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## Suicidal Ideation Among American Indian and Alaska Natives in the United States

Lacie LaShawn Tillman  
*Walden University*

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# Walden University

College of Health Professions

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Lacie LaShawn Tillman

has been found to be complete and satisfactory in all respects,  
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the review committee have been made.

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Walden University  
2021

Abstract

Suicidal Ideation Among American Indian and Alaska Natives in the United States

by

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MPH, University of Arizona, 2011

BS, New Mexico State University, 2009

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Epidemiology

Walden University

February 2022

## Abstract

Suicidal ideation is a silent public health issue across the United States. Evidence suggests that suicidal ideation is a predictor of suicide attempt and completion. Suicide is a leading cause of death among American Indians and Alaska Natives (AIs/ANs) in the United States, especially among younger people. Alcohol and illicit drug use, coupled with poor social conditions, can lead to suicidal ideations—and sometimes suicide completion. Using social cognitive theory, this quantitative cross-sectional study compared variables within the 2017, 2018, and 2019 National Survey on Drug Use and Health to determine the effect that alcohol and/or illicit drug use has on suicidal ideations. The main independent variables were illicit drug use and alcohol use. The dependent variable was suicidal ideation and was analyzed using logistic regression. The study results revealed that age was statistically significantly associated with suicidal ideation among AIs/ANs ( $\beta = 0.423$ ,  $p = 0.02$ ,  $OR = 1.527$  [95% CI: 1.075, 2.267]) in the model that controlled for weekly alcohol use, and gender was statistically significant to suicidal ideation ( $\beta = -0.770$ ,  $p = 0.04$ ,  $OR = 0.463$  [95% CI: 0.225, 0.954]) in the model controlling for weekly marijuana/hashish use. While some of the confounders like age were significant in the illicit drug use /alcohol interaction model, the illicit drug use/alcohol interaction term, gender, educational level, and poverty level were not significant. This study has implications for social change, in that it may assist health care personnel and families in recognizing the risk for suicide and how to score risk factors encountered on a weekly basis.

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## Dedication

This dissertation is dedicated to my husband, my children, my mother, and the rest of my family who have endured this challenging and rewarding process in my life. We have evolved together. I love you all so much and I am so grateful for your presence in my life. Thank you for enduring this grueling journey.

Last, but not least, I dedicate this piece of literature to my father, who passed away in 2012; he was my academic cheerleader—determined to help me succeed. I wish every girl could have someone like him. Thank you, Dad—I miss and love you so much.

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I would like to thank my dissertation committee (Dr. Srikanta Banerjee, Dr. Vasileios Margaritis, and Dr. Simone Salandy) for supporting and believing in me. My committee has endured countless hours guiding and helping me get through this rigorous stage of my academic career. There were many late nights, many edits, and many conversations of improvements to be made as well as triumphs to be celebrated. They challenged me to a better scholar and researcher. I truly believe this is the best committee at Walden University. They did not make it easy for me because they wanted me to reach my highest potential and to be taken seriously as a scholar. They sacrificed their time for me. They also showed their unwavering passion and commitment to the field of public health. To them, I am forever thankful and grateful.

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## Chapter 1: Introduction to the Study

### **Suicidal Ideation Among American Indian and Alaska Natives in the United States**

Suicidal ideation is a silent public health issue across the United States. Globally, suicide claims approximately 800,000 lives every year (Dhingra et al., 2015; Kliem et al., 2017). Suicidal ideation, or suicidal thoughts, refers to thoughts of killing oneself (McNulty et al., 2019) and it can lead to suicide attempts (Jeong & Park, 2020). There is a dire need to better understand factors of suicidality, especially suicidal cognitions or thoughts (McNulty et al., 2019). Suicidal thoughts and nonlethal suicidal attempts are common; therefore, research on interventions and prevention tactics is needed (McNulty et al., 2019). Before an individual attempts or completes a suicide, there are thoughts. One way to prevent suicide and its cost to families and society is to focus on preventing suicidal ideation. In the United States, suicide is among the top 10 leading causes of death (Hong et al., 2018). Evidence suggests that suicidal ideation is a predictor of suicide attempt and completion (Choi et al., 2017), especially the frequency of suicidal ideation (Kliem et al., 2017). Furthermore, De Luca and colleagues (2016) found a relationship between suicidal ideation, mental health, and substance use severity. Risk factors of suicidal behavior include a prior suicide attempt, agitation, substance abuse (Taylor et al., 2016), child abuse, mental health disorders, low socioeconomic status (Kliem et al., 2017), and exposure to suicidal behavior (Dhingra et al., 2015; Leavitt et al., 2018).

Among American Indian/Alaska Natives (AIs/ANs), there is a greater risk for suicide than for any other ethnic or racial group in the United States (Almendreaia, 2015;



Ballard et al., 2015; Cwik et al., 2016; Dilliard et al., 2017; Tucker et al., 2016; Wexler et al., 2016), and more needs to be done to prevent suicidal ideation. Among 18 states participating in the National Violent Death Reporting System, suicide rates for AIs/ANs were the highest—21.5 per 1,000 (Leavitt et al., 2018). According to Leavitt et al. (2018), suicide rates for AIs/ANs are “historically higher than those of the total U.S. population” (p. 239). Many studies have highlighted the apparent risks that proliferate among AIs/ANs when it comes to suicide, such as social isolation, exposure to suicide, personal perception, (Zamora-Kapoor et al., 2016), mental illness, substance abuse (Tucker et al., 2016), poverty, unemployment, acculturation, discrimination, and family dysfunction (Wexler et al., 2016). Suicidal ideation has many risk factors, and the two of interest to me in this study were alcohol and illicit drug use.

### **Background**

The use of alcohol and illicit drugs could be considered substance abuse disorders. The likelihood that an AI/AN has an alcohol (Leavitt et al., 2018) and/or drug use disorder is high compared to other ethnic/racial groups in the United States (Spear et al., 2013). Suicide rates are the highest among the younger population of Native Americans/American Indians (Almendreaia, 2015; Cwik et al. 2016; Wexler et al., 2016; Zamora-Kapoor et al., 2016). AI/AN youth attempt more suicides and die of suicide more often than their racial counterparts (Zamora-Kapoor et al., 2016). Alcohol use and abuse rates have been high in Native Americans/American Indians (NA/AI) along with an elevated risk of alcohol-related mortalities (Venner et al., 2018). NA/AI youth are starting to drink alcohol at younger ages than their racial counterparts (Rees et al., 2014).

AI/AN youth are using/drinking more alcohol than other 12- to 17-year-olds of differing ethnic groups across the United States (Leavitt et al., 2018). AI/AN children are initiating the use of alcohol, marijuana, methamphetamine, and other drugs and have a higher average rate of drug injections (Spear et al., 2013). All of these statistics are especially troubling because the largest percentage of the AI/AN population is aged 10–24 years—and the most suicides occur in this age group (Leavitt et al., 2018).

### **Problem Statement**

To the best of my knowledge, there has not been a research study that addressed alcohol and illicit drug use in conjunction with suicidal ideation among AIs/ANs, despite the disturbing prominence of mental health disorders in studies that involve this target population (Rieckmann et al., 2016). Mental health disorders such as posttraumatic stress disorder (PTSD) and substance use can be contributors to suicidality (McNulty et al., 2019). The use of alcohol and illicit drugs could be considered substance abuse disorders. The likelihood that an AI/AN has an alcohol (Leavitt et al., 2018) and drug use disorder is high compared to other ethnic/racial groups in the United States (Spear et al., 2013).

Young Native Americans/American Indians are experiencing the highest suicide rates, attempting more suicide, and dying as a result of suicide more often compared to other racial groups (Almendraia, 2015; Cwik et al., 2016; Wexler et al., 2016; Zamora-Kapoor et al., 2016). Alcohol is having a severe negative impact on Native Americans/American Indians (NAs/AIs): high alcohol use, high alcohol abuse rates, elevated risk of alcohol-related mortalities (Venner et al., 2018). The impact of alcohol is especially concerning among the American Indian/Alaska Native youth because they are

starting to drink alcohol at younger ages than their racial counterparts (Rees et al., 2014), and using/drinking more alcohol than other 12- to 17-year-olds of differing ethnic groups across the United States (Leavitt et al., 2018). AI/AN children are also using other illicit drugs such as marijuana, methamphetamine, and other injectable drugs (Spear et al., 2013). Since the most suicides occur in the younger AI/AN population, the prevalent use of alcohol and illicit drugs in this age group is very concerning (Leavitt et al., 2018).

### **Purpose of the Study**

The purpose of this survey study was to test social cognitive theory by relating alcohol and illicit drug use to suicidal ideation for American Indians and Alaska Natives in the United States. This theory is a good framework to study variables that could increase the risk of suicidal ideation in this target population, such as alcohol and illicit drug use. Poverty, domestic violence, low educational status, exposure to suicide, and other social inequities plague the AI/AN population, significantly impacting children and adults. In 2013, AIs/ANs aged 12–17 years had the second highest rates of heavy drinking and illicit drug use compared to other racial/ethnic groups (Dickerson et al., 2016). AIs/ANs appear to be especially susceptible to illicit drug and alcohol use; thus, the independent variables in this study were alcohol use and illicit drug use.

The independent variable of illicit drug use was defined as the time period in which the individual most recently used cocaine, heroin, or methamphetamine by needle. The other independent variable of alcohol use was defined as the number of drinks a week within the last 12 months. The dependent variable was suicidal ideation, and it was defined as whether or not an individual seriously thought about killing themselves. These

definitions were based on how the data were collected from the National Study on Drug Use and Health (NSDUH) and how this study defined the variables in its codebook.

