers while off duty.

C. RESEARCH DESIGN

This thesis begins by determining the efficacy of an inclusive cannabis-use policy and then ultimately creates a roadmap for policy regarding the legal use of recreational cannabis for law enforcement and first responders, given its therapeutic benefits. To answer my research questions, I used portions of Eugene Bardach and Eric M. Patashnik’s “eightfold path to more effective problem solving” from their book, *A Practical Guide for*

²⁴ Smith et al., “Medical Cannabis Use in Military and Police Veterans.”

²⁵ Smith et al.

²⁶ Corroon, Mischley, and Sexton, “Cannabis as a Substitute for Prescription Drugs.”

²⁷ Erik D. Baker, “Marijuana, the Straight Dope: Guidance for Federal Policy Reform” (master’s thesis, Naval Postgraduate School, 2017), <http://hdl.handle.net/10945/56828>.

Policy Analysis.²⁸ In line with Bardach and Patashnik's first step, namely "defining the problem," I conducted research on current stress trends and the repercussions of stress when it is poorly managed.²⁹ Using Bardach and Patashnik's second step—assembling evidence through qualitative research—I researched rising suicide levels and mental health conditions in first responders, which are often stress-induced. This research assisted in determining a need to relieve stress while off duty.

With eventual federal legalization in mind, I turned to gathering evidence on the makeup of cannabis and the effects of cannabis use, with an emphasis on therapeutics. When the United States classified marijuana as a Schedule 1 drug, research in this realm decelerated. Recently, more and more scientific and medical analyses are being conducted to examine both the benefits and drawbacks of cannabis, in conjunction with increasing state legalization, and thus pose opportunities for further research.

Bardach and Patashnik explain, "Most challenges in 'exploiting opportunities,' as opposed to solving problems, also involve designing some relatively fresh or new system."³⁰ Therefore, I went on to answer my second research question, which creates the roadmap for cannabis policy use while off duty. I found the answer by first providing an overview of cannabis and its effects. I included information on the cannabis plant, including tetrahydrocannabinol (THC), the intoxicating compound of marijuana. I used studies conducted on marijuana regarding its cognitive effects, presenting both schools of thought regarding the benefits and drawbacks of cannabis, to help determine how cannabis use can be incorporated and what its effect would be to find a middle ground where the drawbacks do not supersede the benefits of off-duty use.

Last, I used Bardach and Patashnik's third reason for assembling evidence: "To assess policies that have been thought, by at least some people, to have worked effectively

²⁸ Eugene Bardach and Eric M. Patashnik, *A Practical Guide for Policy Analysis: The Eightfold Path to More Effective Problem Solving*, 5th ed. (Los Angeles: CQ Press, 2016). The eightfold path involves defining the problem, assembling some evidence, constructing the alternatives, selecting the criteria, projecting the outcomes, confronting the trade-offs, stopping, focusing, narrowing, deepening, deciding, and telling your story.

²⁹ Bardach and Patashnik.

³⁰ Bardach and Patashnik, 113.

in situations similar to your own, in other jurisdictions, perhaps or at other times.”³¹ To that end, I examined existing cannabis policies in the United States and abroad, in addition to looking at analogous professions—doctors and pilots—and their usage policies. Internationally, I focused on Canada because of its recent legalization of recreational cannabis at the national level. I explored policies in their armed forces and presented possible and eventual policies and guidance for off-duty recreational and medical use by law enforcement.

D. CHAPTER ROADMAP

Chapter II examines mental and physical health problems for police officers, their causes and effects, and presents an overview of the stress levels of law enforcement. Chapter III explores the cannabis plant. Chapter IV recognizes obvious policy issues, and Chapter V concludes with policy recommendations and future areas of study.

³¹ Bardach and Patashnik, 13.

II. MENTAL AND PHYSICAL HEALTH PROBLEMS FOR POLICE OFFICERS: CAUSES AND EFFECTS

The inevitability of police officer stress highlights the need for options to manage it. Given the health benefits of cannabis and increasing support for its legalized recreational use, gridlocking policy at a complete restriction of off-duty use will not be beneficial. This chapter defines the problem, as detailed in Bardach and Patashnik's *Practical Guide for Policy Analysis*, by exploring the complex causes of stress that law enforcement officers experience in connection to their work.³² The complexity of stress for law enforcement stems from multiple sources that compound one another. While organizational factors could improve some of the sources of stress, these changes would take long-term planning and execution. Additionally, stressors that are unique to law enforcement are constantly growing and taking a toll on the health of law enforcement personnel.

Humans experience stress every day, often leading to mental and physical health problems. Most of the time, people can readily cope with low-intensity stress; law enforcement officers, too, experience these same stressors. Common law enforcement stressors include workplace dynamics, budget shortfalls, and shift work. Workplace dynamics involve the unique professional environments and organizational structures of law enforcement, resulting in often-contentious interactions with city councils and department administrations that can affect morale.³³ Budget insufficiencies can affect stress levels as well, as they often lead to staffing shortages, inadequate equipment, and reductions in necessary training—all of which are found in the private industry but are becoming more familiar in law enforcement as current anti-police sentiment spurs retirements and impedes potential recruitment efforts.³⁴ This lacuna leaves police shifts understaffed, thereby leaving individual officers more vulnerable to dangers on the streets.

³² Bardach and Patashnik, *A Practical Guide for Policy Analysis*.

³³ Peter Finn and Julie E. Tomz, *Developing a Law Enforcement Stress Program for Officers and Their Families* (Washington, DC: Department of Justice, 1997).

³⁴ Jessica Saunders, Virginia Kotzias, and Rajeev Ramchand, "Contemporary Police Stress: The Impact of the Evolving Socio-Political Context," *Criminology, Criminal Justice, Law & Society* 20, no. 1 (April 2019): 35–52.

These stressors are then further compounded by unique intense stressors for first responders, specifically police officers who often have to risk their lives.³⁵ This constant risk to life, in addition to ever-growing media scrutiny over police misuse of force and the accompanying mistrust, has most recently and acutely raised stress for law enforcement.³⁶

This chapter first discusses occupational stressors that directly affect stress levels of law enforcement officers. These stressors are organized into two categories: organizational stressors—such as interpersonal dynamics, inconsistent rules, and disciplines and budget constraints—and operational stressors—such as shift work, high-risk situations, and ever-growing public scrutiny—that law enforcement faces every day. The second section discusses the effects of stressors on the well-being of officers; it includes impacts to mental health such as increased anxiety, depression, and sleep disorders, which lead to physical effects on the body and ultimately substance abuse and suicide by some officers.

A. CAUSES OF OCCUPATIONAL STRESS

This section examines two types of occupational stressors for law enforcement: organizational stressors and operational stressors. A study by McCreary et al., conducted between April 2014 and March 2015, used organizational and operational police stress questionnaires to assess stress levels in Canadian police officers. The questionnaire consisted of 20 questions ranked on a scale of 1 (*least stressful*) to 7 (*most stressful*), providing agencies with a baseline for determining effectiveness in their stress-reducing initiatives, such as “resilience-based training” and employee assistance programs.³⁷ Violanti et al. detail the specific stressors that contribute to stress levels of officers and ultimately mental health issues:

³⁵ Poonam Kapade-Nikam and Mohsin Shaikh, “Occupational Stress, Burnout and Coping in Police Personnel: Findings from a Systematic Review,” *American International Journal of Research in Humanities, Arts and Social Sciences* 6, no. 2 (May 2014): 145.

³⁶ Rich Morin et al., *Behind the Badge: What Police Think about Their Jobs* (Washington, DC: Pew Research Center, 2017), <https://www.pewsocialtrends.org/2017/01/11/behind-the-badge/>.

³⁷ Donald R. McCreary, Ivy Fong, and Dianne L. Groll, “Measuring Policing Stress Meaningfully: Establishing Norms and Cut-Off Values for the Operational and Organizational Police Stress Questionnaires,” *Police Practice and Research* 18, no. 6 (2017): 613, <https://doi.org/10.1080/15614263.2017.1363965>.

Work schedules include shiftwork, long-work hours, overtime work, and second job; traumatic events include exposure to dead bodies, witnessing police suicide/homicide, violent confrontations, situations of abuse, riot control, seeing battered or dead children, serious accidents and hostages, failed resuscitation attempts, and assistance in disasters; organizational stressors include lack of supervisor and/or co-workers support, job strain, effort-reward imbalance, lack of supervisor feedback, workplace discrimination, excessive paperwork, lack of recognition, dealing with the public, and perceived stress.³⁸

Violanti et al. explain that all of these stressors lead not only to PTSD but also to other mental health issues associated with stress and related fatigue.

While first responders have unique operational stressors, like other professions, they experience stressors at the organizational level, which sometimes even supersede the risk to life and limb as a cause of stress. In addition to these stressors, law enforcement is affected by the public climate and sentiment, which are constantly shifting in favor of or against law enforcement as a whole. As illustrated in Table 1, the top organizational stressors include “bureaucratic red tape, staff shortages, inconsistent leadership style, feeling that different rules apply to different people and the perception that you always have to prove yourself to the organization.”³⁹ The top stressors from an operational standpoint include “fatigue, finding time to stay in good physical condition, shift work, occupational-related health issues such as pain, not having enough time available to spend with friends and family and lastly paperwork,” as illustrated in Table 2.⁴⁰

³⁸ John M. Violanti et al., “Police Stressors and Health: A State-of-the-Art Review,” *Policing: An International Journal of Police Strategies & Management* 40, no. 4 (2017): 645, <https://doi.org/10.1108/PIJPSM-06-2016-0097>.

³⁹ McCreary, Fong, and Groll, “Measuring Policing Stress Meaningfully,” 619.

⁴⁰ McCreary, Fong, and Groll.

Table 1. Organizational Stressors.⁴¹

Rank	Stressor	Mean out of 7
1	Bureaucratic red tape	4.32
2	Staff shortages	4.21
3	Inconsistent leadership style	4.13
4	The feeling that different rules apply to different people	4.12
5	The perception that you always have to prove yourself to the org.	3.84

Table 2. Operational Stressors.⁴²

Rank	Stressor	Mean out of 7
1	Fatigue	4.16
2	Finding time to stay in good physical condition	3.81
3	Shift work	3.81
4	Occupational-related health issues (e.g., back pain)	3.74
5	Not having enough time available to spend with friends and family	3.66
5	Paperwork	3.66

These data were collected from 2,840 of 26,205 (10.8 percent) police officers in the province of Ontario, Canada, who responded to this survey.⁴³ This survey demonstrates that the organizational and operational stressors experienced by police officers lead to health implications because of the significant stress they inflict.

1. Organizational Causes of Stress

Even though the organizational sources of stress could be more directly remedied with organizational reforms, in the moment, before large-scale reform can happen, the effects of this stress are immediate and present in law enforcement in terms of health and

⁴¹ Adapted from McCreary, Fong, and Groll.

⁴² Adapted from McCreary, Fong, and Groll.

⁴³ “Police Officers by Level of Policing, by Province and Territory, 2015,” Statistics Canada, March 30, 2016, <https://www150.statcan.gc.ca/n1/pub/85-002-x/2016001/article/14323/tbl/tbl02-eng.htm>.

performance. This subsection discusses the cascading effects of budget insufficiencies, something that departments have faced for a long time.

Lowering expenses is an everyday endeavor of all companies and organizations around the world. Employees are constantly having to worry about layoffs or closures. These efforts in lowering budgets have resonated with police departments, especially during the coronavirus pandemic, as municipalities have not received the needed taxes to say afloat.⁴⁴ The reduction of police budgets hurts officers, just like private company employees, and causes added stress. Budget cuts lead to a lack of resources—a lack of updated equipment, training, community policing/prevention, and competitive wages—for law enforcement.⁴⁵ Budget gaps ultimately lead to police departments’ being unprepared to respond to any situation, which causes stress. For example, inadequate or meager equipment, such as duty firearms or ballistic vests, results in a lack of confidence, which leads to anxiety in officers.⁴⁶

Budget shortfalls and reductions are often felt in training budgets, leaving police less capable of dealing with ongoing and emerging threats, let alone using the tools to mitigate them, thus creating an added level of stress.⁴⁷ Additional stress on officers comes when agencies allow officers to remain woefully underprepared for emerging challenges that they face every day. These challenges can be mitigated through training that addresses crisis situations, mental illness, and the need for interventions to counter bias and improve interactions with culturally diverse communities. In a study conducted by the Police Executive Research Forum, 68 percent of police departments noted a reduction or elimination of training itself.⁴⁸ Such an issue was highlighted in 2018 at the National

⁴⁴ Jim Zarroli, “Cities Have Never Seen a Downturn Like This, and Things Will Only Get Worse,” NPR, May 20, 2020, <https://www.npr.org/2020/05/20/859713720/american-cities-and-towns-face-financial-challenges-during-the-pandemic>.

⁴⁵ Finn and Tomz, *Developing a Law Enforcement Stress Program*, 6–7.

⁴⁶ Finn and Tomz, 8.

⁴⁷ John M. Violanti et al., “Highly Rated and Most Frequent Stressors among Police Officers: Gender Differences,” *American Journal of Criminal Justice* 41, no. 4 (December 2016): 645–62, <https://doi.org/10.1007/s12103-016-9342-x>.

⁴⁸ Police Executive Research Forum, *Is the Economic Downturn Fundamentally Changing How We Police?* (Washington, DC: Police Executive Research Forum, 2010).

Sheriffs' Association Conference when representatives from various police departments described the lack of funds for training.⁴⁹

In the context of better preparing officers for new challenges, George H. Brereton refers to the need for additional training due to changes in society: "The increasing complexity of our laws find[s] the 'old type' police officer sadly lacking in the qualifications necessary for the solving of his problems."⁵⁰ Along these lines, Pew Research Center notes that 46 percent of police officers surveyed reported having only four hours of training in dealing with people who have mental health issues, and 39 percent of officers have had at least four hours of "bias and fairness" training.⁵¹ This limited training is no match for the 13 percent increase in mental health conditions worldwide.⁵² Necessary training would include implicit bias and cultural training to better prepare the police for dealing with a culturally and racially diverse community more effectively.⁵³ Training is invaluable for officers; especially given the current climate of mistrust in police by some communities and the uncertainty that police officers have when making quick decisions, additional training is imperative to handle the stress caused by a lack of training. In this regard, training insufficiencies multiply themselves.

Budget gaps further exacerbate stress levels for police officers who cannot reliably depend on additional officers needed for response, which undermines their ability to respond to situations with confidence. The lack of necessary police officers on the street, in such cities as Flint, Michigan, increases pressure on its police forces and places them in life-threatening situations. Inevitably, budget cuts limit staffing levels, which then affect not only response times but also crime prevention efforts. As mentioned earlier, in cities

⁴⁹ "Police Department Budget Cuts: How Funding Shortages Impact Safety," National Police Support Fund, July 11, 2018, <https://nationalpolicesupportfund.com/police-department-budget-cuts-officer-safety/>.

⁵⁰ George H. Brereton, "Police Training: Its Needs and Problems," *Journal of Criminal Law and Criminology* 26, no. 2 (July 1935): 249, <https://doi.org/10.2307/1136281>.

⁵¹ Morin et al., *Behind the Badge*, 14–15.

⁵² Spencer L. James et al., "Global, Regional, and National Incidence, Prevalence, and Years Lived with Disability for 354 Diseases and Injuries for 195 Countries and Territories, 1990–2017: A Systematic Analysis for the Global Burden of Disease Study 2017," *Lancet* 392, no. 10159 (November 2018): 1789–1858, [https://doi.org/10.1016/S0140-6736\(18\)32279-7](https://doi.org/10.1016/S0140-6736(18)32279-7).

⁵³ Robert J. Smith, "Reducing Racially Disparate Policing Outcomes: Is Implicit Bias Training the Answer?" *University of Hawai'i Law Review* 37, no. 2 (2015): 295–312.

such as Flint, police often respond more than a day after a call due to high call volume and a lack of manpower stemming from a lack of funding.⁵⁴ Likewise, a survey by the Major Cities Chiefs Association found that 39 percent of law enforcement agencies made cuts to community-policing efforts, 22 percent reduced school resource officers, and 22 percent reduced federal task forces.⁵⁵ Understaffing forces police departments to abandon community-policing models to focus exclusively on dangerous incidents, which in turn affects community attitudes toward police. The discontinuation of community policing coincides with recessionary cuts to police budgets and officer layoffs, which in turn lead police departments to prioritize emergency calls over service to the community.⁵⁶ Such a scenario then leads to an increased burden on law enforcement officers, who must spend the day dealing with high-stress crises call after call, thus increasing levels of exhaustion and stress.⁵⁷ To complicate this situation further, the recent push to defund police departments altogether, or in part, following the death of George Floyd in Minneapolis, Minnesota, on May 25, 2020, would, if successful, further reduce funding for many agencies that already have a budget deficit in the wake of struggling municipal budgets from COVID-19.

These deficits would not only cause the added stressors as previously mentioned but also lead to lower wages and co-workers who are either undertrained or untrustworthy. Sheriff Tom Dart of Cook County, Illinois, spoke to the issue of funding and resources during an interview with National Public Radio in 2018 regarding the consequences of police agencies lacking funding.⁵⁸ In this interview, Dart highlighted how local suburban police agencies in his county lacked funding to retain police officers. According to Dart,

⁵⁴ Office of Community Oriented Policing Services, *Impact of the Economic Downturn on American Police Agencies* (Washington, DC: Office of Community Oriented Policing Services, 2011), <https://www.hsdil.org/?abstract&did=690751>.

⁵⁵ Office of Community Oriented Policing Services.

⁵⁶ Matthew J. Parlow, “The Great Recession and Its Implications for Community Policing,” *Georgia State University Law Review* 28, no. 4 (2012): 1193–1238.

⁵⁷ “Defund the Police—Top 3 Pros and Cons,” ProCon, June 3, 2020, <https://www.procon.org/headlines/defund-the-police-top-3-pros-and-cons/>.

⁵⁸ Patrick Smith, “What Happens When Suburban Police Departments Don’t Have Enough Money?,” NPR, January 22, 2018, <https://www.npr.org/2018/01/22/579778555/what-happens-when-suburban-police-departments-dont-have-enough-money>.

this lack of local funding has led municipalities to pay officers wages lower than those at big box stores such as Walmart—indeed, Walmart starts employees at \$11 an hour while agencies such as the Robbins, Illinois, Police Department pay \$11.50 an hour.⁵⁹ Furthermore, agencies must retain police officers with extensive disciplinary records because they cannot afford to hire new officers and train them correctly, which can cost an agency approximately \$140,000 the first year, if done correctly.⁶⁰ This figure increases if additional training is required. Funding that fails to cover all departmental needs increases liability exposure and large payouts in departments that retain colleagues unsuited to the job, thus adding to the stress of more-suitable officers within the department.

2. Operational Causes of Stress

In addition to organizational sources of stress, some operational stressors are unique to the first responder field. These stressors include shift work, high-risk situations, and ever-growing public scrutiny. This section begins by discussing the effects of shift work on the body, followed by police officers' daily exposure to high-risk situations. Last, it discusses the increase in public scrutiny and mistrust; it does not cover individual cases but focuses on the effect of these incidents and their media coverage on police officers.

a. Shift Work

Shift work takes a heavy toll on police officers in that police serve around the clock, straining sleep patterns and increasing fatigue. High stress levels that accompany policework have many negative effects on the body and mind. Sleep normally allows the mind to recover from the day's stresses; however, those very stresses can keep officers up at night. In addition to stress-induced sleeplessness, first responders constantly suffer from inadequate or disrupted sleep. For instance, first responders often work 24-hour shifts, with only some allowing sleep; however, emergency calls constantly interrupt it. Similarly, police officers work around the clock in increments of 8, 10, or 12-hour shifts. Varying shifts then affect sleep for those who work the night or the "graveyard" shift, which can

⁵⁹ "Walmart Tests Higher Hourly Starting Wages in 500 Stores," CBS Chicago, January 24, 2020, <https://chicago.cbslocal.com/2020/01/24/walmart-tests-higher-hourly-starting-wages-in-500-stores/>.