When an interviewer was sent to the homes of respondents, they provided each respondent with a laptop to type/enter in the answers to the questions, which usually took approximately 1 hour (Substance Abuse and Mental Health Services Administration [SAMHSA], 2019). Respondents entered their responses for each question, choosing from various options, including “I don’t know,” “Refuse to answer,” and “No answer.”

This quantitative study’s purpose was to identify and investigate the influence that certain behaviors and/or risk factors have on suicidal ideation among AIs/ANs in the United States, to potentially assist the medical field or communities in prevention efforts. The behaviors that could be considered risk factors were alcohol and illicit drug use, both of which could be considered a type of substance abuse disorder (Spear et al., 2013). Because there appears to be very limited, if any, valid data that compare the risk factors that may indicate suicidal ideation among AIs/ANs, this quantitative study added to existing literature by exploring possible factors in recognizing and preventing suicide in this target population. In general, the risk of suicide is linked to several factors (Tucker et al., 2016; Wexler et al., 2016; Zamora-Kapoor et al., 2016), but among AIs/ANs, varying degrees of substance abuse (i.e., alcohol and illicit drug use) may indicate the presence of suicidal ideation. It was the purpose of this study to investigate those levels of alcohol and illicit drug use that may alert medical and mental health practitioners that an individual/patient may be thinking about suicide.

## Research Questions and Hypotheses

The main research question addressed what risk factor(s) are more indicative of suicidal ideation among AIs/ANs. The independent variables were alcohol use and illicit drug use. Illicit drug use was defined as the time period in which the individual most recently used cocaine, heroin, methamphetamine, marijuana, hallucinogens, tranquilizers, pain relievers, stimulants, or sedatives. The NSDUH codebook (Center for Behavioral Health Statistics and Quality, 2018) defined the following as illicit drugs: marijuana, hallucinogens, inhalants, methamphetamine, tranquilizers, cocaine, heroin, pain relievers, stimulants, and sedatives (p. 306). Alcohol use was defined as the number of drinks per week within the last 12 months. The dependent variable was suicidal ideation. Suicidal ideation was defined as whether or not an individual seriously thought about killing themselves. The first research question was as follows:

RQ1: Is alcohol use a predictor for suicidal ideation among AIs/ANs in the United States after controlling for age, gender, poverty level, and educational level?

$H_0$ : Alcohol use is not a predictor for suicidal ideation among AIs/ANs in the United States after controlling for age, gender, poverty level, and educational level.

$H_1$ : Alcohol use is a predictor for suicidal ideation among AIs/ANs in the United States after controlling for age, gender, poverty level, and educational level.

The second research question was as follows:

RQ2: Is illicit drug use a predictor for suicidal ideation among AIs/ANs in the United States after controlling for age, gender, poverty level, and educational level?

*H<sub>0</sub>*: Illicit drug use is not a predictor for suicidal ideation among AIs/ANs in the United States after controlling for age, gender, poverty level, and educational level.

*H<sub>1</sub>*: Illicit drug use is a predictor for suicidal ideation among AIs/ANs in the United States after controlling for age, gender, poverty level, and educational level.

The third research question was as follows:

RQ3: Are alcohol and illicit drug use additive interactive predictors for suicidal ideation among AIs/ANs in the United States after controlling for age, gender, poverty level, and educational level?

*H<sub>0</sub>*: Alcohol and illicit drug use are not additive interactive predictors for suicidal ideation among AIs/ANs in the United States after controlling for age, gender, poverty level, and educational level.

*H<sub>1</sub>*: Alcohol and illicit drug use are additive interactive predictors for suicidal ideation among AIs/ANs in the United States after controlling for age, gender, poverty level, and educational level.

### **Nature of the Study**

This study involved quantitative analysis of cross-sectional secondary data.

Quantitative research is consistent with understanding suicidal ideation risks among

AIs/ANs from the health datasets provided by the NSDUH (SAMHSA, n.d.). The NSDUH is cross-sectional survey research that captures useful data on drug use and mental health behaviors among civilians. Survey research was the preference for this study due to its ability to describe a population without conducting a true experiment (Burkeholder et al., 2016). One of the biggest advantages of using the NSDUH as the data set was the opportunity to analyze data with a large number of AIs/ANs involved in one study. The AIs/ANs were from all areas of the United States and from different tribes; one day, future NSDUH data may be broken down further into tribe-by-tribe, community-by-community data.

Every year, roughly 70,000 randomly selected people aged 12 years and over answer questions about alcohol, drug, and tobacco use; mental health; and other health-related issues for the NSDUH (SAMHSA, n.d.). Types of statistical data have been collected by interviewers who visit and interview randomly selected households across the nation as part of a mandate of the Public Health Service Act (SAMHSA, n.d.). Essentially, the NSDUH provides consistent information about drug use across the nation—information that any government agency, private organization, and the public can utilize (SAMHSA, n.d.). Fortunately, there are ample data available regarding the Native American and Alaska Native target population within the dataset for the NSDUH.

With Institutional Review Board approval from Walden University, there is a mutual agreement established between Walden University and the SAMHSA allowing the study to utilize and publish data concerning American Indians and Alaska Natives. The secondary data from NSDUH are confidential, anonymous datasets involving the

variables of interest: suicidal ideation and alcohol and drug use. I am the only person with access to the datasets, and they will be destroyed 5 years after my dissertation has been completed.

### **Assumptions**

The main assumption for this study was that all NSDUH participants who considered themselves as “American Indian or Alaska Native” correctly identified themselves as this ethnic group. Some American Indian or Alaska Native tribes or villages are not state or federally recognized; this brings up the question of validity—What determines a true American Indian or Alaska Native? Is it blood quantum? Blood quantum is generally how much blood a certain individual has of a certain tribe or pueblo—mainly based on lineage. Is American Indian or Alaska Native identity based on knowledge of language and/or culture? Or an individual declaring themselves American Indian or Alaska Native by checking off the box beside “American Indian or Alaska Native”? Sometimes there is no way to verify that each survey respondent is American Indian or Alaska Native. This assumption is important because it limits the generalizability of the study results.

Another assumption was the ethical treatment of study participants or respondents despite the information given by the SAMHSA website. The SAMHSA website maintains the confidentiality and privacy of the respondents. At the end of the survey, each respondent receives \$30.00 for their participation; there is the assumption that \$30.00 does not influence an individual to falsify their responses. False responses are a



constant threat to survey data and study designs because they could decrease the validity of a study (Landrock & Menold, 2016).

### **Scope and Delimitations**

The scope of this study involved examining the relationship between alcohol and illicit drug use against suicidal ideation with a large sample of AIs/ANs. A public health issue among this target population is suicide, and one way to prevent suicide is to recognize the main risk factors for suicidal ideation. Due to the prominence of alcohol and illicit drug use among AIs/ANs, it is believed that these environmental factors significantly increase suicidal ideations.

Only respondents who labeled themselves as “American Indian and/or Alaska Native” were included in the study as data were provided by the NSDUH. All other ethnic or racial groups were excluded. Individuals who opted not to answer questions regarding alcohol use, illicit drug use, or suicidal ideation were excluded. A comparable theory that was considered for this study but later excluded was the interpersonal theory of suicidal behavior (Ma et al., 2016). The interpersonal theory of suicidal behavior focuses on suicide and acknowledging two main risk factors: dissatisfied belonging and hopelessness (Ma et al., 2016). When thwarted belongingness and perceived burdensomeness are combined with suicidal ideation, it could lead to further suicidal behavior—suicide attempt and/or suicide completion (Opperman et al., 2016). The interpersonal theory of suicidal behavior mainly aims toward understanding the leading causes of suicide (Batterhan et al., 2018), but it was not compatible for this study because

there were too many levels to address with precollected, or secondary, data that did not coincide.

### **Limitations**

The biggest limitation to this study was the secondary level of data. The study had already been conducted, and the data were available through a website. There was no control over how the data were collected or what questions were asked. The quality of the data may also be a problem because respondents were not forced to answer all questions on the survey, nor were they forced to be truthful (Hajia, 2019). There could have been errors in the data input (Hajia, 2019) by either the respondent or the computer software.

### **Significance**

While suicide is an unfortunate common occurrence among AI/AN communities, there is a need to better identify individuals who have the highest risks for suicide. The consequences of suicide do not stop at the individual level, especially among AIs/ANs. Families and communities continue to suffer for years from the aftermath of someone they know committing suicide, dealing with the exposure of suicide and becoming at risk for attempting suicide themselves. The cycle will continue until there are initiatives and prevention techniques to address the rise in suicide among AIs/ANs. Through this research, health practitioners working with AIs/ANs may be better equipped to address suicidal ideation in their community. Eventually, this advancement may lead to more AI/AN communities adopting prevention strategies such as a suicide surveillance system (Zamora-Kapoor et al., 2016), which may aid in the ability of each tribal community to accurately monitor suicide rates (Cwik et al., 2016). Generally, routine assessments of

suicidal thinking do not occur in day-to-day clinical settings, but they should as an added layer of suicide prevention (Kliem et al., 2017). Many AIs/ANs have limited access to healthcare facilities, so when these individuals do visit, it is an opportunity for screening and prevention.

AIs/ANs in the United States have endured many traumatic hardships that have threatened to destroy their culture, languages, and way of life (Braveheart et al., 2012; Pember, 2015). Within the last 100 years, AI/AN communities underwent government attempts at mass genocide, colonization, and assimilation in which children were forcibly taken from their homes and transported to boarding schools hundreds, even thousands, of miles away; children were beaten and shamed for practicing their culture or language; and reservation lands were reduced smaller and smaller by decisions beyond the power of the tribes (Bluehen-Unger et al., 2017; Braveheart et al., 2012). As a result, many AIs/ANs could possibly be suffering with PTSD but have never received a proper diagnosis. Historical loss or trauma is not listed as a mental health disorder in the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5; American Psychiatric Association, 2016); researchers such as Ni et al. (2017) believe that it should be. Historical trauma could influence an individual to feel unworthy, which is another risk factor for suicide. Addressing this research, I have sought to support social change by increasing awareness about the potential connection between substance abuse and suicidal ideation. AIs/ANs are at a higher risk for suicide, and there should be a stronger public health effort to address this disparity and prevent suicidal ideation. Mental health issues, especially suicidal ideation, need to be addressed within the AI/AN population

because there are so few AIs/ANs and none of them need to be lost to suicide—generations are depending on the decisions of today to make a positive difference through positive social change.

### **Summary**

This study could help the health practitioner better recognize and identify AIs/ANs who may be at the highest risk for a suicide attempt or completion through risk scoring of suicidal ideation. Above all, this study may help a disadvantaged population of people better understand their prevalent risks for suicide and hopefully address which behaviors (alcohol or illicit drug use) are negative for their mental health or have an additive interaction with each other. Through research and analysis, solutions to public health problems can be identified. With a silent public health issue such as suicidal ideation among AIs/ANs, research is limited and intriguing. In Chapter 2, I further delineate what is present in the literature regarding mental illness and suicidal ideation.

## Chapter 2: Literature Review

### **Suicidal Ideation, Alcohol, and Illicit Drug Use**

The literature related to suicidal ideation is scarce but continues to evolve in answering the cause and identifying significant risk factors. For the purposes of this study, literature searches were limited to the last 5 years of publication and the following keywords on Walden library search engines: *American Indians, Alaska Natives, Alaskan Natives, Native Americans, suicidal ideation, suicide ideation, suicidal thoughts, suicide, substance abuse, illicit drug use, and alcohol use*. Peer-reviewed article searches were conducted on all literature within the Walden University library with the consultation of Walden librarians.

Suicide among AI/AN people is a serious community-level issue; it is a silent public health epidemic among the youth (Caetano et al., 2020; Fitzgerald et al., 2017). It is the leading cause of death among young AI/AN people in some geographic areas of the United States and among some federally recognized tribes (Leavitt et al., 2018). In 2015, the suicide rate for AIs/ANs participating in the National Violent Death Reporting System was 21.5 per 100,000 (Leavitt et al., 2018). In Alaska, suicide is the leading cause of death for AIs/ANs aged 16-34 (Dillard et al., 2007)—the young generation. The same holds true for many AI/AN villages, pueblos, and reservations across the United States. Suicide occurs in just about every AI/AN community and continues to occur—even for a demographic group that constitutes less than 3% of the general population.

Suicide impacts American Indian and Alaska Native communities more than the communities any other racial group (Ivanich & Teasdal, 2018). Numerous health and

social disparities collide to influence suicidal ideation. AIs/ANs tend to be poor, unemployed, and uneducated; experience health issues; experience mental health issues; abuse substances; experience forms of domestic abuse; and live in urban areas (Leavitt et al., 2018). According to Leavitt and colleagues (2018), AIs/ANs who completed suicide had 2.1 greater odds of a positive alcohol toxicology test than their White counterparts and 2.4 odds of exposure to the suicide of a friend or family member. American Indians are more likely to have alcohol abuse disorders (Burduli et al., 2018), making them more likely to have suicidal ideations.

When suicide occurs in an AI/AN community, it impacts and touches the entire community; it exposes everyone to suicide. Exposure to suicide is a risk factor for suicide attempt or completion (Leavitt et al., 2018)—when people see it happen in their communities, or even their neighborhood, they experience trauma and transform themselves into individuals at a higher risk for suicidal ideation and eventually suicide attempt or completion. Trauma relating to suicide exposure is a devastating risk factor because it has the ability to influence dangerous events long into the future (Leavitt et al., 2018). Individuals who have lost important people in their lives and long to be with them, individuals who do not feel like they fit in, individuals who have witnessed a suicide or found someone who committed suicide (Leavitt et al., 2018), individuals who are not succeeding in life, and individuals who are abusing alcohol and/or illicit drugs—these are the people who may attempt a suicide or complete it. Sometimes, within social circles, a completed suicide can set off a phenomenon known as a “suicide contagion,” which is

when suicide behaviors occur close in time in close social circles (Leavitt et al., 2018, p. 240).

This problem is exacerbated when AIs/ANs move away from their ancestral lands to make more money for their families—they lose connection with their ancestral lands and culture. While living in urban areas, AIs/ANs continue to suffer and commit suicide. The change in geography does not change the fact that AIs/ANs are committing suicide, and only their communities experience this devastating public health issue. The entire community is exposed to a risk factor for suicidal ideation and suicide: exposure to suicide (Leavitt et al., 2018). Prevention is needed in AI/AN communities—identifying the high-risk factors and addressing them. One high-risk factor is suicidal ideation: thinking about or contemplating suicide.

If an individual thinks about ending their life (suicidal ideation), it can be accelerated by the use of alcohol or illicit drug use. Alcohol is known to have the effects of euphoria or generating “liquid courage,” much like enabling an individual to achieve a goal (no matter how grave it is). It does not help that American Indians have the highest alcohol use rate compared to the general population: 10.7 % versus 7.6%, respectively (Burdoli et al., 2018). Moreover, coupled with illicit drugs, suicidal ideation can be intensified, as illicit drug use can cause hallucinations. Combined with suicidal ideation, alcohol and illicit drug use may enable an individual to attempt or commit suicide.

Monitoring, tracking, public health education, and developing policies continue to guide the suicide issue among American Indians and Alaska Natives. Prevention efforts should center more on suicidal ideation, preventing the frequency of suicidal ideations or

the risk factors for suicidal ideation. In many cases, the cause of an individual's suicide is unknown, so much of the research centers on the risk factors, and when there is a significant combination it might be able to predict a suicide, thereby initiating preventative techniques or experimenting with a different treatment option.

Unfortunately, there appears to be no uniform treatment option for AIs/ANs contemplating suicide; each individual is unique, and their tribal identity only adds to the complexity of treatment and prevention initiatives. What works for one AI/AN or tribe may not work for another; the public health approaches, much like treatments, must be customized for each person (Venner et al., 2018). Ultimately, it helps if the medical or health practitioner is culturally sensitive and has a working knowledge of the tribe(s) that they service. Aside from medical and behavioral health practitioners, the triage staff of Indian Health Service (IHS) or border town hospitals usually form the first line of communication between an AI/AN experiencing suicidal ideation, and how such staff handle these individuals could play a big role in the outcome of their suicidal ideations. Are staff able to make a connection and influence everyone to seek out mental and/or behavioral health services? Many times, AIs/ANs fail to report their substance abuse (Leavitt et al., 2018) and/or fail to sustain behavioral or mental health services for their suicidal ideations or related mental health issues for various reasons. There may be times when the medical practitioner is confused about the proper diagnosis for each individual, as there are current arguments between the International Classification of Diseases (ICD) and the DSM, as suggested by Chung et al. (2017). AIs/ANs are such unique people that if medical practitioners are confused about some level of substance use order among the



general population, it could be less conclusive among the minority populations—populations that do not have a saturation of participation in such studies as those conducted by Chung et al. (2017). In reality, the behavioral health practitioner may be a Caucasian female who is far removed from AI/AN culture, traditions, and language. Or if the behavioral health practitioner and support staff are community members, privileged medical information may be communicated as gossip—who wants to continue services at an institution that does not respect privacy? As such, AIs/ANs may not receive the professional help that they need and may continue to spiral into hopelessness. If the downward spiral continues, an individual may contemplate suicide (suicidal ideation) as an answer to their problems.

### **Theoretical Framework**

The theoretical framework applied to this study was social cognitive theory (Kershaw et al., 2015) because it addresses the role of individual and social influences on a certain outcome—for this study, suicidal ideation. social cognitive theory is a good foundational theory because it demonstrates how factors in one’s environment can have an effect on an outcome (Kershaw et al., 2015). Behaviors such as drinking alcohol can contribute to outcome expectancy (Hasking et al., 2015)—in this study, drinking and illicit drug behavior may have informed suicidal ideation. The outcome expectancy (Hasking et al., 2015) of suicidal ideation may result in an individual’s decision to consume alcohol or use illicit drugs. Their suicidal self-efficacy, or “belief that they succeed in a particular situation” (Heydari et al., 2014, p. 20), is increased by the presence of alcohol and illicit drug use. I further pose that suicidal ideation in

combination with alcohol or illicit drug use could increase the occurrence of suicide among AIs/ANs—with alcohol and/or illicit drug use, there is more confidence that the individual will succeed in suicide.

Social cognitive theory has been used in suicidology research previously by multiple researchers. For instance, Moon et al. (2015) used social cognitive theory to study the impact that bullying or peer victimization had on suicide among a young population; peer victimization was the environmental or social effect that the researchers were studying in relation to suicide. Moon and colleagues also listed substance use as a risky suicidal behavior, or a risky environmental factor. Social cognitive theory indicates that the surrounding environment can impact the behavior of an individual just as much as, if not more than, personal factors (Moon et al., 2015). Fu et al. (2009) used social cognitive theory to investigate the impact that media influence has on suicidality or studying elements of observational learning as participants had to answer questions about suicide stories. Hasking (2017) used social cognitive theory to determine outcome expectancies of risky drinking being used a tool for nonsuicidal self-harm. The outcome expectancy is always presumed to be suicide completion, so which risky behaviors would an individual choose to partake in to achieve this outcome? I believe that alcohol and illicit drug use are risk indicators for suicidal ideation among AIs/ANs in the United States.