⁶⁰ Smith, "When Suburban Police Departments Don't Have Enough Money."

start with the sun going down and end with the sun coming up, thus disrupting external cues that facilitate circadian rhythms. According to the National Institute of Justice, in the *cycle of fatigue*, a lack of coping mechanisms to address stress disrupts the natural sleep cycle, then chronic disrupted sleep induces fatigue, and then fatigue “diminishes [the] ability to cope with stressors in a healthy way,” as shown in Figure 1.⁶¹

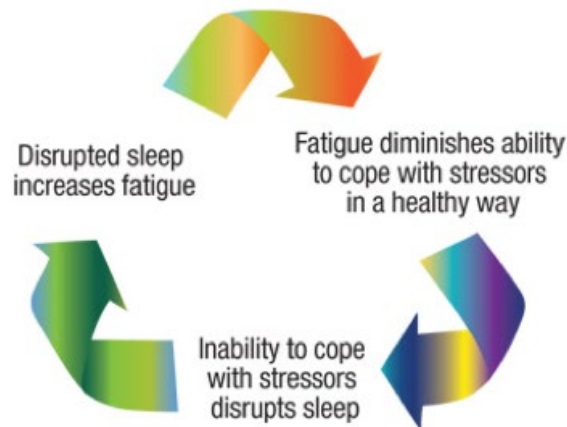


Figure 1. Cycle of Stressors, Sleep, and Fatigue.⁶²

This figure depicts the taxing cycle that first responders often face. Stress-induced sleep is not the only thing to cause fatigue; overworking personnel in understaffed departments causes it, too. The lack of funding and the number of officers on sick leave from injuries also increase overtime to fulfill minimum shift staffing requirements. This overwork, in turn, forces officers who may already be working an 8-hour shift to work a 12-hour shift or officers who work 12-hour shifts to work 16-hour shifts in a 24-hour period.⁶³ Finn and Tomz discuss this phenomenon with an example of a captain who

⁶¹ “Officer Work Hours, Stress and Fatigue,” National Institute of Justice, July 31, 2012, <http://nij.ojp.gov/topics/articles/officer-work-hours-stress-and-fatigue>.

⁶² Source: National Institute of Justice.

⁶³ Mike Maciag, “The Alarming Consequences of Police Working Overtime,” *Governing*, October 2017, <https://www.governing.com/topics/public-justice-safety/gov-police-officers-overworked-cops.html>.

reported a reduction in staff from 32 to 21 officers while the workload handled by his unit increased.⁶⁴

The lack of sleep—caused by workload, forced overtime, late calls, rotating shifts, and disrupted sleep, among other reasons—negatively affects sleeping cycles, thus resulting in fatigue as well as contributing to severe physical and mental health problems. In a study on sleep disorders in police officers, the American Medical Association found that out of 4,957 participants screened, 40.4 percent were positive for one or more sleep disorders, 33.6 percent had “obstructive sleep apnea,” 6.5 percent had significant insomnia, and 5.4 percent suffered from “shift work disorder.”⁶⁵ The findings present a real problem for police officers in that they cannot obtain the needed rest to face the vast scenarios that often put their lives at risk, ultimately exacerbating their stress.

b. High-Risk Situations

The tangible danger police officers face causes personal stress. A 2011 Pew Research Center survey of approximately 8,000 police officers from various departments found that 93 percent had concerns for their safety on the job.⁶⁶ Additionally, 33 percent of officers stated they had experienced a physical altercation with a suspect, and 86 percent believed the general public did not understand the risks that officers take on daily.⁶⁷ Taken together, everyday concerns and fears can unsettle police officers and add to the overall stress, which is compounded over and over by different factors.

High-risk situations present consistent exposure to deadly or potentially deadly situations, which also instill fear and ultimately the inability to relax, resulting in sleeplessness and anxiety, among other mental and physical health issues. For example, traffic stops are stressful because of their uncertainty: the officer has no way of knowing who or what may be inside the stopped vehicle. The potential risk from other motorists

⁶⁴ Finn and Tomz, *Developing a Law Enforcement Stress Program*, 12.

⁶⁵ Shantha Rajaratnam et al., “Sleep Disorders, Health, and Safety in Police Officers,” *JAMA* 306, no. 23 (2011): 2567–78.

⁶⁶ Morin et al., *Behind the Badge*, 5.

⁶⁷ Morin et al., 9.

compounds this stress. Indeed, according to the Officer Down Memorial Page, of 147 law enforcement on-duty deaths in 2019, 44 officers died in traffic accidents, and 14 died from being struck by another vehicle.⁶⁸ Of the on-duty deaths in 2019, 48 were by gunfire, which may also occur at traffic stops or on domestic calls.⁶⁹ As such, a study published by the Office of Community Oriented Policing Services indicates that between 2015 and 2016, 41 percent of fatal calls involved domestic situations.⁷⁰ The study further reports that dispatching officers alone to these calls may expose them to an armed suspect threatening their lives before backup units arrive, if the officer can request help in time. Likewise, officers may be unable to separate household members in domestic conflicts due to legal tenancy limitations, so they must restore peace to prevent a worse outcome such as a renewed domestic altercation.⁷¹ Officers find themselves in tough situations because they cannot legally remove people from their homes when no crime has been committed but may face censure if the situation turns after they leave.⁷² In these ways, ordinary police work entails high-risk situations that induce stress.

c. Public Scrutiny and Mistrust

The increased awareness of scrutiny and the resulting anxiety about possible repercussions of their actions are creating decision paralysis in officers. Media attention has increased since a police-involved shooting on August 9, 2014, caused civil unrest and protests throughout the city of Ferguson, Missouri.⁷³ High community distrust of the police in Ferguson during the deemed justified incident created an intense confrontation, which

⁶⁸ “Home Page,” Officer Down Memorial Page, accessed July 12, 2020, <https://www.odmp.org/>.

⁶⁹ Officer Down Memorial Page.

⁷⁰ Nick Breul and Desiree Luongo, *Making It Safer: A Study of Law Enforcement Fatalities between 2010–2016* (Washington, DC: Office of Community Oriented Policing Services, 2017), 24–25.

⁷¹ “Your Guide to Landlord-Tenant Law,” Illinois State Bar Association, accessed July 28, 2020, <https://www.isba.org/public/guide/landlordtenant>.

⁷² Meg Townsend et al., *Law Enforcement Response to Domestic Violence Calls for Service* (Washington, DC: Department of Justice, 2005), <https://www.ncjrs.gov/pdffiles1/nij/grants/215915.pdf>.

⁷³ “Shooting Death of Michael Brown—Ferguson, MO,” Department of Justice, August 9, 2019, <https://www.justice.gov/crs/timeline-event/shooting-death-michael-brown-ferguson-mo>.

started with a deep-rooted problem between the community and police.⁷⁴ The tension created in this and other cases continues to induce stress among the police.

The reported use of excessive force causing the deaths of black men and women across the country since Ferguson has continued to spark intense public outrage. Charges of racism, protests (sometimes violent), and a call for greater scrutiny of law enforcement's tactical and operational policies have led to what some researchers have termed the "Ferguson effect." This theory holds that increased anti-police sentiment and increased scrutiny of police work make police officers more reluctant to police communities, causing a rise in crime.⁷⁵ This sentiment has resonated among police officers such that they may now delay their response to life-threatening situations, regardless of justification, thus adding to stress levels.⁷⁶ A survey titled "Policing in a Post-Ferguson Society" by PoliceOne and Louisiana State University, involving 3,346 sworn law enforcement officers, revealed that 39.8 percent of officers reported hesitancy to use force, and 45 percent of officers admitted a decreased level of motivation after increased media scrutiny following the Ferguson shooting.⁷⁷ In an extreme example of the Ferguson effect, in 2016, a perpetrator in Chicago violently beat a police officer until she was unconscious because the officer feared being scrutinized about killing her assailant.⁷⁸ Given public pressure on management, officers' fear of such consequences is not unreasonable.

In tracing the evolution of officer stress over one year, New Orleans Superintendent Shaun Ferguson outlined officer tentativeness thus: "Our officers are dealing with more of a mental or emotional process that we're trying to overcome, to keep them focused. They

⁷⁴ Department of Justice, "Department of Justice Report Regarding the Criminal Investigation into the Shooting Death of Michael Brown by Ferguson, Missouri Police Officer Darren Wilson" (official memorandum, Washington, DC: Department of Justice, 2015), https://www.justice.gov/sites/default/files/opa/press-releases/attachments/2015/03/04/doj_report_on_shooting_of_michael_brown_1.pdf.

⁷⁵ Heather Mac Donald, "The Ferguson Effect Lives On," *City Journal*, December 23, 2016, <https://www.city-journal.org/html/ferguson-effect-lives-14919.html>.

⁷⁶ Wyllie, "P1 Research."

⁷⁷ Justin Nix, "Policing in America: American Policing in the Post-Ferguson Era," *Fordham Urban Law Journal*, August 13, 2017, <https://news.law.fordham.edu/fulj/2017/08/13/policing-in-america-american-policing-in-the-post-ferguson-era/>.

⁷⁸ Jeremy Gerner and Hal Dardick, "Chicago's Top Cop: Police Are 'Second-Guessing Themselves,'" PoliceOne, October 7, 2016, <https://www.policeone.com/officer-safety/articles/chicagos-top-cop-police-are-second-guessing-themselves-EIP7XgAl0PsDCIIC/>.

want to do their job, but they don't want to escalate a situation and become the next national news story.”⁷⁹ This constant rumination or inner dialogue linked to stressful situations, as cited by Superintendent Ferguson, exacerbates the negative impacts on the well-being of these first responders.⁸⁰ As Stephen Alkus and Christine Padesky put it in their article for *Counseling Psychologist*, “This anxiety is manifested in fears of doing something wrong, of being criticized, of being investigated, tried, suspended or fired, of being seen as unmanly, or of being the defendant in a civil suit.”⁸¹ Such visibility makes officers anxious over making a decision that could lead to internal investigations, trials, civil suits, or the loss of lifelong careers.⁸² The possibility of litigation increases stress over possible imprisonment or loss of jobs for a split-second decision during a very dangerous situation.⁸³ By the same token, the drive to abolish qualified immunity laws that protect government officials for situations such as these, in turn, places them at a greater risk and increases their overall psychological stress.⁸⁴ Qualified immunity is a doctrine created to protect government officials from being held personally liable for actions taken, so long as those actions do not violate established law.⁸⁵ Making officers subject to liability will inevitably increase the difficulty and stress associated with their instantaneous decisions in ambiguous or life-threatening situations.

Along these lines, there were 280 line-of-duty deaths in 2020 alone, a 100 percent increase from 2019, which arguably linger on the minds of law enforcement officers who

⁷⁹ Police Executive Research Forum, *PERF Daily Critical Issues Report*, July 10, 2020, <https://www.policeforum.org/criticalissuesjuly10>.

⁸⁰ Stephen Alkus and Christine Padesky, “Special Problems of Police Officers: Stress-Related Issues and Interventions,” *Counseling Psychologist* 11, no. 2 (1983): 55–64, <https://doi.org/10.1177%2F0011000083112010>.

⁸¹ Alkus and Padesky, 56.

⁸² Alkus and Padesky.

⁸³ Finn and Tomz, *Developing a Law Enforcement Stress Program*, 12–13.

⁸⁴ Mike Callahan, “The Attack on the Police Officer’s Qualified Immunity Defense,” *PoliceOne*, June 8, 2020, <https://www.policeone.com/legal/articles/the-attack-on-the-police-officers-qualified-immunity-defense-sgocV8c2TrJCvFrU/>.

⁸⁵ Nathaniel Sobel, “What Is Qualified Immunity, and What Does It Have to Do with Police Reform?,” *Lawfare* (blog), June 6, 2020, <https://www.lawfareblog.com/what-qualified-immunity-and-what-does-it-have-do-police-reform>.

share a perception of unfair public discourse.⁸⁶ Pew Research Center has found that in larger police departments, 51 percent of police officers feel law enforcement is treated unfairly by the media, and among that group, 65 percent feel frustrated in their work because of the job’s daily stressors.⁸⁷ These statistics reveal the negative impact on law enforcement and, inevitably, the burden officers carry. The current anti-police environment surrounding law enforcement in the United States exacerbates cascading mental health-related issues caused by repeated trauma, a lack of sleep, and other challenges related to ordinary police work.

B. EFFECTS ON MENTAL AND PHYSICAL WELL-BEING

Stressors affect the bodies and minds of police officers and other first responders. Law enforcement officers face a broad range of stressful scenarios including horrific scenes of violence and death. These realities—in addition to general conditions of shift work, departmental politics, and public and internal scrutiny—keep officers’ minds constantly churning. This endless cycling inevitably affects family life, and the inability to cope with stressors harms mental and physical health and may even lead to suicide—as discussed in the following subsections.

1. Mental Health

According to the National Institute of Justice, job-related stress can lead to negative psychological conditions including anxiety disorders, such as PTSD; depression; and sleep disorders, which in turn increase fatigue, thus affecting mental and physical well-being.⁸⁸ Research conducted by the Ruderman Family Foundation has found that rates of depression and PTSD are far more prominent in law enforcement officers than among the general public. Table 3 is derived from Ruderman’s mental health outcomes.⁸⁹

⁸⁶ Officer Down Memorial Page, “Home Page.”

⁸⁷ John Gramlich and Kim Parker, “Most Officers Say the Media Treat Police Unfairly,” Pew Research Center, January 25, 2017, <https://www.pewresearch.org/fact-tank/2017/01/25/most-officers-say-the-media-treat-police-unfairly/>.

⁸⁸ National Institute of Justice, “Officer Work Hours, Stress and Fatigue.”

⁸⁹ Heyman, Dill, and Douglas, *The Ruderman White Paper*, 12.

Table 3. Law Enforcement Rates of Depression and PTSD.⁹⁰

	Police Officers	General Public
Depression	31% ⁹¹	6.7% ⁹²
PTSD	35% ⁹³	6.8% ⁹⁴

As shown in Table 3, rates of depression and PTSD among law enforcement are almost four times that of the general public. In a study conducted by the American College of Occupational and Environmental Medicine, of 220 law enforcement officers, 31 percent exhibited signs of depression.⁹⁵ Likewise, the Buffalo Cardio-Metabolic Occupational Police Stress Study found that 35 percent of police officers have some form of PTSD symptoms, thus supporting previous findings.⁹⁶ In contrast, the U.S. Department of Veterans Affairs estimates that only 7–8 percent of the general population has PTSD.⁹⁷ Regarding depression, a study by Santa Maria et al. explains that “job demands, operationalized as workload and assaults by citizens, predicted emotional exhaustion, which in turn predicted depression and anxiety levels among police officers.”⁹⁸ In sum, workplace stressors are strongly correlated with increased incidence of PTSD and general depression.

⁹⁰ Adapted from Heyman, Dill, and Douglas, 12.

⁹¹ Chiwekwu Obidoa et al., “Depression and Work Family Conflict among Corrections Officers,” *Journal of Occupational and Environmental Medicine* 53, no. 11 (November 2011): 1294–1301, <https://doi.org/10.1097/JOM.0b013e3182307888>.

⁹² “Major Depression,” National Institute of Mental Health, February 2019, <https://www.nimh.nih.gov/health/statistics/major-depression.shtml>.

⁹³ Tammy L. Austin-Ketch et al., “Addictions and the Criminal Justice System, What Happens on the Other Side? Post-Traumatic Stress Symptoms and Cortisol Measures in a Police Cohort,” *Journal of Addictions Nursing* 23, no. 1 (February 2012): 22–29, <https://doi.org/10.3109/10884602.2011.645255>.

⁹⁴ Jaimie L. Gradus, “Epidemiology of PTSD,” National Center for PTSD, August 10, 2020, <https://www.ptsd.va.gov/professional/treat/essentials/epidemiology.asp>.

⁹⁵ Obidoa et al., “Depression and Work Family Conflict among Corrections Officers.”

⁹⁶ Heyman, Dill, and Douglas, *The Ruderman White Paper*, 7.

⁹⁷ “How Common Is PTSD in Adults?,” National Center for PTSD, accessed July 13, 2020, https://www.ptsd.va.gov/understand/common/common_adults.asp.

⁹⁸ Andreas Santa Maria et al., “The Role of Job Demands and Job Resources in the Development of Emotional Exhaustion, Depression, and Anxiety among Police Officers,” *Police Quarterly* 21, no. 1 (2018): 121–22, <https://doi.org/10.1177/1098611117743957>.

According to the National Institute of Justice, mood swings, impaired judgment, and decreased adaptability often accompany anxiety and depression among stressed police officers.⁹⁹ Following a study of 24 sleep-deprived volunteers, researchers explained that “compared to their resting performance, sleep-deprived volunteers . . . appeared less able to weigh the immediate benefits of short-term rewards against the greater cost of long-term penalties.”¹⁰⁰ This finding suggests those who are sleep-deprived have dulled decision-making performance due to extreme levels of fatigue, which could be life-threatening for police.

Much of this fatigue relates to an inability to decompress, ultimately causing sleep disorders. Along this line, a study by Rajaratnam et al. of sleep disorders in police officers found that “of the 4957 participants, 40.4% screened positive for at least 1 sleep disorder, most of whom had not been diagnosed previously.”¹⁰¹ The next subsection discusses the effects of such sleeplessness.

2. Physical Effects of Sleep Deprivation and Shift Work

The physical impacts of fatigue caused by a lack of sleep include reduced hand–eye coordination, weight gain, body pain, restlessness, gastrointestinal issues, and cardiovascular problems.¹⁰² A report funded by the Department of Justice assesses this issue, detailing a study of 464 police officers and their performance as determined by “objective measures of shift work and sleep quality on stress and subclinical disease biomarkers.”¹⁰³ Violanti’s study showed that police officers under the age of 40 or with fewer than five years on the job had an increased risk of cardiovascular disease, which corresponded with working midnight shifts; sleep deprivation had caused changes to their

⁹⁹ National Institute of Justice, “Officer Work Hours, Stress and Fatigue.”

¹⁰⁰ William D. S. Killgore, Thomas J. Balkin, and Nancy J. Wessenden, “Impaired Decision Making following 49 h of Sleep Deprivation,” *Journal of Sleep Research* 15, no. 1 (March 2006): 11, <https://doi.org/10.1111/j.1365-2869.2006.00487.x>.

¹⁰¹ Rajaratnam et al., “Sleep Disorders, Health, and Safety in Police Officers,” 2567.

¹⁰² National Institute of Justice, “Officer Work Hours, Stress and Fatigue.”

¹⁰³ John M. Violanti, *Shifts, Extended Work Hours, and Fatigue: An Assessment of Health and Personal Risks for Police Officers* (Buffalo: State University of New York, 2012), <https://www.ncjrs.gov/pdffiles1/nij/grants/237964.pdf>.

carbohydrate metabolism and endocrine function. Furthermore, high stress levels and the inability to find rest cause workplace injuries that ultimately lead to additional stress. The Bureau of Labor Statistics explains that occupations in the protective services industry, specifically police officers, have a median of 20 days off per year due to workplace injuries compared to 12 for private industries.¹⁰⁴ The consistent exposure risks and inability to find adequate sleep lead to more time off due to workplace-related injuries and illness.

Shift work affects many aspects of an officer's physiology. Working at night has a harmful impact on an individual's circadian rhythm, which is responsible for regulating sleep, alertness, and other physiological processes.¹⁰⁵ Consequently, an impaired endocrine and metabolic function can reduce the control of blood sugar, increase appetite, and reduce energy.¹⁰⁶ According to one source, the components of this syndrome include an increased waist circumference, elevated triglycerides, lowered HDL cholesterol (good cholesterol), increased frequency of hypertension, and greater glucose intolerance.¹⁰⁷ This study notes that such symptoms are indicators of metabolic syndrome, a strong precursor to cardiovascular disease, which has already been linked to police stress.¹⁰⁸

By the same token, reduced sleep profoundly influences cognitive processes. The lack of sleep and increased fatigue on the body affect the prefrontal cortex of the brain where judgment, decision-making, and other cognitive processes take place.¹⁰⁹ According to a study produced by the *Journal of Sleep Research*, sleep deprivation is associated with

¹⁰⁴ "Table R66: Number of Nonfatal Occupational Injuries and Illnesses Involving Days Away from Work by Occupation and Number of Days Away from Work, and Median Number of Days Away from Work, Private Industry, 2020," Bureau of Labor Statistics, accessed July 13, 2020, https://www.bls.gov/iif/oshwc/osh/case/cd_r66_2020.htm.

¹⁰⁵ N. P. Gordon et al., "The Prevalence and Health Impact of Shiftwork," *American Journal of Public Health* 76, no. 10 (October 1986): 1225–28, <https://doi.org/10.2105/AJPH.76.10.1225>.

¹⁰⁶ Laila AlDabal and Ahmed S. BaHamam, "Metabolic, Endocrine, and Immune Consequences of Sleep Deprivation," *Open Respiratory Medicine Journal* 5 (2011): 31–43, <https://doi.org/10.2174/1874306401105010031>.

¹⁰⁷ AlDabal and BaHamam.

¹⁰⁸ AlDabal and BaHamam.

¹⁰⁹ Matthew Dahlitz, "Prefrontal Cortex," *Science of Psychotherapy*, January 4, 2017, <https://www.thescienceofpsychotherapy.com/prefrontal-cortex/>.

the tendency to make riskier-than-usual choices, which ultimately cause injuries.¹¹⁰ Another study by Violanti et al. notes that officers who work the night shift tend to be more injury prone because of the lack of sleep.¹¹¹ Overall, the lack of sleep and inability to rest caused by stress levels from the job take their toll on decision-making, causing higher levels of risk taking and higher levels of workplace injury.

Beyond sleep-deprived injuries, a high risk of workplace injuries and illness accompanies police work. According to the Bureau of Labor Statistics, on average, 115 police officers incur fatal workplace injuries while 30,990 officers report nonfatal injuries annually.¹¹² These injuries take place in various ways such as attempting to arrest a criminal who is intoxicated by drugs or alcohol, or in pursuit situations such as chasing an offender on foot. In regard to illness incurred on the job, officers report many musculoskeletal problems linked to their heavy equipment. Approximately 54.9 percent of Royal Canadian Mounted Police officers reported having lower back pain since the beginning of their employment.¹¹³ According to Holmes et al., police officers often suffer from lower back and spine issues from inflamed back muscles caused by time spent in squad cars and duty belts that cause discomfort to the body.¹¹⁴ This constant pain puts stress on the body, ultimately affecting officers' stress levels.

3. Substance Abuse and Suicide Levels

Substance abuse often accompanies physical and mental health issues as a way to cope with or mask pain, stress, or sleeplessness. In an effort to find relief from the high stress levels in the law enforcement profession, alcohol or prescription medications are often utilized to mask mental and physical health-related issues. According to the

¹¹⁰ Killgore, Balkin, and Wesensten, "Impaired Decision Making."

¹¹¹ John M. Violanti et al., "Shift Work and Long-Term Injury among Police Officers," *Scandinavian Journal of Work, Environment & Health* 39, no. 4 (2013): 361–68.

¹¹² "Police Officers Factsheet," Bureau of Labor Statistics, April 27, 2018, <https://www.bls.gov/iif/oshwc/cfoi/police-officers-2014.htm>.

¹¹³ Jeremy J. Brown et al., "Back Pain in a Large Canadian Police Force," *Spine* 23, no. 7 (1998): 821–27.

¹¹⁴ M. W. R. Holmes et al., "The Effects of Police Duty Belt and Seat Design Changes on Lumbar Spine Posture, Driver Contact Pressure and Discomfort," *Ergonomics* 56, no. 1 (2013): 126–36, <https://doi.org/10.1080/00140139.2012.739206>.

American Addiction Centers, 30 percent of first responders abuse substances, a grim statistic among public safety personnel.¹¹⁵ Substance abuse can be traced to stress from public safety careers, often leading to a downward spiral from substance dependence that either alleviates or creates mental health issues. Pasillas et al. explain that “law enforcement officers experiencing reoccurring stressful and/or traumatic incidents may avoid contacting negative private events (e.g., distressing thoughts and feelings about their work) by engaging in behaviors such as dissociation, substance abuse and isolation.”¹¹⁶

Alcohol, perhaps the most commonly used intoxicant, is a part of police culture: officers typically meet after work or on a day off to consume alcohol in a social setting as a form of comradery.¹¹⁷ Such bonds emerge among officers when they endure such stress on the job. Chopko et al. explored alcohol use among police officers in the United States and its relationship to work-related stress.¹¹⁸ Their analysis depicted the “significant unique association between alcohol use and subjective work-related traumatic distress and PTSD avoidance symptoms” as reciprocal.¹¹⁹ In this study of 193 police officer participants, 11.1 percent never consumed alcohol; 22.1 percent consumed alcohol monthly; and 35.8 percent consumed alcohol two to four times per month, 21.1 percent two to three times per week, and 10 percent four or more times per week.¹²⁰ This study also found that 20.4 percent of officers “binge drink when consuming alcohol.”¹²¹ Furthermore, “the findings . . . are consistent with those of researchers who found higher alcohol use to be associated with

¹¹⁵ “Substance Abuse among Police,” American Addiction Centers, December 6, 2021, <https://americanaddictioncenters.org/police>.

¹¹⁶ Rebecca M. Pasillas, Victoria M. Follette, and Suzanne E. Perumean-Chaney, “Occupational Stress and Psychological Functioning in Law Enforcement Officers,” *Journal of Police and Criminal Psychology* 21, no. 1 (March 2006): 43, <https://doi.org/10.1007/BF02849501>.

¹¹⁷ Amanda Lautieri, “Substance Abuse in Law Enforcement,” Sunrise House, July 6, 2020, <https://sunrisehouse.com/addiction-demographics/law-enforcement/>.

¹¹⁸ Brian A. Chopko, Patrick A. Palmieri, and Richard E. Adams, “Associations between Police Stress and Alcohol Use: Implications for Practice,” *Journal of Loss & Trauma* 18, no. 5 (September 2013): 10, <https://doi.org/10.1080/15325024.2012.719340>.

¹¹⁹ Chopko, Palmieri, and Adams, 491.

¹²⁰ Chopko, Palmieri, and Adams, 486.

¹²¹ Chopko, Palmieri, and Adams, 491.

more traumatic stress and depression among various populations.”¹²² Once a prohibited substance in the United States, alcohol has long been a commonly used substance with deadly risks, including severe addiction and withdrawal conditions that can also endanger one’s life.¹²³ These data suggest that off-duty officers consume alcohol regularly, and such use may be linked to job stress.

Another slippery slope comes from the use of pain medications, especially the addictive ingredients of opioids. Officers who have suffered injuries on the job or have chronic pain due to heavy duty belts and equipment commonly become addicted to prescription medications.¹²⁴ Such use of medications escalates to abuse of opioids, and sometimes even into heroin addiction. The International Association for the Study of Pain explains that up to 29 percent of patients abuse opioid-based prescriptions and that up to 6 percent of them transition to heroin.¹²⁵ The use of opioids, which can lead to dependency on harsher drugs such as heroin, not only originates in pain management but also presents a way to cope with stress levels.¹²⁶

Stress also triggers suicides among police officers. Indeed, according to the Ruderman Family Foundation, police officers are more likely to die by suicide than in the line of duty.¹²⁷ In 2019 alone, 228 law enforcement officers took their own lives, up from 2016 when 143 officers died by suicide.¹²⁸ By July 2020, 102 law enforcement officers

¹²² Chopko, Palmieri, and Adams, 491.

¹²³ New Zealand Drug Foundation, “Mythbusters—Death by Withdrawal,” *Matters of Substance* 21, no. 4 (November 2011), <https://www.drugfoundation.org.nz/matters-of-substance/november-2011/mythbusters-death-by-withdrawal/>.

¹²⁴ Lewis Z. Schlosser and Gerard P. McAleer, “Opioid Use Disorders among Police and Public Safety Personnel: What Law Enforcement Leaders Need to Know,” *Police Chief Magazine*, March 14, 2018, <https://www.policchiefmagazine.org/opioid-use-among-police-personnel/>.

¹²⁵ Kevin Vowles et al., “Rates of Opioid Misuse, Abuse, and Addiction in Chronic Pain: A Systematic Review and Data Synthesis,” *Pain* 156, no. 4 (April 2015): 569–76, <https://doi.org/10.1097/01.j.pain.0000460357.01998.fl>.

¹²⁶ “Prescription Opioids DrugFacts,” National Institute on Drug Abuse, June 2021, <https://www.drugabuse.gov/publications/drugfacts/prescription-opioids>.

¹²⁷ Heyman, Dill, and Douglas, *The Ruderman White Paper*.

¹²⁸ “Honoring the Service of Law Enforcement Officers Who Died by Suicide,” Blue H.E.L.P., accessed March 3, 2020, <https://bluehelp.org/>.

had committed suicide.¹²⁹ The Center for Disease Control and Prevention reported suicides affecting 26.4 percent men in protective services versus 11.5 percent in the general population and 14 percent of women in protective services versus 4.7 percent of women in the general population.¹³⁰ These numbers represent the need for first responders to decompress from the stresses of work, and especially in an effort to curb the rise of suicide levels.

C. CONCLUSION

The preceding discussion reveals that law enforcement personnel experience a high level of stress and pay the price through both mental and physical health-related issues. Sources of stress are often high-risk situations, including shootings, homicides, domestic situations, traffic stops, and other responses to looming unknowns. Some officers even note that the stresses from work politics can surpass the stress of the work itself.¹³¹ The lack of resources is an added stressor that can create a lack of confidence and make officers more susceptible to being injured on duty. Deteriorating public trust further increases this self-doubt, making officers constantly fearful of making mistakes and confronting the scrutiny that follows. The tendency for more people to record police interactions on phones, and post them to social media, makes officers second-guess their work and increases the impact of potential litigation or disciplinary action. Rotating work schedules also harm the mental and physical well-being of officers.

These stressors directly affect the mental health of police officers by making it all the more difficult to de-stress or unwind after work. Repeated exposure to trauma may trigger PTSD and other mental-related illnesses. Increased anxiety, depression, sleep disorders, extreme fatigue, and other related symptoms are common among police officers.¹³² Additional physical impacts include restlessness, gastrointestinal issues, and

¹²⁹ Blue H.E.L.P.

¹³⁰ Cora Peterson et al., “Suicide Rates by Industry and Occupation—National Violent Death Reporting System, 32 States, 2016,” *Morbidity and Mortality Weekly Report* 69, no. 3 (2020): 57–62, <https://doi.org/10.15585/mmwr.mm6903a1>.

¹³¹ Finn and Tomz, *Developing a Law Enforcement Stress Program*.

¹³² National Institute of Justice, “Officer Work Hours, Stress and Fatigue.”

cardiovascular problems.¹³³ These issues, in addition to injuries on the job and sleep deprivation, can lead to abuse of alcohol, prescription medications, and sleeping medications.

Given the recent increase in suicides among law enforcement, officers need stress-relief measures to better cope with daily stressors. The recreational use of alcohol and abuse of prescribed pain medications have proven to be problematic. Treatment options need to offer some therapeutic value for a variety of physical and psychological conditions but, at the same time, must not create unreasonable risk. The next chapter dives deep into the cannabis plant to better understand its uses and effects. Understanding cannabis is a key element in the drive to legalize recreational use in the United States.

¹³³ National Institute of Justice.

III. CANNABIS: ITS EFFECT AND USES

Over the last decade or so, cannabis has received increased attention from medical scholars and researchers for its therapeutic effects on ailments such as pain and inflammation. In order to answer the research question regarding the potential benefits of cannabis to inform policy about its off-duty use and what that policy might look like, this chapter examines scholarly research to understand the *Cannabis sativa* plant. This chapter “assembles some evidence,” another step from Bardach and Patashnik’s *Eightfold Path*, which involves discussing the plant’s intoxicating compounds, as well as positive and negative effects.¹³⁴ The next step “considers the alternatives” by presenting compiled medical and research studies to corroborate certain positive and negative effects.¹³⁵ This chapter concludes with an answer to the research question of whether a limited-use policy is better suited than a policy banning all off-duty use of cannabis, given its potential benefits.

Cannabis has been used both medicinally and therapeutically for centuries in Asia, dating back some 5,000 years.¹³⁶ In India and other parts of the world, such as Germany, cannabis was used during difficult child births and also as an aphrodisiac.¹³⁷ Historically, in the Middle East, cannabis was used to treat pain.¹³⁸ More recently, in the 19th century, medications containing cannabis, such as Dysmenine, which was used for menstrual cramps, became available.¹³⁹ Such use has returned to the market in the form of suppositories infused with cannabis.¹⁴⁰ The historical use of cannabis throughout the world for its wide range of therapeutic effects far surpasses any historical use of other herbs and,

¹³⁴ Bardach and Patashnik, *A Practical Guide for Policy Analysis*.

¹³⁵ Bardach and Patashnik.

¹³⁶ Philip Robson, “Therapeutic Aspects of Cannabis and Cannabinoids,” *British Journal of Psychiatry* 178, no. 2 (February 2001): 107–15, <https://doi.org/10.1192/bjp.178.2.107>.

¹³⁷ Ethan Russo and Franjo Grotenhermen, eds., *Handbook of Cannabis Therapeutics: From Bench to Bedside* (New York: Haworth Press, 2006), 333.

¹³⁸ Russo and Grotenhermen, 316.

¹³⁹ Russo and Grotenhermen, 329.

¹⁴⁰ Meg Snyder, “NJ Considers Medical Cannabis for Menstrual Cramps,” *Pharmaceutical Processing World*, April 11, 2016, ProQuest.

of course, recreational substances such as alcohol, which has mixed historical uses for pain relief and anesthesia. More recently, cannabis has been utilized to assist with anxiety disorders and pain relief for issues such as back pain, ailments common to those in first responder careers. This alternative to anxiety or pain medication cannot be considered without weighing the positive and negative effects of cannabis use. Policymakers ought to consider these effects in determining its potential as a safer alternative to alcohol or other recreational substances and as a reasonable choice in treating the many physiological and psychological conditions discussed in the previous chapter.

A. THC: HOW THE INTOXICATING COMPOUND WORKS

Cannabis, depending on its form, has different levels of effect. Delta-9 THC in the female plant of *Cannabis sativa* accounts for the psychoactive makeup.¹⁴¹ The most well-known component of cannabis is THC, one of 66 different phytocannabinoids, or cannabinoids, that interact with receptors in the body.¹⁴² The second-most-common cannabinoid is cannabidiol (CBD), which lacks psychoactive properties and is typically used medicinally.¹⁴³ THC-containing forms of the plant are marijuana (cannabis herb), hashish (cannabis resin), and hash oil (cannabis oil).¹⁴⁴ The THC content of marijuana ranges from .5 percent to 5 percent, while hashish, composed of dried cannabis resin and compressed cannabis flowers, contains 2 percent to 20 percent.¹⁴⁵ Hash oil, an oil-based extract of the hashish compound, contains the highest concentration of THC—15 percent to 50 percent.¹⁴⁶ Heating up a THC-containing compound yields its highest psychoactive properties, releasing a carboxyl group in a process called decarboxylation.¹⁴⁷ The wide

¹⁴¹ Wyn Locke, “Tetrahydrocannabinol – THC,” Virtual Chemistry Library, accessed April 18, 2020, https://www.ch.ic.ac.uk/vchemlib/mim/bristol/thc/thc_text.htm.

¹⁴² Russo and Grotenhermen, *Handbook of Cannabis Therapeutics*, 70.

¹⁴³ Ethan B. Russo et al., “Agonistic Properties of Cannabidiol at 5-HT1a Receptors,” *Neurochemical Research* 30, no. 8 (August 2005): 1037–43, <https://doi.org/10.1007/s11064-005-6978-1>.

¹⁴⁴ Beate Hammond et al., 2006 *World Drug Report*, vol. 1, *Analysis* (Vienna: United Nations Office on Drugs and Crime, 2006), 108, https://www.unodc.org/pdf/WDR_2006/wdr2006_volume1.pdf.

¹⁴⁵ Robin Room, ed., *Cannabis Policy: Moving beyond Stalemate* (New York: Oxford University Press, 2010), 6.

¹⁴⁶ Hammond et al., 2006 *World Drug Report*, 1:157.

¹⁴⁷ Russo and Grotenhermen, *Handbook of Cannabis Therapeutics*, 73.

variation in THC concentration means there can be inconsistency in the effects on the body based on the type of cannabis consumed.

THC impairs both motor and psychomotor skills, as well as cognitive functioning such as short-term memory.¹⁴⁸ The frontal cortex of the brain responds to marijuana's effects between 30 and 60 minutes after administration.¹⁴⁹ According to the National Institute on Drug Abuse, THC's chemical makeup resembles that of the brain chemical anandamide, which functions as a neurotransmitter (a chemical messenger) for the brain's areas responsible for "pleasure, memory, thinking, concentration movement, coordination and sensory/time perception."¹⁵⁰ Cannabis thereby delivers a sense of well-being but also inhibits mental processes. Besides THC molecules attaching to neurons, which affect the areas mentioned, they also impact the functioning of the cerebellum and the basal ganglia, areas responsible for balance and coordination (see Figure 2).¹⁵¹

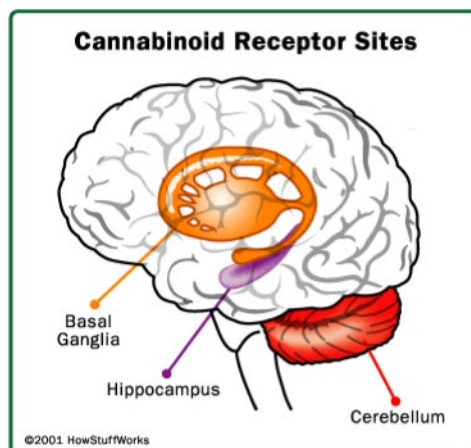


Figure 2. Impact of Cannabinoids on the Brain.¹⁵²

¹⁴⁸ Leslie L. Iversen, *Science of Marijuana* (Cary, UK: Oxford University Press, 2001), 97, ProQuest.

¹⁴⁹ Iversen, 99.