### **Literature Review Related to Key Variables/Concepts**

Several articles relating to suicidal ideation and the suicide behaviors of alcohol and illicit drug use among AIs/ANs are described here. Leavitt et al. (2018) identified

alcohol use as an important risk factor for suicidal behavior and emphasized the importance of culturally sensitive interpersonal and community-level policies for AIs/ANs. Burduli and colleagues (2018) identified the highest prevalence of alcohol abuse disorders among American Indians—as well as the presence of the coaddition of alcohol and drugs among this target population. Ivanich and Teasdale (2016) considered adolescence the most dangerous time for suicidal ideation among AIs/ANs. Ni et al. (2017) found high prevalence rates of illicit drug use in their study involving a specific American Indian Tribe; cocaine use rated 21% and LSD use rated 13%, while the general American Indian population's use rate was 11.2%.

The cultural differences that are unique to this population need to be taken into consideration when tailoring interventions. Several articles highlight the importance of understanding and identifying the specific ramifications. Rieckmann et al. (2016) showcased racial differences that may hinder AIs'/ANs' exposure to preventative methods. Zamora-Kapoor et al. (2016) found a high presence of suicidal ideation among American Indian and Alaskan Native adolescents. Wood and Hays (2014) identified the inconsistencies in identifying AIs/ANs in issues related to substance abuse, such as alcohol and illicit drug use. Patterson Silver Wolf et al. (2014) indicated that American Indians and Native Alaskans have the highest prevalence of substance abuse and their alcohol misuse can be associated with suicide. Herne et al. (2014) stated that although suicide rates are high among American Indians and Alaska Natives, the rates also vary across tribes, or communities, making public health planning more complex and imaginative.

The entire literature surrounding suicidal ideation is quite interesting, even when there are few resources relating to American Indian and Alaska Natives. Nationally, suicide is the 10<sup>th</sup> leading cause of death, and it impacts the young population the most (Fitzgerald et al., 2017; Hong, 2018). It is increasing nationally and even more among American Indian/Alaska Natives (Leavitt et al., 2018), which is disturbing because this demographic group is among one of the smallest and most vulnerable, representing less than 2% of the general population (Ivanich & Teasdale, 2018). Very few, if any, studies have focused on suicidal ideation and its relationship with suicide attempt or completion—this leaves a clear gap in the analysis of suicide among American Indians/Alaskan Natives. Although many authors have pondered the suicide rates among American Indians/Alaskan Natives, none have been able to determine the true cause because every tribe and community are different. Epidemiologic research on suicide among American Indians and Alaska Native communities is thinly scattered across peer-reviewed journals in the scientific community—and for the research that is available, the following themes have been formulated from the peer-reviewed articles between 2014 and 2019.

### **Suicide Rates**

Within the AI/AN demographic group, suicide rates are very high and dangerous (Herne et al., 2014; Leavitt et al., 2018). Leavitt and colleagues (2018) claimed that suicide rates are historically high among this demographic group. Dillard et al. (2017) also demonstrated high suicide rates among Alaska Natives. AI/AN girls 10-19 years old are committing suicide at a higher rate (26 times) than their non-AI/AN counterparts

(Eggertson, 2017). In fact, AI/AN youth have the highest rate of suicide of any demographic group (Burrage et al., 2016). According to Ivanich and Teasdale (2018), the suicide rate was 15.6 per 100,000 during 2012 and 2013 for American Indians.

### **Mental Health and/or Behavioral Health Service Utilization**

When AIs/ANs visit the hospital or clinic for a suicide-related case, they are more likely to be female, living in an urban area, and around 32 years old (Dillard et al., 2017). One study in Alaska was able to find high service utilization of a doctor prior to a suicide (Dillard et al., 2017); indicating that many people came into contact with a medical practitioner or medical worker prior to their suicide. At the clinic and hospital level, more work needs to be done to recognize suicidal individuals or at least take concern when individuals match risk indicators for suicide, such as an American Indian/Alaska Native male being treated at the hospital for alcohol-related injuries (Dillard et al., 2017). Dillard and colleagues (2017) went further to say that any AI/AN with any hospital-related visit involving an injury should be screened for suicide. Conversely, approximately one third of suicide-related deaths had no primary care, emergency/urgent, and no visits to other ambulatory clinics (Dillard et al., 2017).

### **Suicide Risk Indicators**

Another study found that AIs/ANs who are single, are unemployed, and have less than a high school education are most likely to attempt suicide (Dillard et al., 2017). AIs/ANs who receive Medicaid or Medicare or have no health insurance have higher odds of a suicide-related visit (Dillard et al., 2017). Leavitt and colleagues (2018) named nonmetropolitan residence, positive toxicology testing, and experience with a suicide as

leading factors of suicide among AIs/ANs. Fitzgerald et al. (2017) identified substance abuse as a serious risk factor for AI/AN children. AI/AN girls are more likely to attempt suicide than boys (Fitzgerald et al., 2017).

### **Substance Abuse Use (Alcohol and Illicit Drugs)**

American Indians have the highest prevalence of alcohol abuse disorders among all demographic groups (Burduli et al., 2018). Research by Peng et al. (2017) suggested that American Indians may have certain genetic properties that place them at higher risk for alcohol use disorders (AUDs) compared to European Americans. Peng et al. further suggested that American Indians are 4 to 5 times more likely to have an AUD or other drug dependence. The negative impacts of alcohol have been documented among American Indians and Alaska Natives with high rates of alcohol abuse (Ivanich & Teasdale, 2016; Venner et al., 2018). Northern Plains Indians tend to have the highest lifetime prevalence of AUDs, while American Indians in the Southwest have the lowest (Burduli et al., 2018). In Alaska, while other behaviors are identified as nonfatal, “alcohol has been strongly linked to fatal suicide attempts” (Dillard et al., 2017, p. 35). Six-year-old children in an Aboriginal community have been known to sniff gas and then attempt suicide (Eggertson, 2014). In a national study, it was found that AIs/ANs with completed suicides had twice the odds of a positive alcohol toxicology test; they more than likely consumed alcohol hours before their death (Leavitt et al., 2018). Additionally, AIs/ANs are more likely to have used illicit drugs, such as marijuana, amphetamines, antidepressants, and opioids, before their completed suicide (Leavitt et al., 2018). According to Leavitt et al. (2018), substance abuse is a “risk factor for suicidal behavior”

(p. 241). Coaddiction of two or more substances, namely alcohol and illicit drugs, is less studied, and there is little information; however, there is evidence that American Indians are concurrently using “alcohol and an illicit drug” at higher rates “compared to other ethnic groups in the United States” (Burduli et al., 2018, p. 588).

### **Indigenous Health**

When addressing AI/AN suicide among the youth, there is more of a push to emphasize strong indigenous health: “where the traditional knowledge of Indigenous peoples is valued and their capacity to devise solutions to their own health is respected” (Barker et al., 2017, p. e210). With the incorporation of Western and traditional medicine, AIs/ANs are able to use cultural and traditional remedies while utilizing the treatments provided by the local clinics and hospitals such as surveillance systems (Leavitt et al., 2018) or traditional practitioners.

As a way to combat suicide, many want to re-engage their cultures, traditions and languages; building on the resilience that the American Indian/Alaska Natives Elders possess. Suicide and suicidal ideation are issues for the younger generation of AIs/ANs, it is not among the older population—the Elders. AI/AN Elders are strong individuals who have lived through decades of change and strife, and yet they continue to lead tribes and instill hope. Hope that life gets better. Hope is what drives younger generations of AIs/ANs to survive. Hope that someday they are able to be self-sustaining and successful. Hope that they are not a statistic and recognize their value as an AI/AN on this earth.

### **Historical or Intergenerational Trauma**

For one of the first times, historical trauma has been linked to suicidal ideation among AIs/ANs (Fitzgerald, et al. 2017). The health of AI/AN people have been affected by historical trauma, so much that the younger generations are expected to abuse alcohol and other substances (Brockie, Dana-Sacco, Wallen, Wilcox & Campbell, 2015; Burdoli et. al., 2018). As a population AIs/ANs already experience severe historical trauma and in some cases prejudice and racist violence (Bluehen-Unger et al., 2017). AIs/ANs were degraded for speaking their language and practicing their culture. AI/AN children were taken from their families and forced to live in dorms far away from their homelands and everything they knew—some as young as 3. In these assimilation camps or schools, AI/AN were forced to learn about Christianity, Catholicism and military-style learning while being abused emotionally, physically, and sexually—these tragic events happened and they should be acknowledged in order for AIs/ANs to heal (Bluehen-Unger et al., 2017). Only after the healing occurs is it be possible to understand how and why historical trauma impacts some people more negatively than most—such as becoming addicted to alcohol and drugs.