¹⁵⁰ National Institute on Drug Abuse, *Marijuana Research Report* (Washington, DC: National Institutes of Health, 2020), 5–8, <https://nida.nih.gov/download/1380/marijuana-research-report.pdf?v=d9e67cbd412ae5f340206c1a0d9c2bfd>.

¹⁵¹ National Institute on Drug Abuse.

¹⁵² Source: Kevin Bonsor and Nicholas Gerbis, "How Marijuana Works," How Stuff Works, July 2, 2001, <https://science.howstuffworks.com/marijuana3.htm>.

Ingestion of THC has a direct impact on multiple parts of the brain, but the onset of these effects can vary based on the method of ingestion.

B. EFFECTS OF THC BY MODE OF INGESTION

The effects of cannabis vary based on the mode of ingestion, including smoking or consuming THC-infused foods. Smoking marijuana is among the most common avenues of ingesting THC. Users smoke marijuana using glass pipes or roll the dried herb in cigarette paper to create what is commonly known as a “joint.” Burning the plant creates smoke that is inhaled and then absorbed through the lungs’ linings and fat.¹⁵³ THC then enters the blood from the lungs, and the heart pumps it throughout the entire body in seconds. Such ingestion allows THC to be absorbed quickly—compared to absorption in the stomach—and the effects last for one to two hours.¹⁵⁴ Smokers control the dose of the THC through the depth and length of the inhalation. A study conducted by the New York Psychiatric Institute supports the hypothesis that THC dosage can be controlled through the method of smoking; experienced smokers tested with different marijuana cigarettes, ranging from a 0 percent placebo to 5.5 percent or higher THC concentration (without their knowledge), showed that inhalation strength was inversely proportional to the level of THC in the marijuana cigarette.¹⁵⁵ This study hypothesized that smokers adjusted their level of intake to reach intoxication.¹⁵⁶

Conversely, ingesting THC by eating infused foods, known commonly as “edibles,” allows much less control of dose levels. Peak THC levels in the blood take anywhere from one to four hours after ingestion, and the effects may continue up to six hours.¹⁵⁷ The liver breaks down THC before it reaches the blood, with only about 10

¹⁵³ Iversen, *Science of Marijuana*, 45.

¹⁵⁴ Iversen, 50.

¹⁵⁵ Divya Ramesh, Margaret Haney, and Ziva D. Cooper, “Marijuana’s Dose-Dependent Effects in Daily Marijuana Smokers,” *Experimental and Clinical Psychopharmacology* 21, no. 4 (2013): 287–93, <https://doi.org/10.1037/a0033661>.

¹⁵⁶ Ramesh, Haney, and Cooper, 291–92.

¹⁵⁷ Iversen, *Science of Marijuana*.

percent of total THC-infused edibles reaching the bloodstream.¹⁵⁸ In this way, ingested THC takes longer to peak and lasts longer in the blood, but has a delayed impact on physiological response compared to inhaled concentrations.

C. POSITIVE IMPLICATIONS OF CANNABIS USE

Cannabis not only is used recreationally and as a form of relaxation but also aids in mental health issues and physical ailments including anxiety, sleep disorders, muscle pain, and nausea.¹⁵⁹ In a systematic data analysis conducted by Kosiba, Maisto, and Ditre of 13 studies with a combined 6,665 participants from more than 30 countries, 52 percent of individuals used cannabis for anxiety, of which 83 percent reported relief; 35 percent used it for depression, of which 82 percent reported relief; and 67 percent used it for pain, of which 80 percent reported relief.¹⁶⁰ Thus, cannabis appears to have some therapeutic use for anxiety, depression, and pain with perhaps fewer side effects than found in prescription medications. This section discusses the use of cannabis for these ailments, detailing studies conducted on various groups to determine the effects of cannabis for multiple forms of anxiety including generalized anxiety, social anxiety, and PTSD. Also discussed is the use of cannabis for chronic pain caused by injuries such as back pain and illnesses such as cancer.

In 2011, a study confirmed the positive effects of cannabis use on those suffering from generalized anxiety disorder. Scientists ran a double-blind study with 24 subjects divided into a placebo group and a group that received 600 mg of CBD.¹⁶¹ The groups' anxiety levels were then tested during public speaking, a situation that most people with anxiety disorders find difficult. The study found that those who used CBD before the public speaking exercise had significantly less anxiety and experienced greater ease in speaking

¹⁵⁸ Iversen, 47.

¹⁵⁹ Robson, "Therapeutic Aspects of Cannabis and Cannabinoids."

¹⁶⁰ Jesse D. Kosiba, Stephen A. Maisto, and Joseph W. Ditre, "Patient-Reported Use of Medical Cannabis for Pain, Anxiety, and Depression Symptoms: Systematic Review and Meta-Analysis," *Social Science & Medicine* 233 (July 2019): 187, <https://doi.org/10.1016/j.socscimed.2019.06.005>.

¹⁶¹ Mateus M. Bergamaschi et al., "Cannabidiol Reduces the Anxiety Induced by Simulated Public Speaking in Treatment-Naïve Social Phobia Patients," *Neuropsychopharmacology* 36, no. 6 (May 2011): 1220, <https://doi.org/10.1038/npp.2011.6>.

than the placebo group.¹⁶² CBD has likewise been shown to lessen anxiety, similar to the results of prescription medications.¹⁶³ In further support, the National Institute on Drug Abuse reports that CBD's reduction of anxiety lessens the likelihood of drug or alcohol relapse.¹⁶⁴ This effect is important because CBD can provide a similar level of anxiety relief to some prescription medications without the intoxicating effects of THC. However, when separated from THC, CBD is far less potent at achieving a therapeutic effect such that a high dose of CBD achieves the same effect as a much lower dose of THC.¹⁶⁵

To better understand the effect of cannabis on anxiety, Karniol et al. conducted a similar double-blind study of 40 individuals who were split into different groups: some received a placebo while others different amounts of CBD.¹⁶⁶ In this study, CBD decreased the anxiety of those who consumed it. Furthermore, CBD and CBD-THC mixes have been tested numerous times in the treatment of conditions such as bipolar mania and social anxiety disorder. Such studies have established that a high dose of CBD or low dose a CBD-THC mix can lower anxiety in those who have been diagnosed with bipolar disorder or social anxiety.¹⁶⁷

Along this line, the U.S. Department of Veterans Affairs began a five-year study in February 2019 on cannabis and its medical impact among participants who suffer from PTSD, a form of anxiety.¹⁶⁸ Cannabis is believed to aid in PTSD symptoms because of its

¹⁶² Bergamaschi et al., 1224.

¹⁶³ Corroon, Mischley, and Sexton, "Cannabis as a Substitute for Prescription Drugs."

¹⁶⁴ "Non-Psychoactive Cannabinoid May Enable Drug Addiction Recovery," National Institute on Drug Abuse, March 26, 2018, <https://www.drugabuse.gov/news-events/news-releases/2018/03/non-psychoactive-cannabinoid-may-enable-drug-addiction-recovery>.

¹⁶⁵ Simon Zhornitsky and Stéphane Potvin, "Cannabidiol in Humans—The Quest for Therapeutic Targets," *Pharmaceuticals* 5, no. 5 (May 2012): 529, <https://doi.org/10.3390/ph5050529>.

¹⁶⁶ Isac G. Karniol et al., "Cannabidiol Interferes with the Effects of Δ^9 -Tetrahydrocannabinol in Man," *European Journal of Pharmacology* 28, no. 1 (September 1974): 172–77, [https://doi.org/10.1016/0014-2999\(74\)90129-0](https://doi.org/10.1016/0014-2999(74)90129-0).

¹⁶⁷ Zhornitsky and Potvin, "Cannabidiol in Humans," 540.

¹⁶⁸ Congressional Budget Office, "Cost Estimate: H.R. 712, a Bill to Direct the Secretary of Veterans Affairs to Carry Out a Clinical Trial of the Effects of Cannabis on Certain Health Outcomes of Adults with Chronic Pain and Post-Traumatic Stress Disorder, and for Other Purposes" (Washington, DC: Congressional Budget Office, 2020), <https://www.hsdl.org/?abstract&did=836757>.

effects on cannabinoid receptors in the brain. Betthausen, Pilz, and Vollmer explain this process:

CB-1 [cannabinoid-1] receptors are diffusely distributed within the central nervous system, which helps to explain the wide range of effects seen with cannabinoid receptor activation; CB-1 receptors are the primary target for modification of PTSD symptoms. With cannabinoid use, pleasure is increased, while memory and concentration can be inhibited, due to the release of acetylcholine, norepinephrine, dopamine, serotonin, and glutamate neurotransmitters. CB-2 [cannabinoid-2] receptors are concentrated in the peripheral nervous system and elicit immunosuppressive and anti-inflammatory responses when activated. Cannabinoids are highly lipophilic compounds that rapidly cross lipid membranes and the blood-brain barrier, leading to a fast onset of effect, especially when cannabinoids are inhaled.¹⁶⁹

In this way, ingesting cannabis has a rapid effect on neurotransmitters in the brain that impacts PTSD symptoms and other nervous system responses. Studies show that those suffering from PTSD are more likely to use some form of cannabis than non-PTSD sufferers, given its impact on serotonin and dopamine, which aid in sleep and mood regulation.¹⁷⁰ Rotiman et al. conducted a study on patients with chronic PTSD who ingested THC doses in addition to other psychopharmacological treatments.¹⁷¹ The results of this study indicated “a statistically significant decrease in symptom severity . . . in PTSD hyperarousal symptoms.”¹⁷² Additionally, all patients reported an improvement in sleep and frequency of nightmares, and 20 percent of them “attained complete remission of nightmares by week 3.”¹⁷³

¹⁶⁹ Kevin Betthausen, Jeffrey Pilz, and Laura E. Vollmer, “Use and Effects of Cannabinoids in Military Veterans with Posttraumatic Stress Disorder,” *American Journal of Health-System Pharmacy* 72, no. 15 (August 2015): 1280, <https://doi.org/10.2146/ajhp140523>.

¹⁷⁰ Laura Orsolini et al., “Use of Medicinal Cannabis and Synthetic Cannabinoids in Post-Traumatic Stress Disorder (PTSD): A Systematic Review,” *Medicina* 55, no. 9 (September 2019), <https://doi.org/10.3390/medicina55090525>.

¹⁷¹ Pablo Roitman et al., “Preliminary, Open-Label, Pilot Study of Add-On Oral Δ^9 -Tetrahydrocannabinol in Chronic Post-Traumatic Stress Disorder,” *Clinical Drug Investigation* 34, no. 8 (August 2014): 587–91, <https://doi.org/10.1007/s40261-014-0212-3>.

¹⁷² Roitman et al., 589.

¹⁷³ Roitman et al., 589.

Cannabis has been proven to alleviate chronic pain caused by injuries and diseases or illnesses. A study conducted by Yassin, Garti, and Robinson examined the effect of cannabis on 46 participants with chronic low back pain, sciatica, and lumbar range-of-motion issues who were taking prescription medications for pain. The participants were instructed to smoke cannabis cigarettes daily and were monitored for a period of 12 months.¹⁷⁴ Notably, 30 percent of patients reported an increased range of motion due to the pain-relieving properties of the medicinal cannabis therapy, 89 percent testified to pain relief equivalent to that of morphine, and 100 percent self-reported lower pain severity.¹⁷⁵

Another cannabis application may be for assisting in emotional distress and pain, especially in those undergoing cancer treatments such as chemotherapy.¹⁷⁶ In the 1980s, the United States (and United Kingdom) prescribed a medication called Nabilone, a synthetic form of cannabis, to reduce the side effects of chemotherapy.¹⁷⁷ A randomized control trial conducted by Regelson et al. tested this hypothesis with cancer patients who were experiencing the common side effects of weight loss, body pains, and despondency from cancer treatments.¹⁷⁸ This study took place over the course of multiple one-week periods and included capsules containing THC and a placebo. The psychological effects of THC lowered the level of depression, increased emotional stability, and induced greater tranquility.¹⁷⁹ The physical effects included a reduction in weight loss, pain, and nausea.¹⁸⁰

¹⁷⁴ Mustafa Yassin, Avraham Garti, and Dror Robinson, “Effect of Medicinal Cannabis Therapy (MCT) on Severity of Chronic Low Back Pain, Sciatica and Lumbar Range of Motion,” *International Journal of Anesthesiology & Pain Medicine* 2, no. 1 (2016), <https://doi.org/10.21767/2471-982X.100014>.

¹⁷⁵ Yassin, Garti, and Robinson, 3–4.

¹⁷⁶ David T. Brown, ed., *Cannabis: The Genus Cannabis* (Amsterdam: Harwood Academic Publishers, 2003), 235.

¹⁷⁷ Robson, “Therapeutic Aspects of Cannabis and Cannabinoids,” 2.

¹⁷⁸ W. Regelson et al., “Tetrahydrocannabinol as an Effective Antidepressant and Appetite-Stimulating Agent in Advanced Cancer Patients,” in *The Pharmacology of Marihuana*, ed. M. C. Braude and S. Szara (New York: Raven Press, 1976), 763–76.

¹⁷⁹ Regelson et al., 768–69.

¹⁸⁰ Regelson et al., 769–72.

D. NEGATIVE EFFECTS OF CANNABIS USE

Despite increasingly compelling studies pointing to efficacy in so many medical indications and applications, cannabis use inspires some controversy. The National Institute on Drug Abuse explains that “using marijuana causes impaired thinking and interferes with a person’s ability to learn and perform complicated tasks.”¹⁸¹ Similarly, the World Health Organization’s report about cannabis concludes regular users of cannabis experience problems with “verbal learning, memory and attention.”¹⁸² As explained in the beginning of this section, the consumption of cannabis affects the basil ganglia, cerebellum, hippocampus, and orbitofrontal cortex of the brain. In doing so, cannabis can impact both motor and psychomotor skills, cause short-term memory loss, and temporarily affect neurotransmitters involved in thinking, concentration, and coordination.¹⁸³ Medical research provides empirical data to support the negative impacts on cognitive and psychomotor performance associated with cannabis use. Law enforcement among other first responder and public safety professions inarguably require such top capabilities.

Research shows negative cognitive effects of recent cannabis use. Petker et al. examined data collected through the Human Connectome Project to determine the effects of cannabis use in neuropsychological performance. In the Human Connectome Project, 1,121 adults ages 22–36 were screened for their use of THC and the resulting effects through various tests.¹⁸⁴ Nine tests measured brain functionality in episodic and working memory, intelligence, ability to pay attention, executive function, decision-making at the impulsive level, processing abilities, and psychomotor dexterity.¹⁸⁵ Researchers utilize these nine tests to assess brain functionality, which is imperative in understanding the effects of cannabis, especially for law enforcement whose mental performance must be optimal.

¹⁸¹ National Institute on Drug Abuse, *Marijuana Research Report*, 5–8.

¹⁸² Hall, Renstrom, and Poznyak, *Effects of Nonmedical Cannabis Use*, 24.

¹⁸³ National Institute on Drug Abuse, *Marijuana Research Report*, 5–8.

¹⁸⁴ Tashia Petker et al., “Cannabis Involvement and Neuropsychological Performance: Findings from the Human Connectome Project,” *Journal of Psychiatry and Neuroscience* 44, no. 6 (2019): 417, <https://doi.org/10.1503/jpn.180115>.

¹⁸⁵ Petker et al., 414.

The presence of THC inhibits memory and mental agility. Using the picture sequence memory test, Petker et al. highlighted a decline in participant memory function with cannabis use. This test assessed episodic memory through the analysis of an individual's ability to reorganize pictures in a previously demonstrated order. The associated negative correlation ($r = -.165$; $p < .001$) suggests participant recall declined with the presence of THC in their urine. Similarly, through the pattern comparison processing speed test, whereby participants rapidly determine whether two adjacent images are the same, the presence of THC negatively impacted their timed performance. The results ($r = -.144$; $p < .001$) point to a reduced cognitive processing ability. Collectively, Petker et al. note the impairment of memory and mental performance following cannabis use aligns with previous research.

The findings of this study presented a poor ability to remember words that were shown to participants after having consumed cannabis, which was tested through a urine sample. The results of the correlation of cannabis use and its psychomotor impacts are associated with decreased performance in episodic memory, processing speed, and fluid intelligence.¹⁸⁶ Ultimately, Petker et al. concluded that “although the effected sizes were of small magnitude and most domains were unaffected, this study nonetheless documents potential risks of recent cannabis use to people in professions that rely on optimum cognitive performance.”¹⁸⁷

Research has shown a reduction in cognitive abilities following THC consumption, namely concept formation, memory, and the ability to interpret literature. In their double-blind study examining relationships between marijuana use, smoking techniques, and cognition, Block, Farinpour, and Braverman found that cannabis users experienced impairment effects. In this study, participants were given marijuana to smoke and then assessed on their cognitive abilities through six computerized tests and five paper exams.¹⁸⁸

¹⁸⁶ Petker et al., 414.

¹⁸⁷ Petker et al., 421.

¹⁸⁸ Robert I. Block, Roxanna Farinpour, and Kathleen Braverman, “Acute Effects of Marijuana on Cognition: Relationships to Chronic Effects and Smoking Techniques,” *Pharmacology Biochemistry and Behavior* 43, no. 3 (November 1992): 907–17, [https://doi.org/10.1016/0091-3057\(92\)90424-E](https://doi.org/10.1016/0091-3057(92)90424-E).

Each participant attended eight sessions, separated by a four-day minimum, and was asked not to consume other drugs or alcohol during the study to examine the immediate effects of marijuana. As with the Petker et al. study, Block, Farinpour, and Braverman, aimed to assess the neuropsychological performance effects of cannabis on the brain and found similar results.

In a series of tests, post-consumption effects of cannabis or a placebo were found to show a reduction in cognitive ability. In one test, the percentage correct was gathered to determine effects on the dependent of concept formation. This test resulted in 74.5 ± 1.4 for the placebo while cannabis resulted in 71.5 ± 1.4 .¹⁸⁹ In Buschke's test, the number of correctly recalled words was 5.5 ± 0.1 for the placebo and $5.2 \pm .01$ for cannabis, pointing to a decrease in memory.¹⁹⁰ Similarly, in the Iowa Tests of Educational Development, the ability to interpret literature resulted in 27.2 ± 0.5 for the placebo and 26.7 ± 0.5 for cannabis.¹⁹¹ Additional dependent variables resulted in homogeneous scores for immediate and delayed recall of propositions, paired associate learning, long-term memory, and quantitative thinking. Regarding cannabis effects over time, Ganzer et al. concluded in their systematic research study review that the results of tests were heterogeneous in that some participants were found to have varying deficits in attention, concentration, memory, and motor function.¹⁹²

E. CONCLUSION

Cannabis has been used throughout the world for centuries, and its uses are being discovered as more and more states begin to approve medical and recreational use. While cannabis arguably treats conditions that police officers regularly experience because of on-the-job stressors, studies have proven there is a reduction in cognitive abilities after having recently consumed THC. These considerations will help determine the most suitable policy

¹⁸⁹ Block, Farinpour, and Braverman, 911.

¹⁹⁰ Block, Farinpour, and Braverman, 911.

¹⁹¹ Block, Farinpour, and Braverman, 911.

¹⁹² Florian Ganzer et al., "Weighing the Evidence: A Systematic Review on Long-Term Neurocognitive Effects of Cannabis Use in Abstinent Adolescents and Adults," *Neuropsychology Review* 26, no. 2 (June 2016): 186, <https://doi.org/10.1007/s11065-016-9316-2>.

to incorporate the benefits while weighing the negatives and limiting lasting effects on duty.

The physical benefits include pain relief from lower back pain caused by duty gear and assistance with sleep, which lowers fatigue levels and ultimately reduces the use of prescription medications. In the realm of mental health, cannabis relieves anxiety disorders including PTSD and depression, which many officers endure because of daily exposure to tragic scenes and risks to life. However, there is a proven reduction in cognitive capabilities after having consumed marijuana. These include short-term memory loss and reductions in concentration, coordination, and both cognitive and psychomotor performance levels, so like alcohol, cannabis use should not be allowed while on duty or within proximity to starting a shift.

Based on all this molecular and medical research and knowledge, cannabis has been increasingly recognized as a useful substance in the treatment of many conditions that effect law enforcement officers through physical and psychological injury. Cannabis does impact cognitive functions such as decision-making and memory, which could ultimately lead to accidental injuries or death. To this notion, alcohol impacts the brain similarly, and like cannabis, its effects are typically temporary—thus rendering use of both intoxicants viable only if they are used recreationally or under the supervision of a medical professional. Such utility suggests the inclusion of cannabis in the arsenal of tools available for medical practitioners and its recognition as a viable option as a recreational substance—which obviously presents the need for a strategy built on proactive thinking about a potential shift to legalization.

Additionally, in implementing a policy, policymakers need to consider the effects of high occupational stress, both organizational and operational, on law enforcement. This stress ultimately creates ailments affecting both the mental and physical health of officers. The relief found from cannabis use, namely from anxiety and pain, provides a viable alternative to prescription opioids, which often lead to addiction and overdoses. Stress levels are ever-growing for law enforcement due to scrutiny of the occupation. The current climate of law enforcement is bringing about internal changes within agencies that, too, add stress for officers who choose to stay in the profession. Recreational cannabis use

would allow for the relief of this compounded stress while off duty. Considering all this research, and as a response to the first research question, it is recommended that a policy allowing law enforcement limited off-duty use of cannabis be implemented given the found benefits. The next chapter answers the second research question by considering how other governments and professions regulate cannabis use and how law enforcement would address specific challenges.

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IV. POLICY ISSUES

With the future in mind, agencies need to employ strategic planning regarding employee issues with legalized cannabis use, given the increase in recreational use laws at the state level and the push for federal legalization. To this notion, in January 2021, H.R. 365 was introduced in the U.S. House of Representatives, calling for a change in the scheduling of marijuana from a Schedule 1 to a Schedule 3 drug under the Controlled Substances Act.¹⁹³ This change would not only decriminalize cannabis but also allow for greater research of its benefits and risks, as noted by Baker in his thesis on federal policy reform for cannabis.¹⁹⁴ In September 2021, the bill to decriminalize and reschedule marijuana was approved by the House Judiciary Committee; however, the future is uncertain due to other priorities awaiting congressional approval.¹⁹⁵

Given the therapeutic value of cannabis, the United States should examine other countries' stances to assess whether the benefits outweigh the drawbacks of off-duty recreational cannabis use. Lessons and fundamentals can be found in foreign countries that are ahead of the United States in both medical and recreational use. This chapter reviews cannabis-use policies in U.S. states that have legalized marijuana for recreational use, and their challenges. Then, it explores other countries' policy challenges and outcomes. Additionally, the chapter compares policies in other professions, such as the medical field and the military, because of their similar stress levels from making life-and-death decisions daily, and thus the rigor with which their fitness for duty is regulated. Finally, specific challenges for law enforcement are discussed, including available technologies to determine intoxication levels and possible thresholds for cannabis in the blood.

¹⁹³ Marijuana 1-to-3 Act of 2021, H.R. 365, 117th Cong. (2021), <https://www.congress.gov/bill/117th-congress/house-bill/365>.

¹⁹⁴ Baker, "Marijuana, the Straight Dope," 39.

¹⁹⁵ Lauren Clason, "House Committee Advances Bill to Legalize Marijuana," Roll Call, September 30, 2021, <https://www.rollcall.com/2021/09/30/house-committee-advances-bill-to-legalize-marijuana/>.

A. EXISTING INTOXICATION POLICIES AND PROCEDURES IN THE UNITED STATES

1. Cannabis-Use Laws by State

According to the Governors Highway Safety Association, as of February 2021, 14 states have passed no marijuana-related laws that authorize decriminalization, medical, or recreational uses.¹⁹⁶ Nevertheless, 29 states have decriminalized marijuana, 37 states allow medical use of marijuana, and 18 states have legalized its recreational use. All states that have legalized recreational cannabis use have thereby documented opposition to the federal ban.¹⁹⁷ Table 4 summarizes the status of these laws.

Table 4. Marijuana-Related Laws on Use.¹⁹⁸

State	Decriminalized	Medical	Recreational
Alabama	No	Yes	No
Alaska	Yes	Yes	Yes
Arizona	Yes	Yes	Yes
Arkansas	No	Yes	No
California	Yes	Yes	Yes
Colorado	Yes	Yes	Yes
Connecticut	Yes	Yes	Yes
Delaware	Yes	Yes	No
DC	Yes	Yes	Yes
Florida	No	Yes	No
Georgia	No	No	No
Hawaii	Yes	Yes	No
Idaho	No	No	No
Illinois	Yes	Yes	Yes
Indiana	No	No	No
Iowa	No	No	No
Kansas	No	No	No
Kentucky	No	No	No
Louisiana	No	Yes	No

¹⁹⁶ “Marijuana-Related Laws,” Governors Highway Safety Association, February 26, 2021, https://www.ghsa.org/sites/default/files/2021-02/marijuanalaws_feb2021.pdf.

¹⁹⁷ “State Medical Marijuana Laws,” National Conference of State Legislatures, February 3, 2022, <https://www.ncsl.org/research/health/state-medical-marijuana-laws.aspx>.

¹⁹⁸ Adapted from Governors Highway Safety Association, “Marijuana-Related Laws”; National Conference of State Legislatures, “State Medical Marijuana Laws.”

State	Decriminalized	Medical	Recreational
Maine	Yes	Yes	Yes
Maryland	Yes	Yes	No
Massachusetts	Yes	Yes	Yes
Michigan	No	Yes	Yes
Minnesota	Yes	Yes	No
Mississippi	Yes	Yes	No
Missouri	Yes	Yes	No
Montana	Yes	Yes	Yes
Nebraska	Yes	No	No
Nevada	Yes	Yes	Yes
New Hampshire	Yes	Yes	No
New Jersey	Yes	Yes	Yes
New Mexico	Yes	Yes	Yes
New York	Yes	Yes	Yes
North Carolina	Yes	No	No
North Dakota	Yes	Yes	No
Ohio	Yes	Yes	No
Oklahoma	No	Yes	No
Oregon	Yes	Yes	Yes
Pennsylvania	No	Yes	No
Rhode Island	Yes	Yes	No
South Carolina	No	No	No
South Dakota	Yes	Yes	No
Tennessee	No	No	No
Texas	No	No	No
Utah	No	Yes	No
Vermont	Yes	Yes	Yes
Virginia	Yes	Yes	Yes
Washington	Yes	Yes	Yes
West Virginia	No	Yes	No
Wisconsin	No	No	No
Wyoming	No	No	No

Illinois legalized recreational cannabis use as of January 1, 2020, providing a recent example of a state diverging from federal law. The Cannabis Regulation and Tax Act allows residents over 21 to possess 30 g of cannabis flower, 500 mg of THC-infused edibles, and 5 g of cannabis concentrate for use in their private domicile and with certain

provisions.¹⁹⁹ Although the act itself does not prohibit law enforcement from using cannabis off duty, in response to the law’s passage, Illinois law enforcement agencies have banned police use, though they do allow prior use histories in hiring.²⁰⁰ Similarly, in other states such as Colorado, the recreational use of cannabis is legal for residents but not for first responders.

According to the National Conference of State Legislatures, in 1996, California’s legalization of medical cannabis heralded the trend of incoming legalizations—except for the 13 states that still prohibit medical cannabis as of February 2022.²⁰¹ Of the states that have legalized medical use, 37 states, in addition to the District of Columbia, Guam, the Northern Mariana Islands, Puerto Rico, and the U.S. Virgin Islands, have availed cannabis programs to the public.²⁰² Yet, as of February 2022, Idaho, Nebraska, and Kansas are the only states not to have “public cannabis access programs.”²⁰³

2. Recreational Use Policies in Similar Professions

In the 2018 annual crime report published by the U.S. Army, THC accounted for 68 percent of positive drug tests among service members.²⁰⁴ This report explains that the U.S. Army has seen a rise in cannabis use in states that have legalized its recreational use. Currently, all military branches prohibit cannabis use, despite declining recruitment (related in part to widespread disqualifying histories of prior use) and increasing use by active military service members.²⁰⁵ In this regard, Beth Asch, a military recruiting expert

¹⁹⁹ Illinois Cannabis Regulation and Tax Act, 410 Ill. Comp. Stat. 705 (2019), <http://www.ilga.gov/legislation/ilcs/ilcs5.asp?ActID=3992&ChapterID=35>.

²⁰⁰ Jeff Burke, “Easy Rider: Illinois Cannabis Trailer Bill Allows Public Sector Employers/Collective Bargaining Agreements to Regulate Cannabis Use by First Responders,” Illinois Fraternal Order of Police Labor Council, December 24, 2019, https://www.fop.org/?zone=/unionactive/view_article.cfm&HomeID=804881&page=legislation.

²⁰¹ National Conference of State Legislatures, “State Medical Marijuana Laws.”

²⁰² National Conference of State Legislatures.

²⁰³ National Conference of State Legislatures.

²⁰⁴ Office of the Provost Marshal General, *FY2018 Army Crime Report* (Washington, DC: U.S. Army, 2019), <https://www.documentcloud.org/documents/6523607-FY2018ArmyCrimeReport-Copy.html>.

²⁰⁵ David P. Shafer, “Legalized Marijuana and Divergent Enlistment Policies” (civilian research project, U.S. Army War College, 2015), https://sites.duke.edu/tcths_fellows/files/2015/09/DivergentMJLaws_Shaferpaper-2.pdf.

with the RAND Corporation, recommends altering enlistment requirements to overlook past use of cannabis (because of the increase in use among today's youth), which has been supported by the U.S. Army's head of recruiting, Major General Jeffrey Snow.²⁰⁶ By contrast, alcohol use while off duty for service members is permitted, but there is a zero-tolerance policy for alcohol while on duty. This disconnect suggests a need for the Department of Defense to adopt policies that reflect social change to attract and maintain personnel in the military, as it did with its more liberal acceptance of tattoos when recruitment declined due to the prohibition of ink below the elbow.²⁰⁷

As frontline workers, doctors often face similar stressors on the job to those of first responders, especially law enforcement, in that they are subject to horrific scenes and medical emergencies, and like law enforcement, their cognitive acuity and fitness for duty are a life-and-death proposition.²⁰⁸ The legalization of cannabis has not only affected government organizations such as the military but also led the medical profession to determine the best possible policy for employee use under state law. Such is the case for the medical field in California, which allows the legal use of recreational marijuana. For example, an interview published by the website MDLinx with the Medical Board of California confirmed doctors' ability to use cannabis products so long as they are consumed outside of work hours.²⁰⁹ When the board was asked whether a doctor who uses cannabis either medicinally or recreationally would forfeit his board certifications, the board responded that as with alcohol use, doctors may not be under the influence of any substance while treating patients.²¹⁰ This position allows doctors in California to use cannabis given its legal status. This policy foreshadows policies for other states that have legalized

²⁰⁶ Vanden Brook, "Giving Waivers for Marijuana to Hit Targets."

²⁰⁷ Scott Simon, "Tattoos Make Headway in Army, Myrtle Beach," NPR, April 1, 2006, <https://www.npr.org/templates/story/story.php?storyId=5317511>.

²⁰⁸ Katherine J. Gold, "Physician Mental Health and Suicide: Combating the Stigma in Medicine," American Academy of Family Physicians, accessed March 6, 2022, <https://www.aafp.org/family-physician/practice-and-career/managing-your-career/physician-well-being/suicide-prevention-and-emergency-help/combating-stigma.html>.

²⁰⁹ Naveed Saleh, "Can Doctors Smoke Marijuana?," MDLinx, December 19, 2018, <https://www.mdlinx.com/article/can-doctors-smoke-marijuana/lfc-3224>.

²¹⁰ Saleh.

recreational cannabis use, along with other careers that may similarly benefit from the therapeutic effects of cannabis.

According to the Federal Aviation Administration, 2.7 million passengers fly every day across the United States.²¹¹ Pilots, who are responsible for making those flights happen, are held to standards that allow them to decompress and socialize over the legal use of alcohol during their off times. For the airline industry, standards are an eight-hour limit from the last drink until having to fly; however, some airlines are changing to a 12-hour limit even though the Federal Aviation Administration recommends a 24-hour limit.²¹² As with law enforcement, airlines test pilots randomly and whenever there is suspicion of a pilot under the influence. The blood alcohol content (BAC) limit for airline pilots is .04 percent, which is half the typical legal driving limit (.08 percent) in most states.²¹³ There is no explicit allowance for THC levels in blood, nor is the use of cannabis allowed due to federal prohibition. It is reasonable to assume that since low levels of alcohol in the blood are tolerated in these professional contexts, the increasing legalization of cannabis will also need to be considered, especially given its therapeutic value.

B. EXISTING FOREIGN CANNABIS POLICIES AND PROCEDURES

On October 17, 2018, the Canadian government legalized recreational cannabis at the federal level, allowing for its regulated use throughout the country. In November of the same year, Great Britain legalized medical cannabis to be prescribed by Britain's National Health Service without restrictions on the conditions approved for its use.²¹⁴ Likewise, South Africa legalized cannabis in 2018.²¹⁵ However, it approved only the possession and

²¹¹ "Air Traffic by the Numbers," Federal Aviation Administration, March 19, 2020, https://www.faa.gov/air_traffic/by_the_numbers/.

²¹² Hannah Sampson, "What Happens When an Airline Pilot Is Arrested for Drinking on the Job?," *Washington Post*, August 13, 2019, <https://www.washingtonpost.com/travel/2019/08/12/what-happens-when-an-airline-pilot-is-arrested-drinking-job/>.

²¹³ "Alcohol, the Pilot, and the FAA," Aviation Medical Services, accessed August 27, 2020, <http://www.airspacedoc.com/alcohol-the-pilot-and-the-faa/>.

²¹⁴ Sajid Javid, "Government Announces That Medicinal Cannabis Is Legal," Home Office, October 11, 2018, <https://www.gov.uk/government/news/government-announces-that-medicinal-cannabis-is-legal>.

²¹⁵ "South Africa's Highest Court Legalises Cannabis Use," BBC News, September 18, 2018, <https://www.bbc.com/news/world-africa-45559954>.

growth of cannabis privately by adults for personal use. While these countries recently legalized cannabis use, the Netherlands decriminalized cannabis in 1976 and has since tolerated its use, and Uruguay legalized cannabis in 2014 but has identified a minimal increase in use since then.²¹⁶ Most evidence internationally concerns the policy issues surrounding legalization, such as enforcement and regulation. For these concerns, the discussion turns to Canada, the second country to legalize cannabis use, because of its proximity to and working relationship with the United States.

1. Canada

Unlike the U.S. military, the Canadian Armed Forces can freely consume cannabis while off duty.²¹⁷ The policies of the Canadian Department of National Defence provide strict guidelines for acceptable and unacceptable cannabis use. For example, cannabis may not be used during military training, while on missions, or on any military-related activity overseas.²¹⁸ Additional provisions include the time between consumption and the tour of duty, as well as the ability to request exceptions based on circumstances. Canadian service members must stop consuming cannabis at least eight hours before any defense-related duty and at least 24 hours before specialized duties such as weapon handling and training.²¹⁹

Moreover, the legalization of cannabis at the federal level allows police officers to consume cannabis while off duty, as with alcohol. Indeed, Canadian officers abide by what is called a “fit for duty” policy, which means that officers cannot be intoxicated while on duty.²²⁰ This policy allows supervisors to send an officer home if he or she appears to be

²¹⁶ José Miguel Cruz, Maria Fernanda Boidi, and Rosario Queirolo, “The Status of Support for Cannabis Regulation in Uruguay 4 Years after Reform: Evidence from Public Opinion Surveys: Support for Cannabis Regulation,” *Drug and Alcohol Review* 37 (April 2018): S429–34, <https://doi.org/10.1111/dar.12642>.

²¹⁷ Canadian Department of National Defence, *Use of Cannabis by CAF Members*, DAOD 9004–1 (Ottawa: Canadian Department of National Defence, 2019), <https://www.canada.ca/en/departement-national-defence/corporate/policies-standards/defence-administrative-orders-directives/9000-series/9004/9004-1-use-cannabis-caf-members.html#pbosc>.

²¹⁸ Canadian Department of National Defence.

²¹⁹ Canadian Department of National Defence.

²²⁰ “Marijuana OK’d for Off-Duty Canadian Cops,” PoliceOne, October 10, 2018, <https://www.policeone.com/canada/articles/marijuana-okd-for-off-duty-canadian-cops-y0nN7LDj0G6kkMUG/>.

intoxicated. The fit-for-duty provision is absolute and also applies to medical need. Agencies such as the Ottawa Police Department feel that allowing officers to consume a legal product is the best approach to managing the issue so long as they follow the fit-for-duty order.²²¹

Canadian policies vary widely. On the extreme end, the Calgary Police Department does not allow cannabis use by police officers, including police recruits, on or off duty.²²² Also extreme, but somewhat more moderate, the Royal Canadian Mounted Police's current policy limits cannabis use by police officers to 28 days before working a shift, a policy apparently created in the absence of clear data on intoxication levels and their effects.²²³ On a much more common-sense level, many other police administrations allow for recreational use, including the Regina Police Service, whose Chief Evan Bray has stated in an interview with Canadian press, "We don't tell our employees they cannot drink alcohol in their own time, away from work. . . . But we do expect our officers to show up for work fit for duty and, on occasions where they do consume alcohol in their spare time, they've acquired it legally and used it legally."²²⁴ In this regard, alcohol use policies should set the stage for cannabis-use policies.

As explained in Chapter III, some military and police veterans use cannabis as part of their treatment plans for ailments like PTSD and chronic pain, and this use has proven to be beneficial, which cannot be said for alcohol given its absent therapeutic value or medical use. In common-sense fashion, fit-for-duty policies allow the recreational use of legal substances but require officers on duty to be free of any intoxicant. The next section addresses ways to enforce such a policy, including what levels of THC in the blood meet the threshold for intoxication.

²²¹ "Ottawa Police Allowed to Use Cannabis Off-Duty," CBC News, October 1, 2018, <https://www.cbc.ca/news/canada/ottawa/ottawa-police-officers-allowed-to-use-cannabis-off-duty-1.4846162>.

²²² Creeden Martell, "Pot Use Policy among RCMP, Regina Police Will Differ from Banned Calgary Police Officers," CBC News, September 27, 2018, <https://www.cbc.ca/news/canada/saskatchewan/regina-police-rcmp-pot-use-policy-legalization-1.4837979>.

²²³ "RCMP Workplace Substance Use Policy," Royal Canadian Mounted Police, October 10, 2018, <https://www.rcmp-grc.gc.ca/en/rcmp-workplace-substance-use-policy>.

²²⁴ Martell, "Pot Use Policy among RCMP."