### **Inclusion of American Indians and Alaska Natives Within Studies or Research**

American Indians and Alaska Natives (AIs/ANs) are a small demographic of the overall U.S.A. population and this is much the case among the general study participants—AIs/ANs are under-represented in peer-reviewed academic studies. Many challenges exist when including AIs/ANs in scientific studies such as poor participation (Burduli et al., 2018) or correctly identifying what is an “American Indian or Alaska



Native” (Wood & Hays, 2014). Although it may seem like identifying American Indians and Alaska Natives is a simple task, it is not. How studies have identified American Indians and Alaska Natives in their studies may have caused them to be invalid (Wood & Hays, 2014). There are generally three (3) forms of identification: self-identification, tribal enrollment, and administrative identification (Wood & Hays, 2014). Many notable national surveys utilize self-identification to define an individual being American Indian or Native American, such as the Behavior Risk Factor Surveillance Survey; this is especially concerning because it is not always a valid method to determine or categorize an individual as AI/AN (Wood & Hays, 2014). Other studies have overlooked the presence of AI/AN participants and do not provide a demographic category for them, instead they are categorized under “Other Race” or “Another Race”, (Wood & Hays, 2014) which greatly diminishes their statistical representation in major studies. Among national studies and surveys, the trend of including Native Americans and Alaska Natives into the “Other Races” category is becoming increasingly concerning and unethical.

Today, many AIs/ANs hardly speak their language or know their traditions and cultures. A drive through an AI/AN town, village, or pueblo might not yield as many transient individuals who seem to have lost their way, abuse substances, and sleep wherever they can; exposing themselves to various forms of violence and exposure to the elements. Many travel a fine line of tribal identity and modernity; when does one’s identity end and the other begin? Can they both exist? Identity among AIs/ANs is a complex population issue that makes examining behaviors like alcohol and illicit drugs use difficult (Wood & Hays, 2014). Past studies have struggled with valid study samples

of AIs/ANs which sometimes led to threats of validity of the study results; much of it rests with “American Indian or Alaska Native” identity (Wood & Hays, 2014). How are AIs/ANs defined besides tribal enrollment? Who determines AI/AN identity? Can a study rely on self-reporting identity? Herne et al. (2014) claim that racial misclassification is a reason that most study samples of AIs/ANs are invalid.

### **Summary**

In general, AIs/ANs are not studied too often and as a result the literature that exists on the subject is scarce. Even more scarce is the AI/AN literature on suicidal ideation, how to recognize it and more so, how to prevent it. As it is, medical practitioners are over worked and need tools that help them better care for their patients. This study can yield identifiable risk factors for suicidal ideation among AIs/ANs, thereby preventing suicide attempts and completions across AI/AN communities in the United States. Epidemiological data on tribal lands is scarce. The NSDUH allows researchers the ability to manipulate and study secondary data that comes from American Indians and Alaska Natives: the target population. With data from NSDUH, this study manipulated certain variables to determine, if any, the effect that alcohol and illicit drug use has on suicidal ideation among American Indians and Alaska Natives. In the next section, data from the NSDUH is extracted and analyzed to determine the impact of alcohol and illicit drug use on suicidal ideation.

## Chapter 3: Research Method

### **Introduction**

This study used secondary data from the 2017, 2018, and 2019 NSDUH to investigate the impact of alcohol and illicit drug use on suicidal ideation among American Indians and Alaska Natives (AI/AN) in the United States. Suicide is a major public health issue among this population, and more effective preventative strategies are needed to ensure that AIs/ANs receive the help that they need. With the secondary data available from the NSDUH, this cross-sectional study was completed without the primary use of human subjects, but with valuable data provided by human respondents from across the United States. It is unlikely for AI/AN studies to have more than 1,000 participants, and this study contained more than 2,000 AI/AN respondents. More respondents/participants meant more power for the study, especially as it related to AIs/ANs. The main independent variables were alcohol use and illicit drug use. Both variables are present in AI/AN society, and they were a focus of this study. The dependent variable was suicidal ideation. Suicide has a devastating impact on every AI/AN community, and one way to prevent it is to understand and address the initial stages: suicidal ideation.

### **Research Approach**

Due to the availability of data on AIs/ANs from SAMHSA, this study used secondary data to address assumptions about the risk scoring of suicidal ideation. Do alcohol and/or illicit drug use influence suicidal ideations among AIs/ANs? In general, data on AIs/ANs are limited to maybe 100 participants, whereas the NSDUH can feature

more than 3,000 AI/AN respondents (3% of the average 70,000 respondents)—this increased the power of the study. With available data, certain variables are measured against each other to determine the relationship to suicidal ideation.

### **Study Design**

The cross-sectional study design was most effective because it focused on a time period in which the data were collected (Creswell, 2009) by NSDUH. The independent variable of Research Question 1 was alcohol use while the dependent variable was suicidal ideation. The independent variable of Research Question 2 was illicit drug use while the dependent variable was suicidal ideation. The independent variable of Research Question 3 was alcohol and illicit drug use while the dependent variable was suicidal ideation.

The statistical data were analyzed using logistic regression and cross tab with alcohol use and illicit drug use as the independent variables and suicidal ideation as the dependent binary variable controlling for age, sex, poverty level, and educational level. Fitzgerald et al. (2017) analyzed the “relationship between the presence of protective variables and past-year suicide attempt” (p. 44) in a similar way using logistic regression. In this study, logistic regression was used because there was one or more independent variables and one binary dependent variable; this predictive test helped to describe the data and explain the relationship between the variables (Wang et al., 2017). Many national surveys analyze data using logistic regression and are able to make predictions, such as that it is more likely for an AI/AN suicide to be preceded by an argument or preceded by consuming alcohol (Leavitt et al., 2018). There are also instances where

AIs/ANs are included in studies but only comprise a very small percentage of the sample size or where researchers claim to focus on ethnic minorities but exclude AIs/ANs (Hong et al., 2018).

### **Research Design and Rationale**

The purpose of this survey study was to test social cognitive theory, which relates alcohol and illicit drug use to suicidal ideation for American Indians and Alaska Natives in the United States. This theory surmises that environmental factors can influence an individual's thoughts or actions. With the availability of alcohol and illicit drugs and the horrific combinations of environmental stressors, it would seem that AIs/ANs have more risk of suicidal ideation. A cross-sectional study was appropriate because, in this case, an enormous amount of data on the target population were available through the NSDUH. Although a longitudinal study would have yielded better data, it was not practical for the amount of time and money that it would have required to follow a group of American Indian or Alaska Natives for a number of years. The subject matter of suicide is also a culturally sensitive topic that many AIs/ANs do not want to discuss. The aim of this study was to ascertain a causal relationship between the independent variables and the one dependent variable. Does alcohol or illicit drug use contribute more to suicidal ideation? Does the combination contribute more to suicidal ideation than one single variable? Other research designs seem to yield lower numbers of the AI/AN population in the sample size as research participants; a larger number of participants from the target population could yield a higher power for the study. Qualitative studies are beneficial in that they yield detailed self-reported information from the participants, which can lead to new

understandings about a population; however, there is usually a small group of participants (Creswell, 2009)—and sometimes even lower participation from AIs/ANs. Mixed methods studies involve a combination of quantitative and qualitative methods, which also means customized alignment with research questions, timing, weighting, mixing of the data, and transforming perceptions from the theory or theories of choice (Creswell, 2009). Although qualitative and mixed methods have their advantages, a quantitative approach through survey research allows for an analysis based on secondary data. For this study, a quantitative method should yield insight into the effect that alcohol use and illicit drug use have on suicidal ideation among American Indians/Alaska Natives in the United States.

### **Methodology**

This study used archival, or secondary, data from the 2017, 2018, and 2019 NSDUH. This national survey allows researchers to utilize the variables provided to run certain SPSS tests, such as cross tabs and binary logistic regression. The archival data to be used from 2017-2019 in this study are available through the NSDUH website (<https://nsduhweb.rti.org/respweb/homepage.cfm>).

### **Population**

The target population for this study was American Indians and Alaska Natives (AIs/ANs) in the United States. In general, AIs/ANs make up about 2-3% of the general population and are usually underrepresented in research studies. Most studies feature less than 100 total participants who are AIs/ANs, impeding the ability to generalize the results. More recent studies on AIs/ANs, such as a 2020 study from Caetano and

colleagues, are beginning to utilize multiple years of secondary data to make inferences surrounding this population. By combining several years of secondary data on AIs/ANs, one can have a larger sample size of the target population and be able to increase the power of the study as well as the ability to make better generalizations from the data to the public. Each AI/AN participant self-reported their race to be American Indian or Alaska Native in the 2017-2019 NSDUH.

### **Definitions of Variables**

In this study, there were three main variables: alcohol use, illicit drug use, and suicidal ideation. Before an individual attempts suicide, they may think about it (suicidal ideation), and those thoughts need to be prevented or at least recognized as a significant indicator of suicide attempt and completion (Burke et al., 2018). Alcohol use is defined as when an individual consumes an amount of alcohol. Illicit drug use is when an individual consumes an amount of illicit drugs. In the NSDUH, there are many variables related to drug use and mental health (suicidal ideation) under examination, which is extremely advantageous because it includes a sample of Native Americans/Alaska Natives (SAMHSA, n.d.). Certain variables in the NSDUH relate to the variables of interest to this study.