2. Other Countries

Before legalization by the Canadian government, other countries had decriminalized or legalized cannabis use. For example, in December 2013, Uruguay became the first country to legalize cannabis for trade, including cultivation and commercial sale.²²⁵ Having never criminalized possession of cannabis, in July 2017, Uruguay announced a legal nationwide market that is highly regulated.²²⁶

Some other countries have also moved toward legalization in some form. The Netherlands is a well-known destination country for vacationers who prefer to use cannabis. Contrary to popular belief, cannabis is illegal but remains decriminalized.²²⁷ Most recently, Mexico intends to implement an amended law, as of 2017, that allows for the use of medical marijuana.²²⁸ Current cannabis laws in Mexico decriminalize possession up to 5 g.²²⁹ Other countries that have either decriminalized or legalized the use of cannabis include Argentina, Australia, Belgium, Cambodia, Croatia, the Czech Republic, Denmark, Germany, Italy, Jamaica, Latvia, Portugal, Slovenia, and Spain.²³⁰ Thus, the legalization of cannabis seems to be gaining a foothold around the world, providing the United States with several real-world precedents to study.

²²⁵ Malena Castaldi and Felipe Llambias, “Uruguay Becomes First Country to Legalize Marijuana Trade,” Reuters, December 11, 2013, <https://www.reuters.com/article/us-uruguay-marijuana-vote-idUSBRE9BA01520131211>.

²²⁶ Ben Campbell, “Cannabis Legalisation in Uruguay: Public Health and Safety over Private Profit,” Transform Drug Policy Foundation, November 20, 2018, <https://transformdrugs.org/cannabis-legalisation-in-uruguay-public-health-and-safety-over-private-profit/>.

²²⁷ “What Are the Drug Laws in the Netherlands?,” Dutch Drug Policy, March 11, 2011, <https://www.holland.com/global/tourism/information/general/dutch-drug-policy.htm>.

²²⁸ Mexican Office of the Health Secretary, “Plazo de cumplimiento de la sentencia del amparo en revisión 57/2019 (reglamento de cannabis)” [Term of compliance with the judgment of protection in revision 57/2019 (cannabis regulation)], Government of Mexico, June 30, 2020, <http://www.gob.mx/salud/prensa/140-plazo-de-cumplimiento-de-la-sentencia-del-amparo-en-revision-57-2019-reglamento-de-cannabis-247017>.

²²⁹ Associated Press, “Mexico Legalizes Drug Possession,” *New York Times*, August 21, 2009, <https://www.nytimes.com/2009/08/21/world/americas/21mexico.html>.

²³⁰ “Countries Where Weed Is Illegal 2020,” World Population Review, accessed March 5, 2020, <http://worldpopulationreview.com/countries/countries-where-weed-is-illegal/>.

C. ENFORCEMENT OF CANNABIS-USE POLICIES

1. THC Intoxication Levels

One of the main issues that arises during legalization discussions is the lack of a numerical value for THC in the blood in conjunction with its effects on intoxication. This level is especially important because THC can stay in the body for days or even weeks, unlike alcohol, which is metabolized and flushed at a rate of approximately .015 per hour.²³¹ This rate becomes a concern when officers or employees are tested randomly or exhibit possible intoxication indicators. These tests should come after the failure of standardized field sobriety tests (SFSTs) and advanced SFSTs for drugs. In 2005, an expert international panel on driving under the influence of cannabis published its collective findings—including the conclusion that the effects of cannabis on driving subside within four hours of ingesting through smoking.²³² The report compares a .04 percent BAC to 4 ng/mL of THC:

The results of a meta-analysis on alcohol and driving suggests that a THC concentration in serum of about 4 ng/mL, caused by smoking or oral use of cannabis, is associated with the same overall performance impairment as blood alcohol content (BAC) of 0.04% (percent by weight). In similar sense, a BAC of 0.08% corresponds approximately to a THC concentration in serum of 9–10 ng/mL.²³³

The panel recommends a per se limit of 7–10 ng/mL when measuring blood serum or plasma or 3.5–5 ng/mL when measuring whole blood. Consideration must be given for chronic users who normally have 0–2 ng/mL of THC at any given time because these users are not currently intoxicated at such levels.²³⁴ While a consumer of alcohol who demonstrates a BAC of .04 percent is currently subject to the effects of alcohol although

²³¹ “Alcohol Metabolism,” Bowling Green State University, accessed January 19, 2022, <https://www.bgsu.edu/recwell/wellness-connection/alcohol-education/alcohol-metabolism.html>.

²³² Franjo Grotenhermen et al., *Developing Science-Based Per Se Limits for Driving under the Influence of Cannabis (DUI): Findings and Recommendations by an Expert Panel* (Semantic Scholar, 2005), <https://www.semanticscholar.org/paper/Developing-Science-Based-Per-Se-Limits-for-Driving-Grotenhermen-Leson/785622b64cd2d9b662596f5564ae70afac6bceee>.

²³³ Franjo Grotenhermen et al., “Developing Limits for Driving under Cannabis,” *Addiction* 102, no. 12 (December 2007): 6, <https://doi.org/10.1111/j.1360-0443.2007.02009.x>.

²³⁴ Grotenhermen et al., “Developing Limits for Driving under Cannabis.”

mild and not disabling, a user of cannabis with a level of 4 ng/mL in one's blood feels no effects of the drug whatsoever but merely carries that level of THC as a residual effect of chronic use.²³⁵ As with organizations that allow for an employee to report for duty with as high as .04 percent BAC, consideration should be made for THC, given the residual lasting presence but nonintoxicating effect in the blood.

As for law enforcement, the comparative substance used recreationally is alcohol. Many departments take the need to decompress into account when creating a limit for BAC levels in officers returning to work. Some police and fire departments allow employees to report for duty with a .04 percent BAC if they have not recently consumed alcohol.²³⁶ Policies must also accommodate the activities of some officers, who, in the commission of regular undercover duties, must drink alcohol with informants or other people involved in investigations but still need to drive a police vehicle. These issues are on the horizon for law enforcement administration to consider once cannabis is federally approved for recreational use.

2. Available Technologies for Enforcement

Technologies to evaluate impaired driving are important in regulating the use of recreational cannabis to prevent harm. As with alcohol, SFSTs can determine whether someone is under the influence of cannabis by asking the suspect to walk a straight line. Enforcement technologies available for alcohol accurately determine intoxication levels; however, limited tools can be used for cannabis. Typically, with alcohol, portable breathalyzer testing (PBT) machines check blood alcohol levels after the suspect fails an SFST. These PBTs produce a number, which allows officers to measure intoxication. Determining THC levels in a suspect's body involves urine or blood testing. New testing technologies currently in development and provisionally rolled out employ an oral fluid test that uses a cotton swab or a THC breathalyzer. Yet both of these tools determine only the presence of a threshold amount of THC, not the level of intoxication. The cannabis

²³⁵ Grotenhermen et al., *Developing Science-Based Per Se Limits*, 6.

²³⁶ Josh Sweigart, "Some Cops Allowed to Work after Drinking," *Journal-News*, November 18, 2013, <https://www.journal-news.com/news/some-cops-allowed-work-after-drinking/V3iD4LiZMze2PJvfAxH5MM/>.

intoxication testing industry is growing to serve the need to determine intoxication levels for cannabis, given its expanding usage.

Using oral fluid for testing purposes has increased over the years due to its advantages over blood and urine. Oral fluid is easily collected and less invasive than collecting blood samples through a blood draw. Like blood, urine samples need to be taken to a hospital with medical professionals. Although blood, hair, and urine are options to collect samples for THC, drugs can be detected in oral samples even 5–48 hours from last use. Alain G. Verstraete explains that after smoking a cannabis cigarette, the body absorbs about 5–30 mg of THC.²³⁷ This THC concentration then peaks between three and eight minutes and begins to decrease every 30 minutes to an approximate half-life. Since THC metabolizes so quickly in the body, blood samples can produce an incorrect result for THC intoxication. This instant return of results allows employers or field supervisors to test an officer if there is a suspicion of intoxication. An example of a portable alcohol breathalyzer is the Alco-Sensor FST (see Figure 3), made by Intoximeters.²³⁸ There is a need for easy-to-use technology that can detect intoxication levels of THC in an individual's body.



Figure 3. Alco-Sensor FST by Intoximeters.²³⁹

²³⁷ Alain G. Verstraete, "Detection Times of Drugs of Abuse in Blood, Urine, and Oral Fluid," *Therapeutic Drug Monitoring* 26, no. 2 (April 2004): 200–205.

²³⁸ "Alco-Sensor FST," Intoximeters, accessed March 16, 2022, <https://www.intox.com/product/alco-sensor-fst/>.

²³⁹ Source: Intoximeters, "Alco-Sensor FST."

Likewise, a portable breath collection (breathalyzer) unit is a piece of technology being developed by Cannabix Technology Incorporated, a company in Canada.²⁴⁰ Different from its competitors, the product from Cannabix uses a breath sample rather than oral fluid through a swab. As of May 2020, Cannabix released a new version of its machine, currently in the testing phase (see Figure 4).²⁴¹ According to Cannabix, detecting THC in the breath is more efficient because once consumed, it can be spread throughout the body in the blood stream, which can reduce the accuracy of the reading due to the time it stays in bodily fluids. Furthermore, the benefit of this breathalyzer is that it tests the breath for THC up to three hours after consumption—the peak intoxication time. After that, it cannot detect THC, which is beneficial because it does not generate a false positive for a small amount of THC in saliva. Because those who use cannabis regularly may have a constant level of THC in saliva but may not be intoxicated at the time of testing, this time-limited response ensures a true measure of intoxication.



Figure 4. THC Breath Analyzer.²⁴²

²⁴⁰ “Home Page,” Cannabix Technologies, accessed October 17, 2019, <http://www.cannabixtechnologies.com/>.

²⁴¹ “Cannabix Technologies Develops Version 2.0 of THC Breath Analyzer,” Cannabix Technologies, accessed May 26, 2020, <http://www.cannabixtechnologies.com/news-releases.html>.

²⁴² Source: “THC Breath Analyzer,” Cannabix Technologies, accessed January 24, 2022, <https://cannabixtechnologies.com/technology/thc-breath-analyzer/>.

Since cannabis legalization in 2018, Canadian police officers have used the Dräger DrugTest 5000 (see Figure 5), a standard testing device for THC in drivers. The United States also uses this testing unit, and various states have piloted its use, too. The Dräger unit uses a cotton swab to collect saliva from a subject’s mouth, provided he has not consumed anything within 10 minutes of testing. The swab is then put into the machine for analysis. The Dräger DrugTest 5000 also tests for drugs other than THC, including amphetamines, benzodiazepines, cocaine, methamphetamines, and opiates.²⁴³



Figure 5. Dräger DrugTest 5000.²⁴⁴

Although this machine detects a wide array of drugs, it produces results based solely on the presence of that drug in saliva. Likewise, it does not provide a measurement of the accumulation of the substance in the test subject.

A more practical device for oral fluid testing is the SoToxa by Abbott Laboratories (see Figure 6). According to an article in Oxford University’s *Journal of Analytical Toxicology*, oral fluid is the ideal specimen in testing for driving under the influence of

²⁴³ “Dräger DrugTest 5000,” Dräger, accessed August 24, 2020, https://www.draeger.com/en-us_us/Alcohol-And-Drug-Detection/Products/Alcohol-and-Drug-Testing/Drug-Testing-Devices/DrugTest-5000.

²⁴⁴ Source: Dräger.

drugs.²⁴⁵ The Michigan State Police piloted this less-abrasive oral swab testing product.²⁴⁶ To use this machine, officers collect oral fluid from the mouth of the test subject with a cotton swab and insert it into the testing machine, which uses dried reagents, a buffer, and immunoassay test strips to present a result in about five minutes. The SoToxa provides only a positive or negative reading, requiring further testing upon arrest.²⁴⁷



Figure 6. SoToxa by Abbot Labs.²⁴⁸

According to the Michigan State Police’s pilot project, on-site testing of the blood in 100 people resulted in 62 positive-positive readings, one negative-positive reading, 11 positive-negative readings, and 11 negative-negative readings.²⁴⁹ This result represents a 73 percent success rating for immediate testing. However, for delayed testing, results showed 68 positive-positive readings, one negative-positive reading, five positive-negative readings, and 11 negative-negative readings; thus, providing a 79 percent success rate. For

²⁴⁵ Allison M. Veitenheimer and Jarrad R. Wagner, “Evaluation of Oral Fluid as a Specimen for DUID,” *Journal of Analytical Toxicology* 41, no. 6 (August 2017): 517–22, <https://doi.org/10.1093/jat/bkx036>.

²⁴⁶ Michigan State Police, *Oral Fluid Roadside Analysis: Pilot Program* (Lansing: Michigan State Police, 2019), https://www.michigan.gov/documents/msp/Oral_Fluid_Report_646833_7.pdf.

²⁴⁷ Michigan State Police.

²⁴⁸ Source: “SoToxa Mobile Test System,” Abbott Labs, accessed August 24, 2020, <https://www.globalpointofcare.abbott/en/product-details/sotoxa-mobile-test-system-us.html>.

²⁴⁹ Michigan State Police, *Oral Fluid Roadside Analysis*.

comparison, alcohol PBTs can have an error margin of 15 percent to 23 percent, leaving blood testing as the best way to analyze alcohol levels.

Neither the SoToxa by Abbot Labs nor the Dräger DrugTest 5000 provides a numerical value representing the amount of a substance in someone's body but rather only a positive or negative result of the drug's presence. The cut-off level for cannabis on the SoToxa is 25 ng/mL in oral fluid, which is the equivalent of less than 1 ng/mL in whole blood. This cut-off level makes enforcement more difficult because a chronic user can have 2 ng/mL in whole blood while not being intoxicated. Therefore, the current route of blood testing for a suspected cannabis-intoxicated employee would be the best way to measure impairment by providing law enforcement agencies an accurate assessment of current cannabis intoxication.

D. CONCLUSION

Since the legalization of cannabis in many U.S. states and Canada, issues have arisen concerning employers' ability to limit recreational cannabis use. Such issues have been debated among U.S. police agencies that have seen declining recruitment, and the military has experienced an increase in illegal recreational use as well as reduced recruiting. In states such as Illinois that recently legalized recreational cannabis use, chiefs of police have pushed for the employer's right to ban its use while off duty. This stance contrasts with that of Canada, whereby military and police forces can use recreational cannabis. Meanwhile, medical professionals in California have been approved to consume cannabis products while not at work.

The fit-for-duty policy adopted by most Canadian police agencies bans any sort of intoxication during working hours but provides room for recreational cannabis use. This policy is a standard that needs to be considered when implementing a policy for law enforcement in the United States. One of the largest issues that arises concerns enforcement. SFSTs for cannabis use, as with alcohol, allows an agency to discern whether an employee is intoxicated. Moreover, cannabis mimics many of alcohol's effects on the brain and motor skills. To assist in this regard, recent technological advances can confirm the presence of THC. However, these tests allow only for a positive or negative result,

which can be skewed by detection of past use, and not the current level of intoxication. The final chapter of this thesis presents policy recommendations for agencies making informed decisions about off-duty cannabis use by law enforcement, military, and other first responders after federal legalization.

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V. CONCLUSION

This thesis aspired to identify what a department policy or directive should be for the recreational and therapeutic use of marijuana by law enforcement while off duty. The discussion on this topic began with an examination of the stressors that law enforcement faces and the negative impact on both mental and physical well-being. Considering the effects of daily stressors on police officers, this thesis examined current anti-police sentiment along with other issues that law enforcement personnel face, given their already difficult profession. Then, the discussion turned to the *Cannabis sativa* plant to better understand its effects on the body and how those effects are achieved. In examining the science behind cannabis, this thesis depicted the plant in a different light and offered considerations for policy implementation. Last, this thesis discussed policies on intoxicant use from Canada and other countries, as well as examples of other professions, such as aviation, medical professionals, and the military.

Additionally, as seen recently, distrust of law enforcement and scrutiny by both the media and the public have increased, causing lower morale and higher crime across the United States. Law enforcement faces new challenges with officers who now have PTSD or other injuries, and officer suicides. Often, police officers cannot decompress, so they suffer from conditions such as sleep apnea. The stressors that police officers endure have been amplified by nightly violent riots and looting, which have accompanied protests of police use of force. This stress, coupled with the COVID-19 pandemic, has taken a tremendous toll on police officers' levels of stress. COVID-19 has provided a new challenge to police, especially with having to enforce stay-at-home orders and mask regulations. Moreover, police officers suffer an increased exposure to COVID-19.

A. SUMMARY OF FINDINGS

Law enforcement faces an ever-increasing level of stress, far surpassing that of most people. These stresses negatively impact both mental and physical well-being. On a daily basis, police officers are exposed to violent scenes, risks to life, rotating shift work, and various other stressors. This thesis found that there are many additional factors in stress

levels for police officers. It found that police officers' stress levels are attributed to high-risk situations, military-like structures, frustrating workplace dynamics, shift work, limited availability of resources, media scrutiny, and a growing anti-police climate nationally. These stressors lead to mental health issues such as PTSD, sleep disorders, anxiety, and depression. Physical effects of stress include reduced hand–eye coordination, weight gain, and cardiovascular disease. This repetitive stress then increases fatigue, which can ultimately lead to a rise in workplace injuries. It also found that in dealing with chronic stress, which causes severe trauma and injuries, some officers use opioids for pain management, at a highly addictive cost. Last, law enforcement agencies throughout the United States are suffering from rising suicide levels due to various stresses, affecting not only officers but also their families.

In terms of cannabis, this thesis found that the main negative cognitive impact is for brain development in those who use the drug recreationally at a young age, but this danger does not apply to fully developed police personnel, who are at least 21 years old by definition. Prolonged use also shows some adverse effects; however, studies do not prove that IQ levels drop with cannabis use in general. Cannabis comprises cannabinoids, which are similar to the natural cannabinoid receptors found in the body and are responsible for changes to appetite, pain sensations, mood, and memory. The beneficial applications of cannabis include its anti-inflammatory properties, anxiety treatment, pain management, PTSD treatment, and use in cancer treatments to increase appetite, improve mood, and reduce nausea.

Like the general population, police officers also turn to recreational uses of intoxicants such as alcohol to decompress after a long day or as a way to bond in a social setting with work friends. One thing that differs is that the general population may use cannabis recreationally while law enforcement may not. While cannabis, the second-most-common intoxicant, has a therapeutic value and intoxication effects, alcohol, the most-used intoxicant, does not. This disparity between intoxicant use and the therapeutic benefits leads many states to consider recreational legalization. As such, Canada approved the use of cannabis recreationally throughout its nation. In response, some police departments still banned off-duty use; however, many departments adopted a fit-for-duty policy, which

outlines that officers shall not be intoxicated by any means while on duty but may be intoxicated off duty.

Overall, this thesis finds that police officers throughout the United States have increased stress levels that affect almost every aspect of their lives. Cannabis, however, provides some relief for ailments caused by on-the-job effects and has been used medically for ages. Alcohol, the most commonly used recreational substance, has no medicinal effects other than changes to the mood of the user, which can be volatile. When compared to alcohol, cannabis presents a viable option for recreational use that may also assist therapeutically in highly stressed officers who are unable to decompress otherwise.

B. RECOMMENDATIONS

The following recommendations should be considered when implementing a policy for the recreational use of cannabis by law enforcement officers, providing federal legalization of its use.