The variables with the NSDUH for this study to focus on were NEWRACE2, IRSEX, POVERTY3, CATAG6, EDUHIGHCAT, SUICTHINK, ALDAYPWK, MRDAYPWK, CCDAYPWK, HRDAYPWK, HALLDAYPWK, INHDAYPWK, and METHDAYPWK (SAMHSA, n.d.). The variable “SUICTHINK” was used to determine measurements for suicidal ideation. The variable “ALDAYPWK” was used to measure

weekly alcohol use and referred to responses to the following NSDUH question: How many days in the past week did you consume alcohol? (SAMHSA, n.d.). The variables MRDAYPWK, CCDAYPWK, HRDAYPWK, HALLDAYPWK, INHDAYPWK, and METHDAYPWK were used to measure illicit drug use due to all variables fitting the description for illicit drug use and the availability of these five variables in the form of days per week, which was consistent with the ACLDAYPWK, or the other independent variable. The independent variable “MRDAYPWK” measured weekly marijuana/hashish use, or illicit drug use, and referred to the following question: How many days per week did you smoke marijuana and/or hashish this past year? (SAMHSA, n.d.). The independent variable “CCDAYPWK” measured weekly cocaine use, or illicit drug use, and referred to the following question: How many days per week did you use cocaine over this past year? (SAMHSA, n.d.). The independent variable “HRDAYPWK” measured weekly heroin use and referred to the following question: How many days per week did you use heroine in the past year? (SAMHSA, n.d.). The independent variable “HALLDAYPWK” measured hallucinogen use, or illicit drug use, and referred to the following question: How many days per week in the last week did you use hallucinogens? (SAMHSA, n.d.). The independent variable “INHDAYPWK” measured weekly inhalant use, or illicit drug use, and referred to the following question: How many days per week did you use inhalants in the past week? (SAMHSA, n.d.). The independent variable “METHDAYPWK” measured weekly methamphetamine use, or illicit drug use, and referred to the following question: How many days in the past week did you use methamphetamine in the last year? (SAMHSA, n.d.). The variable “IRSEX” referred to



two levels of response: male or female (SAMHSA, n.d.) The variable “POVERTY3” referred to three levels of response: living in poverty, income up to 2x federal poverty threshold, and income more than 2X federal poverty threshold (SAMHSA, n.d.). The variable “EDUHIGHCAT” referred to five levels of response: less high school, high school grad, some college/associate degree, college graduate, and 12–17 years old (SAMHSA, n.d.). The variable “CATAG6” referred to six levels of responses: 12–17 years old, 18–25 years old, 26–34 years old, 35–49 years old, 50–64 years old, and 65 or older (SAMHSA, n.d.). The variable “NEWRACE2” referred to seven levels of responses: non-Hispanic White, non-Hispanic Black/African American, non-Hispanic Native American/Alaska Native, non-Hispanic Native Hawaiian or Pacific Islander, non-Hispanic Asian, and non-Hispanic more than one race (SAMHSA, n.d.). This study utilized Level 3, or Non-Hispanic Native American/Alaska Native, to run binary logistic analysis specific to the research question. For all variables, there were several layers to each variable beyond the traditional “yes” or “no” answer, such as “I don’t know,” “blank,” and “refuse to answer”; however, this did not affect the binary requirement of the dependent variable for logistic regression as the data could be filtered (SAMHSA, n.d.).

### **Sampling and Sampling Procedures**

The data had already been collected by SAMHSA through random sampling. Once a participant was identified, they were contacted for an appointment to complete the NSDUH. Samples were taken from all 50 states, and if a selected individual declined, no other person could be substituted for that slot. Over 70,000 participants from across the

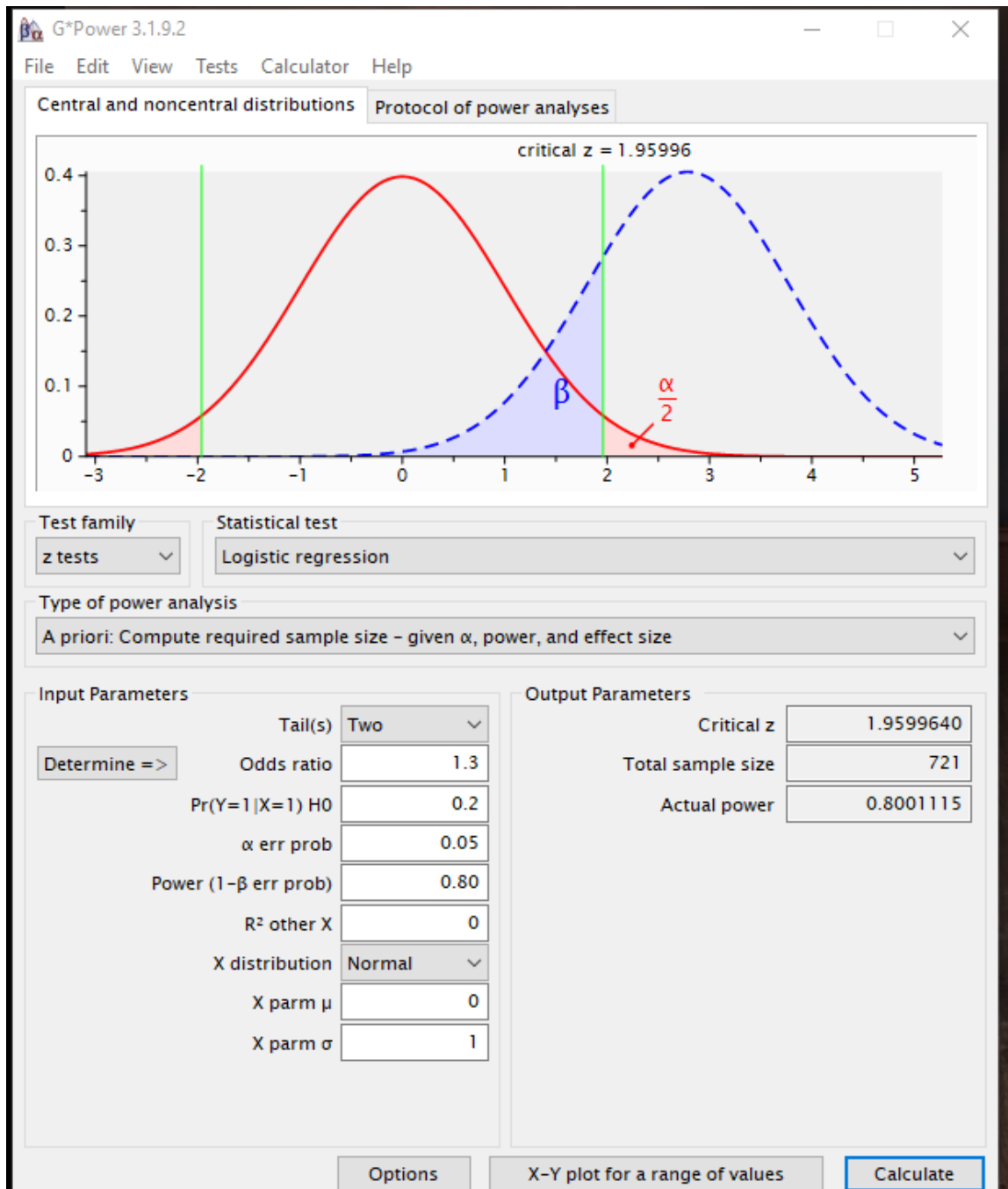
United States participated in this study, which produced valuable information about the behaviors of drug use and mental health. Drug use and mental health are sensitive subjects, and most people would not divulge such information to anyone—as such, this study was performed with confidentiality and professionalism. Responses were not recorded or entered in by the researcher or interviewer; they were entered into a computer/laptop by the respondent or participant. Data produced by the NSDUH are valuable and were a great source for this study, as the NSDUH considers American Indians and Alaska Natives and most other studies do not have nearly as much American Indian and Alaska Native participation.

### **Power Analysis**

While other researchers have opted to conduct qualitative (Dickerson et al., 2016) and mixed methods studies, a quantitative design for this population group using existing data was an ideal choice because of the larger sample size. Researchers who have been able to conduct experimental studies using all-American Indian/Alaska Native participants usually have had a sample size of around 100 participants (Burduli et al., 2018). While a sample size of 100 produces power for a study, a study involving 1,000 or more yields even more power, an attribute needed for epidemiological research on AIs/ANs. See Figure 1 for the priori power analysis, which yields a suitable sample size of 721 participants to achieve 80% power. The larger the sample size, the easier it is to achieve the 0.05 level of significance as well as reducing baseline indicators and population variance. The study could have a 5%, or 0.05, alpha because it indicates that

there is a 5% chance of the significant difference being attributed to chance and it is not true, or if there was a significant difference 5% would be because of chance.

Figure 1

*A Priori Power Analysis*

The effect size is 1.3 because there is more than one unit difference between the individuals who have suicidal ideation and those who do not. Thus, the odds ratio is more than one because this study aims to significantly identify alcohol and illicit drug use within AIs/ANs as having higher odds of suicidal ideation; the exposure is alcohol and illicit drug use, and the outcome is suicidal ideation.

Within the NSDUH, respondents are allowed to provide a limited range of answers, such as “I don’t know,” “refused to answer,” “legitimate skip,” “yes,” “no,” and so forth (SAMHSA, n.d.), but for the purposes of this study—especially with logistic regression requiring a binary dependent variable—only yes and no answers were considered for analysis. Although this may have reduced the number of eligible participants in the sample size, it was necessary to ensure that variables remained binary if needed. The odds ratio was more than one because this study aimed to significantly identify alcohol and illicit drug use within AIs/ANs as having higher odds of suicidal ideation; the exposure was alcohol and illicit drug use, and the outcome was suicidal ideation. The beta was set at 0.20, or a 20% chance that the significant difference was missed. Thus, the power of the study was 80%, or 0.80 (Power = 1 -  $\beta$ ).