- **Policy Guidelines:** In consideration of the therapeutic benefits and given the extreme levels of stress in law enforcement, guidelines should closely parallel those used in Canada with their use of a fit-for-duty policy. This policy, simply put, means that no officer shall be under the influence of any intoxicant while on duty. Fit-for-duty allows for the use of cannabis while off duty but requires an employee to abstain for at least eight hours before reporting for duty.
- **Alternative to Alcohol:** In adopting such a policy, the recreational use may replace alcohol but will come with a significant therapeutic value. This policy could lead to more employee retention, increased recruitment, and most importantly, lower stress levels. Unlike alcohol, cannabis does not have long-lasting, post-use effects, such as headaches and nausea.
- **Enforcement of Policies and Oversight:** The enforcement of this policy can be through SFSTs and available oral and blood testing. Supervisors and peers shall administer fit-for-duty policies and utilize guidance for

officers' screening based on their training for the detection of substance use. Should there be any doubt of intoxication, the employee shall submit to SFSTs and then to an oral or blood test, preferably the latter, to determine THC or alcohol levels. The threshold for intoxication is recommended to be set at 7–10 ng/mL for blood serum or plasma or 3.5–5 ng/mL for whole blood. These are the recommended limits based on intoxication testing, considering that regular users may normally have THC in their bodies from previous use without any current intoxication.

As more states begin discussions on allowing recreational use, which has the backing of science, it is inevitable that the United States consider the federal legalization of recreational as many states have done. With incoming legalization in mind, law enforcement leaders will need to consider recreational use of this additional legalized substance by officers, given its therapeutic benefits, to help curb stress in a profession that yields some of the highest levels.

C. FUTURE RESEARCH

Research for this thesis was limited in terms of finding statistics on the use of cannabis or its potential use by law enforcement, namely because of its illegal federal standing. For foreign countries, data were also limited even with the legalization of recreational cannabis use in Canada. Future research would benefit from surveys of departments that permit recreational use in Canada or potential use in the United States, should recreational cannabis become legal.

In this connection, further studies should be conducted to validate the effect of cannabis on professions with high stress levels to determine its therapeutic value. This research could be done through surveys and interviews of users. They will be difficult, though, because of cannabis's prohibited use and will need to be anonymized. Overall, there is enough research that supports the high stress levels of law enforcement and the resultant need for therapeutics to improve officers' mental and physical well-being. Information on the benefits of cannabis is also available in current research; however, no

research has quantified users of cannabis either medically, therapeutically, or recreationally and the effects, either positive or negative.

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LIST OF REFERENCES

- Abbott Labs. "SoToxa Mobile Test System." Accessed August 24, 2020. <https://www.globalpointofcare.abbott/en/product-details/sotoxa-mobile-test-system-us.html>.
- AlDabal, Laila, and Ahmed S. BaHammam. "Metabolic, Endocrine, and Immune Consequences of Sleep Deprivation." *Open Respiratory Medicine Journal* 5 (2011): 31–43. <https://doi.org/10.2174/1874306401105010031>.
- Alkus, Stephen, and Christine Padesky. "Special Problems of Police Officers: Stress-Related Issues and Interventions." *Counseling Psychologist* 11, no. 2 (1983): 55–64. <https://doi.org/10.1177%2F0011000083112010>.
- American Addiction Centers. "Substance Abuse among Police." December 6, 2021. <https://americanaddictioncenters.org/police>.
- Anderson, Mark, Daniel I. Rees, and Joseph J. Sabia. *High on Life? Medical Marijuana Laws and Suicide*. IZA DP No. 6280. Bonn, Germany: Institute for the Study of Labor, 2012. <http://ftp.iza.org/dp6280.pdf>.
- Associated Press. "Mexico Legalizes Drug Possession." *New York Times*, August 21, 2009. <https://www.nytimes.com/2009/08/21/world/americas/21mexico.html>.
- Austin-Ketch, Tammy L., John Violanti, Desta Fekedulegn, Michael E. Andrew, Cecil M. Burchfield, and Tara A. Hartley. "Addictions and the Criminal Justice System, What Happens on the Other Side? Post-Traumatic Stress Symptoms and Cortisol Measures in a Police Cohort." *Journal of Addictions Nursing* 23, no. 1 (February 2012): 22–29. <https://doi.org/10.3109/10884602.2011.645255>.
- Aviation Medical Services. "Alcohol, the Pilot, and the FAA." Accessed August 27, 2020. <http://www.airspacedoc.com/alcohol-the-pilot-and-the-faa/>.
- Baker, Erik D. "Marijuana, the Straight Dope: Guidance for Federal Policy Reform." Master's thesis, Naval Postgraduate School, 2017. <http://hdl.handle.net/10945/56828>.
- Bardach, Eugene, and Eric M. Patashnik. *A Practical Guide for Policy Analysis: The Eightfold Path to More Effective Problem Solving*. 5th ed. Los Angeles: CQ Press, 2016.
- BBC News. "South Africa's Highest Court Legalises Cannabis Use." September 18, 2018. <https://www.bbc.com/news/world-africa-45559954>.

- Bergamaschi, Mateus M., Regina Helena Costa Queiroz, Marcos Hortes Nisihara Chagas, Danielle Chaves Gomes de Oliveira, Bruno Spinosa de Martinis, Flávio Kapczinski, João Quevedo, et al. "Cannabidiol Reduces the Anxiety Induced by Simulated Public Speaking in Treatment-Naïve Social Phobia Patients." *Neuropsychopharmacology* 36, no. 6 (May 2011): 1219–26. <https://doi.org/10.1038/npp.2011.6>.
- Bethausen, Kevin, Jeffrey Pilz, and Laura E. Vollmer. "Use and Effects of Cannabinoids in Military Veterans with Posttraumatic Stress Disorder." *American Journal of Health-System Pharmacy* 72, no. 15 (August 2015): 1279–84. <https://doi.org/10.2146/ajhp140523>.
- Block, Robert I., Roxanna Farinpour, and Kathleen Braverman. "Acute Effects of Marijuana on Cognition: Relationships to Chronic Effects and Smoking Techniques." *Pharmacology Biochemistry and Behavior* 43, no. 3 (November 1992): 907–17. [https://doi.org/10.1016/0091-3057\(92\)90424-E](https://doi.org/10.1016/0091-3057(92)90424-E).
- Blue H.E.L.P. "Honoring the Service of Law Enforcement Officers Who Died by Suicide." Accessed March 3, 2020. <https://bluehelp.org/>.
- . "The Numbers: Officer Suicide Statistics." Accessed May 1, 2021. <https://bluehelp.org/the-numbers/>.
- Bonsor, Kevin, and Nicholas Gerbis. "How Marijuana Works." How Stuff Works, July 2, 2001. <https://science.howstuffworks.com/marijuana3.htm>.
- Bowling Green State University. "Alcohol Metabolism." Accessed January 19, 2022. <https://www.bgsu.edu/recwell/wellness-connection/alcohol-education/alcohol-metabolism.html>.
- Brereton, George H. "Police Training: Its Needs and Problems." *Journal of Criminal Law and Criminology* 26, no. 2 (July 1935): 247–54. <https://doi.org/10.2307/1136281>.
- Breul, Nick, and Desiree Luongo. *Making It Safer: A Study of Law Enforcement Fatalities between 2010–2016*. Washington, DC: Office of Community Oriented Policing Services, 2017.
- Britannica ProCon. "Recreational Marijuana Legality by State." March 2, 2022. <https://marijuana.procon.org/legal-recreational-marijuana-states-and-dc/>.
- Brown, David T., ed. *Cannabis: The Genus Cannabis*. Amsterdam: Harwood Academic Publishers, 2003.
- Brown, Jeremy J., George A. Wells, Alain J. Trottier, Jean Bonneau, and Blake Ferris. "Back Pain in a Large Canadian Police Force." *Spine* 23, no. 7 (1998): 821–27.

Bureau of Labor Statistics. "Police Officers Factsheet." April 27, 2018. <https://www.bls.gov/iif/oshwc/foi/police-officers-2014.htm>.

———. "Table R66: Number of Nonfatal Occupational Injuries and Illnesses Involving Days Away from Work by Occupation and Number of Days Away from Work, and Median Number of Days Away from Work, Private Industry, 2020." Accessed July 13, 2020. https://www.bls.gov/iif/oshwc/osh/case/cd_r66_2020.htm.

Burke, Jeff. "Easy Rider: Illinois Cannabis Trailer Bill Allows Public Sector Employers/Collective Bargaining Agreements to Regulate Cannabis Use by First Responders." Illinois Fraternal Order of Police Labor Council, December 24, 2019. https://www.fop.org/?zone=/unionactive/view_article.cfm&HomeID=804881&page=LEGISLATION.

Callahan, Mike. "The Attack on the Police Officer's Qualified Immunity Defense." PoliceOne, June 8, 2020. <https://www.policeone.com/legal/articles/the-attack-on-the-police-officers-qualified-immunity-defense-sgocV8c2TrJCvFrU/>.

Campbell, Ben. "Cannabis Legalisation in Uruguay: Public Health and Safety over Private Profit." Transform Drug Policy Foundation, November 20, 2018. <https://transformdrugs.org/cannabis-legalisation-in-uruguay-public-health-and-safety-over-private-profit/>.

Canadian Department of National Defence. *Use of Cannabis by CAF Members*. DAOD 9004-1. Ottawa: Canadian Department of National Defence, 2019. <https://www.canada.ca/en/departement-national-defence/corporate/policies-standards/defence-administrative-orders-directives/9000-series/9004/9004-1-use-cannabis-caf-members.html#pbosc>.

Cannabix Technologies. "Cannabix Technologies Develops Version 2.0 of THC Breath Analyzer." Accessed May 26, 2020. <http://www.cannabixtechnologies.com/news-releases.html>.

———. "Home Page." Accessed October 17, 2019. <http://www.cannabixtechnologies.com/>.

———. "THC Breath Analyzer." Accessed January 24, 2022. <https://cannabixtechnologies.com/technology/thc-breath-analyzer/>.

Castaldi, Malena, and Felipe Llambias. "Uruguay Becomes First Country to Legalize Marijuana Trade." Reuters, December 11, 2013. <https://www.reuters.com/article/us-uruguay-marijuana-vote-idUSBRE9BA01520131211>.

CBC News. "Ottawa Police Allowed to Use Cannabis Off-Duty." October 1, 2018. <https://www.cbc.ca/news/canada/ottawa/ottawa-police-officers-allowed-to-use-cannabis-off-duty-1.4846162>.

- CBS Chicago. "Walmart Tests Higher Hourly Starting Wages in 500 Stores." January 24, 2020. <https://chicago.cbslocal.com/2020/01/24/walmart-tests-higher-hourly-starting-wages-in-500-stores/>.
- Chopko, Brian A., Patrick A. Palmieri, and Richard E. Adams. "Associations between Police Stress and Alcohol Use: Implications for Practice." *Journal of Loss & Trauma* 18, no. 5 (September 2013): 482–97. <https://doi.org/10.1080/15325024.2012.719340>.
- Clason, Lauren. "House Committee Advances Bill to Legalize Marijuana." Roll Call, September 30, 2021. <https://www.rollcall.com/2021/09/30/house-committee-advances-bill-to-legalize-marijuana/>.
- Congressional Budget Office. "Cost Estimate: H.R. 712, a Bill to Direct the Secretary of Veterans Affairs to Carry Out a Clinical Trial of the Effects of Cannabis on Certain Health Outcomes of Adults with Chronic Pain and Post-Traumatic Stress Disorder, and for Other Purposes." Washington, DC: Congressional Budget Office, 2020. <https://www.hsdl.org/?abstract&did=836757>.
- Corroon, James M., Laurie K. Mischley, and Michelle Sexton. "Cannabis as a Substitute for Prescription Drugs—A Cross-Sectional Study." *Journal of Pain Research* 10 (2017): 989–98. <https://doi.org/10.2147/JPR.S134330>.
- Dahlitz, Matthew. "Prefrontal Cortex." *Science of Psychotherapy*, January 4, 2017. <https://www.thescienceofpsychotherapy.com/prefrontal-cortex/>.
- Dawson, Jim. "Fighting Stress in the Law Enforcement Community." *NIJ Journal*, no. 281 (November 2019): 1–6.
- Department of Justice. "Department of Justice Report Regarding the Criminal Investigation into the Shooting Death of Michael Brown by Ferguson, Missouri Police Officer Darren Wilson." Official memorandum. Washington, DC: Department of Justice, 2015. https://www.justice.gov/sites/default/files/opa/press-releases/attachments/2015/03/04/doj_report_on_shooting_of_michael_brown_1.pdf.
- . "Shooting Death of Michael Brown—Ferguson, MO." August 9, 2019. <https://www.justice.gov/crs/timeline-event/shooting-death-michael-brown-ferguson-mo>.
- De Silva, Varuni Asanka, Nicholas Jayasekera, and Raveen Hanwella. "Cannabis Use among Navy Personnel in Sri Lanka: A Cross Sectional Study." *BMC Research Notes* 9, no. 174 (2016). <https://doi.org/10.1186/s13104-016-1988-4>.
- Dräger. "Dräger DrugTest 5000." Accessed August 24, 2020. https://www.draeger.com/en-us_us/Alcohol-And-Drug-Detection/Products/Alcohol-and-Drug-Testing/Drug-Testing-Devices/DrugTest-5000.

- Dutch Drug Policy. “What Are the Drug Laws in the Netherlands?” March 11, 2011. <https://www.holland.com/global/tourism/information/general/dutch-drug-policy.htm>.
- Federal Aviation Administration. “Air Traffic by the Numbers.” March 19, 2020. https://www.faa.gov/air_traffic/by_the_numbers/.
- Finn, Peter, and Julie E. Tomz. *Developing a Law Enforcement Stress Program for Officers and Their Families*. Washington, DC: Department of Justice, 1997.
- Ganzer, Florian, Sonja Bröning, Stefanie Kraft, Peter-Michael Sack, and Rainer Thomasius. “Weighing the Evidence: A Systematic Review on Long-Term Neurocognitive Effects of Cannabis Use in Abstinent Adolescents and Adults.” *Neuropsychology Review* 26, no. 2 (June 2016): 186–222. <https://doi.org/10.1007/s11065-016-9316-2>.
- Gold, Katherine J. “Physician Mental Health and Suicide: Combating the Stigma in Medicine.” Accessed March 6, 2022. <https://www.aafp.org/family-physician/practice-and-career/managing-your-career/physician-well-being/suicide-prevention-and-emergency-help/combating-stigma.html>.
- Goldenberg, Sol. “Decriminalization of Marijuana: Gateway to Substance Abuse?” *AMT Events* 34, no. 1 (March 2017): 4.
- Gordon, N. P., P. D. Cleary, C. E. Parker, and C. A. Czeisler. “The Prevalence and Health Impact of Shiftwork.” *American Journal of Public Health* 76, no. 10 (October 1986): 1225–28. <https://doi.org/10.2105/AJPH.76.10.1225>.
- Gorner, Jeremy, and Hal Dardick. “Chicago’s Top Cop: Police Are ‘Second-Guessing Themselves.’” *PoliceOne*, October 7, 2016. <https://www.policeone.com/officer-safety/articles/chicagos-top-cop-police-are-second-guessing-themselves-EIP7XgAl0PsDCIIC/>.
- Governors Highway Safety Association. “Marijuana-Related Laws.” February 26, 2021. https://www.ghsa.org/sites/default/files/2021-02/marijuanalaws_feb2021.pdf.
- Gradus, Jaimie L. “Epidemiology of PTSD.” National Center for PTSD, August 10, 2020. <https://www.ptsd.va.gov/professional/treat/essentials/epidemiology.asp>.
- Gramlich, John, and Kim Parker. “Most Officers Say the Media Treat Police Unfairly.” Pew Research Center, January 25, 2017. <https://www.pewresearch.org/fact-tank/2017/01/25/most-officers-say-the-media-treat-police-unfairly/>.
- Grinspoon, Peter. “Medical Marijuana.” *Harvard Health Blog*, January 15, 2018. <https://www.health.harvard.edu/blog/medical-marijuana-2018011513085>.

- Grotenhermen, Franjo, Gero Leson, Günter Berghaus, Olaf H. Drummer, Hans-Peter Krüger, Marie Longo, Herbert Moskowitz, et al. "Developing Limits for Driving under Cannabis." *Addiction* 102, no. 12 (December 2007): 1910–17. <https://doi.org/10.1111/j.1360-0443.2007.02009.x>.
- . *Developing Science-Based Per Se Limits for Driving under the Influence of Cannabis (DUIC): Findings and Recommendations by an Expert Panel*. Semantic Scholar, 2005. <https://www.semanticscholar.org/paper/Developing-Science-Based-Per-Se-Limits-for-Driving-Grotenhermen-Leson/785622b64cd2d9b662596f5564ae70afac6bceee>.
- Hall, Wayne, Maria Renstrom, and Vladimir Poznyak, eds. *The Health and Social Effects of Nonmedical Cannabis Use*. Geneva: World Health Organization, 2016. https://www.who.int/substance_abuse/publications/msbcannabis.pdf.
- Hammond, Beate, Anja Korenblik, Martin Raithelhuber, Suzanne Kunnen, Ted Leggett, Aruna Nathwani, Thomas Pietschmann, Wolfgang Rhomberg, Ali Saadeddin, and Johny Thomas. *2006 World Drug Report*. Vol. 1, *Analysis*. Vienna: United Nations Office on Drugs and Crime, 2006. https://www.unodc.org/pdf/WDR_2006/wdr2006_volume1.pdf.
- Heyman, Miriam, Jeff Dill, and Robert Douglas. *The Ruderman White Paper on Mental Health and Suicide of First Responders*. Newton, MA: Ruderman Family Foundation, 2018.
- Holmes, M. W. R., C. D. McKinnon, C. R. Dickerson, and J. P. Callaghan. "The Effects of Police Duty Belt and Seat Design Changes on Lumbar Spine Posture, Driver Contact Pressure and Discomfort." *Ergonomics* 56, no. 1 (2013): 126–36. <https://doi.org/10.1080/00140139.2012.739206>.
- Illinois State Bar Association. "Your Guide to Landlord-Tenant Law." Accessed July 28, 2020. <https://www.isba.org/public/guide/landlordtenant>.
- Intoximeters. "Alco-Sensor FST." Accessed March 16, 2022. <https://www.intox.com/product/alco-sensor-fst/>.
- Iversen, Leslie L. *Science of Marijuana*. Cary, UK: Oxford University Press, 2001. ProQuest.
- James, Spencer L., Degu Abate, Kalkidan Hassen Abate, Solomon M. Abay, Cristiana Abbafati, Nooshin Abbasi, Hedayat Abbastabar, et al. "Global, Regional, and National Incidence, Prevalence, and Years Lived with Disability for 354 Diseases and Injuries for 195 Countries and Territories, 1990–2017: A Systematic Analysis for the Global Burden of Disease Study 2017." *Lancet* 392, no. 10159 (November 2018): 1789–1858. [https://doi.org/10.1016/S0140-6736\(18\)32279-7](https://doi.org/10.1016/S0140-6736(18)32279-7).