### **Study Variables**

The independent variables were alcohol use and illicit drug use, as seen in Table 1. Illicit drug use is defined as the number of times that an individual used cocaine, heroin, crack, hallucinogens, inhalants, or methamphetamine per week in the last 12 months or year. Alcohol use was defined as the number of days per week that alcohol was used in the last 12 months or year. The dependent variable was suicidal ideation. Suicidal

ideation was defined as whether or not an individual seriously thought about killing themselves; only yes or no responses were utilized. Age was defined as the age of the respondent, and the variable named CATAG6 was used because it segmented into six levels: 12–17 years old, 18–25 years old, 26–34 years old, 35–49 years old, 50–64 years old, and 65 years or older. Gender was defined as the self-reported sex of the respondent, and the variable was labeled as IRSEX throughout the 2017–2019 NSDUH data. Poverty level was defined as the reported poverty level of each respondent based on their self-reported income, and the variable was labeled as POVERTY3 throughout the 2017–2019 NSDUH data. Educational level was defined as the reported educational level of the respondent, and it was labeled as EDUHIGHCAT throughout the 2017–2019 NSDUH data.

**Table 1**

*Identification of Study Variables: Alcohol and Illicit Drug Use on Suicidal Ideation*

Variable	Level of measurement	Independent or dependent
Alcohol use	Interval	Independent
Illicit drug use	Interval	Independent
Suicidal ideation	Nominal	Dependent
Age	Interval	Independent
Gender	Nominal	Independent
Poverty level	Nominal	Independent
Educational level	Nominal	Independent

## Data Analysis Plan

There are three research questions under investigation in this study. There are two independent variables and one dependent variable. The one dependent variable is dichotomous, in which only two responses are utilized from the NSDUH. As with all surveys, respondents are given several options to respond, such as “Refuse to Answer” or “I don’t know.” Each answer is usually coded as a number and for the purposes of this study only the “Yes” and “No” responses are considered for the dependent variables of suicidal ideation.

Since there is one dichotomous outcome/variable and more than one independent variable, the data analysis tool is multiple logistic regression. The first research question is as follows: Is alcohol use a predictor for suicidal ideation among AIs/ANs in the United States after controlling for age, gender, poverty level, and educational level?

$H_0$ : Alcohol use is not a predictor for suicidal ideation among AIs/ANs in the United States after controlling for age, gender, poverty level, and educational level.

$H_1$ : Alcohol use is a predictor for suicidal ideation among AIs/ANs in the United States after controlling for age, gender, poverty level, and educational level.

For the 1<sup>st</sup> research question, binomial logistic regression (BLR) is used to apply the independent variables to the dichotomous dependent variable. This data analysis tool helped determine an equation to predict the probability of suicidal ideation as a function

of alcohol use. What are the odds that alcohol use is a predictor for suicidal ideation among AIs/ANs?

The second research question is as follows: Is illicit drug use a predictor for suicidal ideation among AIs/ANs in the United States after controlling for age, gender, poverty level, and educational level?

*H<sub>0</sub>*: Illicit drug use is not a predictor for suicidal ideation among AIs/ANs in the United States after controlling for age, gender, poverty level, and educational level.

*H<sub>1</sub>*: Illicit drug use is a predictor for suicidal ideation among AIs/ANs in the United States after controlling for age, gender, poverty level, and educational level.

For the 2<sup>nd</sup> research question, BLR is used to apply the independent variables to the dichotomous dependent variable. This data analysis tool helped determine an equation to predict the probability of suicidal ideation as a function of illicit drug use. What are the odds that illicit drug use is a predictor for suicidal ideation among AIs/ANs?

The third research question is as follows: Are alcohol and illicit drug use additive interactive predictors for suicidal ideation among AIs/ANs in the United States after controlling for age, gender, poverty level, and educational level?

*H<sub>0</sub>*: Alcohol and illicit drug use are not additive interactive predictors for suicidal ideation among AIs/ANs in the United States after controlling for age, gender, poverty level, and educational level.



*H<sub>1</sub>*: Alcohol and illicit drug use are not additive interactive predictors for suicidal ideation among AIs/ANs in the United States after controlling for age, gender, poverty level, and educational level.

For the 3<sup>rd</sup> research question, BLR is used to apply the independent variables to the dichotomous dependent variable. This data analysis tool helped determine an equation to predict the probability of suicidal ideation as a function of alcohol and illicit drug use. What are the odds that alcohol and illicit drug use are additive factors for suicidal ideation among AIs/ANs?

### **Threats to Validity**

As with all research studies there are threats to validity (Creswell, 2009)—validity of alcohol and illicit drug use affecting suicidal ideation among AIs/ANs. The internal threats to validity (Creswell, 2009) are minimized due to the data being secondary and the study being conducted by a national government agency with many resources to ensure the data collected was valid and reliable. The quantitative study design procedures have been followed by the NSDUH research team: the study features a large, diverse population that was identified through random sampling and data is reported through de-identifying information (SAMHSA, n.d.). Although the sample size of AIs/ANs in the 2017-2019 NSDUH was large (SAMHSA, n.d.), complete generalizations cannot be made for all AIs/ANs based on the study results (Creswell, 2018). Sub-categories of AIs/ANs were not included in the study, such as active military duty personnel, incarcerated individuals as well as those who are in institutional group quarters (Center for Health Statistics & Quality, 2018). Although there are some internal threats to validity

in this study, it only limits the generalization of the study results, which is a common threat for almost all studies because all studies cannot capture every single representation of a human being.

In parallel, external threats to validity occur, but they are not completely damaging to the study. History can impact the study participants; however, the study was conducted across the United States within a specific period of time so all participants experienced equal amounts of external events (Creswell, 2009). Maturation (Creswell, 2009) may impact this study; however the study's design was only made stronger with a larger sample size that included several people at different ages—which allowed for more generalizable results. Although all study participants are not the same age (Creswell, 2009) in the 2017-2019 NSDUH, there are many people in each age category which allows for a more stratified analysis. Regression can be avoided in this study by choosing to showcase and analyze all variables, not just those with extreme scores (Creswell, 2009). Selection (Creswell, 2009) was avoided by using random sampling to choose the participants for this study. Mortality in any experiment or study cannot be avoided as participants may drop out or end their participation in the study at any time which is why a large sample size is preferred when conducting analyses on a target population (Creswell, 2009). The NSDUH has approximately 70,000 participants from different ethnic or racial demographics (SAMHSA, n.d.) and this allows for study participants to end their participation at any point in the study with minimal impacts to the overall power of the sample size (Creswell, 2009). Thus, threats to validity exist but they are minimized in this proposed study.

### **Ethical Procedures**

With Walden University's Institutional Review Board Approval # 03-02-20-0530832, I gained access to the 2017-2019 NSDUH data. Since this study is based on a secondary dataset there is no harm to human participants that have participated in the initial study because the participant information has been de-identified.

Additionally, within this study there are ethical considerations. Insensitive descriptions about AI/AN data are a valid ethical consideration because AIs/ANs fear that they stigmatization and exploitation (Claw et al., 2017). Data gathered on AIs/ANs has been used in unethical ways without consent of the representing tribes or individuals, which causes AIs/ANs from participating in probing scientific research conducted by individuals who seem to lack cultural sensitivity (Claw et al., 2017). Lack of tribal consultation prior to the study (Claw et al., 2017) is a concern and it would require the research team to visit every tribe represented in the NSDUH and consult before the study could commence. There would not be an ethical way to learn the true identities of all the AI/AN participants in the 2017-2019 NSDUH as all participant information is de-identified (SAMHSA, n.d.). Another concern is the lack of tribal consultation after the study could alleviate some ethical considerations because the tribes would be properly de-briefed on what information is published, what information is kept confidential, and how they may access the data for their own public health use (Claw et al., 2017)—however due to the size and limit of the study, tribal consultation with all tribes represented in the NSDUH would be near impossible with the amount of resources and time available, unless a national or international tribal consultation took place in which

all tribes represented in the 2017-2019 NSDUH attended and received the same information.

### **Summary**

American Indians and Alaska Natives (AI/ANs) are such a diverse population of people living in remote areas of North America with a high affinity for suicidal tendencies (Wexler et al., 2016); deadly combination for tragedies. Many times, for AI/ANs the nearest clinic or hospital is over 30 minutes away or they do not have health insurance to cover the costs for off-reservation, non-Indian Health Service medical care—so they many postpone or fail to address any type of health concern, much less mental health concerns. Mental health concerns are not a widely popular subject among AI/ANs. According to Leavitt and colleagues (2018) seventy percent (70%) of AI/ANs live in metropolitan areas compared to reservations. In the cities, AI/ANs have more access to health care facilities but may not afford it. Most hospitals and clinics off Indian Reservations do not provide free health care services to AI/ANs like the Indian Health Service (IHS). Should an AI/AN receive medical care in a non-Indian Health Service facility they receive a bill from the health care facility, a bill that many are not able to pay.

In addition, AI/ANs may feel that health care facilities in the metropolitan areas lack cultural competency, which only increases the chances of miscommunication and decreased awareness of suicidal ideation or suicidal risks among this target population. Cultural sensitivity must be exercised in the exploration of mental illness, substance abuse and suicide because there are different meanings, interpretations, and ceremonies

according to each tribe, pueblo, or village. Although it would not be possible to segregate the data according to each tribe, pueblo, or village, there is a large sample of AIs/ANs in the NSDUH and it is a great study that provides annual information on some of the most sensitive behaviors of residents across the United States: drug use. With this data, there is a possibility that it could arm health care practitioners with a better tool to risk score for suicide among AIs/ANs. Therefore, a further examination of alcohol use, illicit drug use, and suicidal ideation would contribute to the understanding and, hopefully, prevention of high suicide rates among AIs/ANs in the United States. With current data from NSDUH, the variables in question are analyzed and the results aid all public health practitioners by further investigating these risk factors for suicidality.