- Javid, Sajid. "Government Announces That Medicinal Cannabis Is Legal." Home Office, October 11, 2018. <https://www.gov.uk/government/news/government-announces-that-medicinal-cannabis-is-legal>.
- Kapade-Nikam, Poonam, and Mohsin Shaikh. "Occupational Stress, Burnout and Coping in Police Personnel: Findings from a Systematic Review." *American International Journal of Research in Humanities, Arts and Social Sciences* 6, no. 2 (May 2014): 144–48.
- Karniol, Isac G., Itiro Shirakawa, Nelson Kasinski, Abraham Pfeferman, and Elisaldo A. Carlini. "Cannabidiol Interferes with the Effects of Δ^9 -Tetrahydrocannabinol in Man." *European Journal of Pharmacology* 28, no. 1 (September 1974): 172–77. [https://doi.org/10.1016/0014-2999\(74\)90129-0](https://doi.org/10.1016/0014-2999(74)90129-0).
- Killgore, William D. S., Thomas J. Balkin, and Nancy J. Wessensten. "Impaired Decision Making following 49 h of Sleep Deprivation." *Journal of Sleep Research* 15, no. 1 (March 2006): 7–13. <https://doi.org/10.1111/j.1365-2869.2006.00487.x>.
- Kosiba, Jesse D., Stephen A. Maisto, and Joseph W. Ditte. "Patient-Reported Use of Medical Cannabis for Pain, Anxiety, and Depression Symptoms: Systematic Review and Meta-Analysis." *Social Science & Medicine* 233 (July 2019): 181–92. <https://doi.org/10.1016/j.socscimed.2019.06.005>.
- Lautieri, Amanda. "Substance Abuse in Law Enforcement." Sunrise House, July 6, 2020. <https://sunrisehouse.com/addiction-demographics/law-enforcement/>.
- Locke, Wyn. "Tetrahydrocannabinol – THC." Virtual Chemistry Library. Accessed April 18, 2020. https://www.ch.ic.ac.uk/vchemlib/mim/bristol/thc/thc_text.htm.
- Mac Donald, Heather. "The Ferguson Effect Lives On." *City Journal*, December 23, 2016. <https://www.city-journal.org/html/ferguson-effect-lives-14919.html>.
- Maciag, Mike. "The Alarming Consequences of Police Working Overtime." *Governing*, October 2017. <https://www.governing.com/topics/public-justice-safety/gov-police-officers-overworked-cops.html>.
- Martell, Creeden. "Pot Use Policy among RCMP, Regina Police Will Differ from Banned Calgary Police Officers." CBC News, September 27, 2018. <https://www.cbc.ca/news/canada/saskatchewan/regina-police-rcmp-pot-use-policy-legalization-1.4837979>.
- McCreary, Donald R., Ivy Fong, and Dianne L. Groll. "Measuring Policing Stress Meaningfully: Establishing Norms and Cut-Off Values for the Operational and Organizational Police Stress Questionnaires." *Police Practice and Research* 18, no. 6 (2017): 612–23. <https://doi.org/10.1080/15614263.2017.1363965>.

- Mexican Office of the Health Secretary. “Plazo de cumplimiento de la sentencia del amparo en revisión 57/2019 (reglamento de cannabis)” [Term of compliance with the judgment of protection in revision 57/2019 (cannabis regulation)]. Government of Mexico, June 30, 2020. <http://www.gob.mx/salud/prensa/140-plazo-de-cumplimiento-de-la-sentencia-del-amparo-en-revision-57-2019-reglamento-de-cannabis-247017>.
- Michigan State Police. *Oral Fluid Roadside Analysis: Pilot Program*. Lansing: Michigan State Police, 2019. https://www.michigan.gov/documents/msp/Oral_Fluid_Report_646833_7.pdf.
- Miguel Cruz, José, Maria Fernanda Boidi, and Rosario Queirolo. “The Status of Support for Cannabis Regulation in Uruguay 4 Years after Reform: Evidence from Public Opinion Surveys: Support for Cannabis Regulation.” *Drug and Alcohol Review* 37 (April 2018): S429–34. <https://doi.org/10.1111/dar.12642>.
- Morin, Rich, Kim Parker, Renee Stepler, and Andrew Mercer. *Behind the Badge: What Police Think about Their Jobs*. Washington, DC: Pew Research Center, 2017. <https://www.pewsocialtrends.org/2017/01/11/behind-the-badge/>.
- National Center for PTSD. “How Common Is PTSD in Adults?” Accessed July 13, 2020. https://www.ptsd.va.gov/understand/common/common_adults.asp.
- National Conference of State Legislatures. “State Medical Marijuana Laws.” February 3, 2022. <https://www.ncsl.org/research/health/state-medical-marijuana-laws.aspx>.
- National Institute of Justice. “Officer Work Hours, Stress and Fatigue.” July 31, 2012. <http://nij.ojp.gov/topics/articles/officer-work-hours-stress-and-fatigue>.
- National Institute of Mental Health. “Major Depression.” February 2019. <https://www.nimh.nih.gov/health/statistics/major-depression.shtml>.
- National Institute on Drug Abuse. *Marijuana Research Report*. Washington, DC: National Institutes of Health, 2020. <https://nida.nih.gov/download/1380/marijuana-research-report.pdf?v=d9e67cbd412ae5f340206c1a0d9c2bfd>.
- . “Non-Psychoactive Cannabinoid May Enable Drug Addiction Recovery.” March 26, 2018. <https://www.drugabuse.gov/news-events/news-releases/2018/03/non-psychoactive-cannabinoid-may-enable-drug-addiction-recovery>.
- . “Prescription Opioids DrugFacts.” June 2021. <https://www.drugabuse.gov/publications/drugfacts/prescription-opioids>.
- National Police Support Fund. “Police Department Budget Cuts: How Funding Shortages Impact Safety.” July 11, 2018. <https://nationalpolicesupportfund.com/police-department-budget-cuts-officer-safety/>.

- New Zealand Drug Foundation. “Mythbusters—Death by Withdrawal.” *Matters of Substance* 21, no. 4 (November 2011). <https://www.drugfoundation.org.nz/matters-of-substance/november-2011/mythbusters-death-by-withdrawal/>.
- Nix, Justin. “Policing in America: American Policing in the Post-Ferguson Era.” *Fordham Urban Law Journal*, August 13, 2017. <https://news.law.fordham.edu/fulj/2017/08/13/policing-in-america-american-policing-in-the-post-ferguson-era/>.
- Obidoa, Chiwekwu, David Reeves, Nicholas Warren, Susan Reisine, and Martin Cherniack. “Depression and Work Family Conflict among Corrections Officers.” *Journal of Occupational and Environmental Medicine* 53, no. 11 (November 2011): 1294–1301. <https://doi.org/10.1097/JOM.0b013e3182307888>.
- Office of Community Oriented Policing Services. *Impact of the Economic Downturn on American Police Agencies*. Washington, DC: Office of Community Oriented Policing Services, 2011. <https://www.hsd1.org/?abstract&did=690751>.
- Office of the Provost Marshal General. *FY2018 Army Crime Report*. Washington, DC: U.S. Army, 2019. <https://www.documentcloud.org/documents/6523607-FY2018-ArmyCrimeReport-Copy.html>.
- Officer Down Memorial Page. “Home Page.” Accessed July 12, 2020. <https://www.odmp.org/>.
- Orsolini, Laura, Stefania Chiappini, Umberto Volpe, Domenico De Berardis, Roberto Latini, Gabriele Duccio Papanti, and John Martin Corkery. “Use of Medicinal Cannabis and Synthetic Cannabinoids in Post-Traumatic Stress Disorder (PTSD): A Systematic Review.” *Medicina* 55, no. 9 (September 2019): 1–14. <https://doi.org/10.3390/medicina55090525>.
- Parlow, Matthew J. “The Great Recession and Its Implications for Community Policing.” *Georgia State University Law Review* 28, no. 4 (2012): 1193–1238.
- Pasillas, Rebecca M., Victoria M. Follette, and Suzanne E. Perumean-Chaney. “Occupational Stress and Psychological Functioning in Law Enforcement Officers.” *Journal of Police and Criminal Psychology* 21, no. 1 (March 2006): 41–53. <https://doi.org/10.1007/BF02849501>.
- Peterson, Cora, Aaron Sussell, Jia Li, Pamela K. Schumacher, Kristin Yeoman, and Deborah M. Stone. “Suicide Rates by Industry and Occupation—National Violent Death Reporting System, 32 States, 2016.” *Morbidity and Mortality Weekly Report* 69, no. 3 (2020): 57–62. <https://doi.org/10.15585/mmwr.mm6903a1>.

- Petker, Tashia, Max M. Owens, Michael T. Amlung, Assaf Oshri, Lawrence H. Sweet, and James MacKillop. "Cannabis Involvement and Neuropsychological Performance: Findings from the Human Connectome Project." *Journal of Psychiatry and Neuroscience* 44, no. 6 (2019): 414–422. <https://doi.org/10.1503/jpn.180115>.
- Police Executive Research Forum. *Is the Economic Downturn Fundamentally Changing How We Police?* Washington, DC: Police Executive Research Forum, 2010.
- . *PERF Daily Critical Issues Report*, July 10, 2020. <https://www.policeforum.org/criticalissuesjuly10>.
- PoliceOne. "Marijuana OK'd for Off-Duty Canadian Cops." October 10, 2018. <https://www.policeone.com/canada/articles/marijuana-okd-for-off-duty-canadian-cops-y0nN7LDj0G6kkMUG/>.
- ProCon. "Defund the Police—Top 3 Pros and Cons." June 3, 2020. <https://www.procon.org/headlines/defund-the-police-top-3-pros-and-cons/>.
- Rajaratnam, Shantha, Laura K. Barger, Steven W. Lockley, Steven A. Shea, Wei Wang, Christopher P. Landrigan, Conor S. O'Brien, et al. "Sleep Disorders, Health, and Safety in Police Officers." *JAMA* 306, no. 23 (2011): 2567–78.
- Ramesh, Divya, Margaret Haney, and Ziva D. Cooper. "Marijuana's Dose-Dependent Effects in Daily Marijuana Smokers." *Experimental and Clinical Psychopharmacology* 21, no. 4 (2013): 287–93. <https://doi.org/10.1037/a0033661>.
- Regelson, W., J. R. Butler, J. Schulz, T. Kirk, L. Peek, M. L. Green, and M. O. Zalis. "Tetrahydrocannabinol as an Effective Antidepressant and Appetite-Stimulating Agent in Advanced Cancer Patients." In *The Pharmacology of Marijuana*, edited by M. C. Braude and S. Szara, 763–76. New York: Raven Press, 1976.
- Robson, Philip. "Therapeutic Aspects of Cannabis and Cannabinoids." *British Journal of Psychiatry* 178, no. 2 (February 2001): 107–15. <https://doi.org/10.1192/bjp.178.2.107>.
- Roitman, Pablo, Raphael Mechoulam, Rena Cooper-Kazaz, and Arie Shalev. "Preliminary, Open-Label, Pilot Study of Add-On Oral Δ^9 -Tetrahydrocannabinol in Chronic Post-Traumatic Stress Disorder." *Clinical Drug Investigation* 34, no. 8 (August 2014): 587–91. <https://doi.org/10.1007/s40261-014-0212-3>.
- Room, Robin, ed. *Cannabis Policy: Moving beyond Stalemate*. New York: Oxford University Press, 2010.
- Royal Canadian Mounted Police. "RCMP Workplace Substance Use Policy." October 10, 2018. <https://www.rcmp-grc.gc.ca/en/rcmp-workplace-substance-use-policy>.

- Russo, Ethan B., Andrea Burnett, Brian Hall, and Keith K. Parker. "Agonistic Properties of Cannabidiol at 5-HT_{1A} Receptors." *Neurochemical Research* 30, no. 8 (August 2005): 1037–43. <https://doi.org/10.1007/s11064-005-6978-1>.
- Russo, Ethan, and Franjo Grotenhermen, eds. *Handbook of Cannabis Therapeutics: From Bench to Bedside*. New York: Haworth Press, 2006.
- Saleh, Naveed. "Can Doctors Smoke Marijuana?" MDLinx, December 19, 2018. <https://www.mdlinx.com/article/can-doctors-smoke-marijuana/lfc-3224>.
- Sampson, Hannah. "What Happens When an Airline Pilot Is Arrested for Drinking on the Job?" *Washington Post*, August 13, 2019. <https://www.washingtonpost.com/travel/2019/08/12/what-happens-when-an-airline-pilot-is-arrested-drinking-job/>.
- Santa Maria, Andreas, Franziska Wörfel, Christine Wolter, Burkhard Gusy, Max Rotter, Sabine Stark, Dieter Kleiber, and Babette Renneberg. "The Role of Job Demands and Job Resources in the Development of Emotional Exhaustion, Depression, and Anxiety among Police Officers." *Police Quarterly* 21, no. 1 (2018): 109–34. <https://doi.org/10.1177/1098611117743957>.
- Saunders, Jessica, Virginia Kotzias, and Rajeev Ramchand. "Contemporary Police Stress: The Impact of the Evolving Socio-Political Context." *Criminology, Criminal Justice, Law & Society* 20, no. 1 (April 2019): 35–52.
- Schaub, Michael P. "Legal Weed: A Lifesaver?" Master's thesis, Naval Postgraduate School, 2019. <http://hdl.handle.net/10945/62290>.
- Schlosser, Lewis Z., and Gerard P. McAleer. "Opioid Use Disorders among Police and Public Safety Personnel: What Law Enforcement Leaders Need to Know." *Police Chief Magazine*, March 14, 2018. <https://www.policechiefmagazine.org/opioid-use-among-police-personnel/>.
- Shafer, David P. "Legalized Marijuana and Divergent Enlistment Policies." Civilian research project, U.S. Army War College, 2015. https://sites.duke.edu/tcths_fellows/files/2015/09/DivergentMJLaws_Shaferpaper-2.pdf.
- Simon, Scott. "Tattoos Make Headway in Army, Myrtle Beach." NPR, April 1, 2006. <https://www.npr.org/templates/story/story.php?storyId=5317511>.
- Smith, Patrick. "What Happens When Suburban Police Departments Don't Have Enough Money?" NPR, January 22, 2018. <https://www.npr.org/2018/01/22/579778555/what-happens-when-suburban-police-departments-dont-have-enough-money>.
- Smith, Paul A., Stephanie Chan, Alexia Blake, Amiti Wolt, Liying Zhang, Bo Angela Wan, Pearl Zaki, et al. "Medical Cannabis Use in Military and Police Veterans Diagnosed with Post-Traumatic Stress Disorder (PTSD)." *Journal of Pain Management* 10, no. 4 (2017): 397–405.

- Smith, Robert J. "Reducing Racially Disparate Policing Outcomes: Is Implicit Bias Training the Answer?" *University of Hawai'i Law Review* 37, no. 2 (2015): 295–312.
- Snyder, Meg. "NJ Considers Medical Cannabis for Menstrual Cramps." *Pharmaceutical Processing World*, April 11, 2016. ProQuest.
- Sobel, Nathaniel. "What Is Qualified Immunity, and What Does It Have to Do with Police Reform?" *Lawfare* (blog), June 6, 2020. <https://www.lawfareblog.com/what-qualified-immunity-and-what-does-it-have-do-police-reform>.
- Statistics Canada. "Police Officers by Level of Policing, by Province and Territory, 2015." March 30, 2016. <https://www150.statcan.gc.ca/n1/pub/85-002-x/2016001/article/14323/tbl/tbl02-eng.htm>.
- Sweigart, Josh. "Some Cops Allowed to Work after Drinking." *Journal-News*, November 18, 2013. <https://www.journal-news.com/news/some-cops-allowed-work-after-drinking/V3iD4LiZMze2PJvfAxH5MM/>.
- Townsend, Meg, Dana Hunt, Sarah Kuck, and Caity Baxter. *Law Enforcement Response to Domestic Violence Calls for Service*. Washington, DC: Department of Justice, 2005. <https://www.ncjrs.gov/pdffiles1/nij/grants/215915.pdf>.
- Vanden Brook, Tom. "Army Is Accepting More Low-Quality Recruits, Giving Waivers for Marijuana to Hit Targets." *USA Today*, October 11, 2017. <https://www.usatoday.com/story/news/politics/2017/10/10/army-accepting-more-low-quality-recruits-giving-waivers-marijuana-hit-targets/750844001/>.
- Veitenheimer, Allison M., and Jarrad R. Wagner. "Evaluation of Oral Fluid as a Specimen for DUID." *Journal of Analytical Toxicology* 41, no. 6 (August 2017): 517–22. <https://doi.org/10.1093/jat/bkx036>.
- Verstraete, Alain G. "Detection Times of Drugs of Abuse in Blood, Urine, and Oral Fluid." *Therapeutic Drug Monitoring* 26, no. 2 (April 2004): 200–205.
- Violanti, John M. *Shifts, Extended Work Hours, and Fatigue: An Assessment of Health and Personal Risks for Police Officers*. Buffalo: State University of New York, 2012. <https://www.ncjrs.gov/pdffiles1/nij/grants/237964.pdf>.
- Violanti, John M., Luenda E. Charles, Erin McCanlies, Tara A. Hartley, Penelope Baughman, Michael E. Andrew, Desta Fekedulegn, Claudia C. Ma, Anna Mnatsakanova, and Cecil M. Burchfiel. "Police Stressors and Health: A State-of-the-Art Review." *Policing: An International Journal of Police Strategies & Management* 40, no. 4 (2017): 642–56. <https://doi.org/10.1108/PIJPSM-06-2016-0097>.

- Violanti, John M., Desta Fekedulegn, Michael E. Andrew, Luenda E. Charles, Tara A. Hartley, Bryan Vila, and Cecil M. Burchfiel. "Shift Work and Long-Term Injury among Police Officers." *Scandinavian Journal of Work, Environment & Health* 39, no. 4 (2013): 361–68.
- Violanti, John M., Desta Fekedulegn, Tara A. Hartley, Luenda E. Charles, Michael E. Andrew, Claudia C. Ma, and Cecil M. Burchfiel. "Highly Rated and Most Frequent Stressors among Police Officers: Gender Differences." *American Journal of Criminal Justice* 41, no. 4 (December 2016): 645–62. <https://doi.org/10.1007/s12103-016-9342-x>.
- Vowles, Kevin E., Mindy L. McEntee, Peter Siyahhan Julnes, Tessa Frohe, John P. Ney, and David N. van der Goes. "Rates of Opioid Misuse, Abuse, and Addiction in Chronic Pain: A Systematic Review and Data Synthesis." *Pain* 156, no. 4 (April 2015): 569–76. <https://doi.org/10.1097/01.j.pain.0000460357.01998.fl>.
- World Population Review. "Countries Where Weed Is Illegal 2020." Accessed March 5, 2020. <http://worldpopulationreview.com/countries/countries-where-weed-is-illegal/>.
- Wyllie, Doug. "P1 Research: De-policing and Police Morale Are Troubling Trends Post-Ferguson and Dallas." PoliceOne, April 23, 2017. <https://www.policeone.com/major-event-impact/articles/p1-research-de-policing-and-police-morale-are-troubling-trends-post-ferguson-and-dallas-2wJWL16xD5Ntlkfz/>.
- Yassin, Mustafa, Avraham Garti, and Dror Robinson. "Effect of Medicinal Cannabis Therapy (MCT) on Severity of Chronic Low Back Pain, Sciatica and Lumbar Range of Motion." *International Journal of Anesthesiology & Pain Medicine* 2, no. 1 (2016). <https://doi.org/10.21767/2471-982X.100014>.
- Zaroli, Jim. "Cities Have Never Seen a Downturn Like This, and Things Will Only Get Worse." NPR, May 20, 2020. <https://www.npr.org/2020/05/20/859713720/american-cities-and-towns-face-financial-challenges-during-the-pandemic>.
- Zhornitsky, Simon, and Stéphane Potvin. "Cannabidiol in Humans—The Quest for Therapeutic Targets." *Pharmaceuticals* 5, no. 5 (May 2012): 529–52. <https://doi.org/10.3390/ph5050529>.

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