## Chapter 4: Results

### Introduction

This study focused on the possible effect that alcohol and/or illicit drug use may have on suicidal ideation among American Indians and Alaska Natives in the United States. Suicide is a prominent public health issue among American Indians and Alaska Natives—one that silently devastates families and communities. Health care practitioners fight this battle every day as they try to find strategies to help American Indian and Alaska Native communities overcome this horrible monster. Clinics and hospitals sometimes do not have the time to fully screen every patient for suicide risks. With a risk scoring tool such as the one proposed in this study, health care practitioners are able to ask a couple of target questions to determine the suicide risk of a Native American/Alaskan Native who comes into their care.

Using 2017, 2018, and 2019 data from the NSDUH, there were 168,725 participants from all 50 states included in the study data. Due to the low number of American Indian/Alaska Native participants responding to the NSDUH survey questions involving sensitive behaviors, 3 years' worth of data were merged within SPSS to achieve a higher sample size of the target population. Out of the 168,725 participants, 2,365 were non-Hispanic American Indian or Alaska Natives, which was 1.4% of the total study sample size. This is an acceptable sample size of the target population, as most studies that involve American Indians and Alaska Natives include less than 100 representing that ethnic group. There were varying levels of participation among the American Indians and Alaska Natives within this study, as some opted out of answering

certain questions, or at least providing a valid response for the purposes of this study. Variables under investigation for this study involved behaviors of a sensitive nature as well as possibly traumatic experiences, which impacted the overall intent of the study. The aim was to investigate how suicidal ideation is impacted by alcohol and illicit drug use; however, if respondents choose not to answer questions involving those variables, it did not allow for comprehensive epidemiological analyses.

### **Purpose**

The purpose of this survey study was to test the social cognitive theory that relates alcohol and illicit drug use to suicidal ideation for American Indians and Alaska Natives in the United States. The independent variables were alcohol use and illicit drug use. Illicit drug use was defined as how many times an individual used cocaine, heroin, or methamphetamine during a time period (based on the NSDUH data available). Data for the independent variables were limited to those with usage reported by the week. Alcohol use was defined as the number of drinks that an individual had within the last week (based on the NSDUH data available). Illicit drug use was defined as the number of times that an individual used heroin, cocaine, crack, or methamphetamines in the last week. The weekly usage rate (compared to monthly or yearly usage) was preferred for this study due to the need for simple risk scoring questions. The dependent variable was suicidal ideation. Suicidal ideation was defined as whether or not an individual seriously thought about killing themselves. There were other related variables involving suicide, but for the purposes of this study, only the SUICTHINK variable was used as the independent variable. For this study, three hypotheses were evaluated.

The first research question was as follows:

RQ1: Is alcohol use a predictor for suicidal ideation among AIs/ANs in the United States after controlling for age, gender, poverty level, and educational level?

$H_0$ : Alcohol use is not a predictor for suicidal ideation among AIs/ANs in the United States after controlling for age, gender, poverty level, and educational level.

$H_1$ : Alcohol use is a predictor for suicidal ideation among AIs/ANs in the United States after controlling for age, gender, poverty level, and educational level.

The second research question was as follows:

RQ2: Is illicit drug use a predictor for suicidal ideation among AIs/ANs in the United States after controlling for age, gender, poverty level, and educational level?

$H_0$ : Illicit drug use is not a predictor for suicidal ideation among AIs/ANs in the United States after controlling for age, gender, poverty level, and educational level.

$H_1$ : Illicit drug use is a predictor for suicidal ideation among AIs/ANs in the United States after controlling for age, gender, poverty level, and educational level.

The third research question was as follows:



RQ3: Are alcohol and illicit drug use additive interactive predictors for suicidal ideation among AIs/ANs in the United States after controlling for age, gender, poverty level, and educational level?

*H<sub>0</sub>*: Alcohol and illicit drug use are not additive interactive predictors for suicidal ideation among AIs/ANs in the United States after controlling for age, gender, poverty level, and educational level.

*H<sub>1</sub>*: Alcohol and illicit drug use are additive interactive predictors for suicidal ideation among AIs/ANs in the United States after controlling for age, gender, poverty level, and educational level.

This chapter includes a presentation of the data selected for this study and binary logistic regression analysis of all three proposed hypotheses seen above.

### **Data Collection**

Data for this study were extracted from the 2017, 2018, and 2019 NSDUH, which is the prominent source of information on the behaviors of Americans involving drug use and mental health (NSDUH Codebook, 2018). NSDUH data were collected the year before for each survey year, and the results were published the following year. The 2017–2019 data sets were downloaded into SPSS. The 2017–2019 NSDUH data were allocated so that a specific percentage of participants represented all age groups:

25 percent for youths aged 12 to 17, 25 percent for young adults aged 18 to 25, 15 percent of adults aged 26 to 34, 20 percent for adults aged 35–49, and 15 percent for adults aged 50 and older. (NSDUH Codebook, p. i.4)

This method by NSDUH to effectively provide representation of all age groups was also showcased in the descriptive statistic identified in Table 2. Further descriptive statistics for variables under observation are listed in Tables 3–6.

**Table 2**

*Frequency Table by Age Group in 2017–2019 National Survey on Drug Use and Health*

Age	<i>N</i>	%
12–17 years old	40,406	23.9
18–25 years old	41,703	24.7
26–34 years old	26,181	15.5
35–49 years old	34,036	20.2
50–64 years old	14,815	8.8
65 years or older	11,584	6.9
Total	168,725	100

Overall, there were a total of 168,725 participants in the 2017–2019 data set. Participants were from all 50 states. Non-Hispanic Whites made up the majority of the sample size, followed by Hispanics and non-Hispanic Black/African Americans, at 58.1%, 18.7%, and 12.7%, respectively (see Table 3).

**Table 3***Frequency Table by Race in 2017–2019 National Survey on Drug Use and Health*

Race	<i>N</i>	%
Non-Hispanic White	97,967	58.1
Non-Hispanic Black/African American	21,501	12.7
Non-Hispanic Native American/Alaska Native	2,365	1.4
Non-Hispanic Native Hawaiian/Other Pacific Islander	845	0.5
Non-Hispanic Asian	7,998	4.7
Non-Hispanic more than one race	6,508	3.9
Hispanic	31,541	18.7
Total	168,725	100

There were 80,780 men and 87,945 women, or 47.9% and 52.1%, respectively (see Table 4). A majority of respondents had an associate's degree or some college credit, followed by respondents not yet old enough to graduate from high school, college graduates, and high school graduates, at 25.5%, 23.9%, 20.9%, and 20.1%, respectively (see Table 5). Most respondents were living above the poverty level (see Table 6).

**Table 4***Frequency Table by Gender in 2017–2019 National Survey on Drug Use and Health*

Gender	<i>N</i>	%
Male	80,780	47.9
Female	87,945	52.1
Total	168,735	100

**Table 5***Frequency Table by Education Level in 2017–2019 National Survey on Drug Use and Health*

Education level	<i>N</i>	%
Less than high school	16,067	9.5
High school graduate	33,970	20.1
Some college/associate's degree	43,042	25.5
College graduate	35,240	20.9
12–17 year olds	40,406	23.9
Total	168,725	100

**Table 6**

*Frequency Table by Poverty Level in 2017–2019 National Survey on Drug Use and Health*

Poverty level	<i>N</i>	%
Living in poverty	30,830	18.3
Income up to 2X federal poverty threshold	36,062	21.4
Income more than 2X federal poverty threshold	100,519	59.6
Missing	1,314	0.8
Total	168,725	100

For the target population of this study, there were a total of 2,365 Native American or Alaskan Native (AI/AN) participants, which was a reasonable number to provide power to this study. One thousand one hundred and twenty-five were AI/AN men, and 1,240 were AI/AN women, at 47.6% and 53.4%, respectively (also see Appendix A). A majority of the AI/AN respondents were 18–25-year-olds, followed by 12–17-year-olds, 35–49-year-olds, and 26–35-year-olds, at 27.6%, 25.3%, 19.2%, and 16%, respectively (see Appendix B). Nearly 29% (28.3%) of AI/AN respondents graduated from high school, 25.3% were still in school and had not graduated from high school, 24.5% had an associate’s degree or some college courses, 15.0% had less than a high school education, and 6.9% had graduated from college (see Appendix C). A majority of AIs/ANs were living in poverty (39.2%) while 60.1% lived above the federal poverty threshold (see Appendix D).

For the dependent variable of suicidal ideation (SUICITHINK), majority (67%) of the 2,365 American Indian/Alaska Natives did not have suicidal ideation (See *Table 7*). However, 628 responses to the SUICITHINK question were considered missing data for this study variable; 599 legitimately skipped the question, 21 refused to answer the question, four answered “don’t know,” two left the question blank, and two were considered bad data (see Appendix M).

**Table 7**

*Dependent Variable by Frequency of American Indians/Alaska Natives*

Variable	N & %			
	Yes		No	
SUICITHINK	154	7%	1,583	67%

The independent variables were measured under eight indicators within the NSDUH: weekly alcohol use (ALCPRWK), weekly marijuana/hashish (MRDAYPWK), weekly cocaine use (CCDAYPWK), weekly crack use (CRDAYPWK), weekly heroin use (HRDAYPWK), weekly hallucinogens use (HALLDYPWK), weekly inhalant use (INHDPWK), and weekly methamphetamines use (METHDPWK). For the independent variable of weekly alcohol use, 384 (or 16%) AIs/ANs utilized alcohol weekly, 718 (or 31%) AIs/ANs never used alcohol, and 380 (or 16%) did not use alcohol in the last 12 months (see *Table 8*). This may indicate a lower alcohol use rate among AIs/ANs than currently thought or propagated in media and society. For the independent variable of weekly marijuana/hashish use, 216 (or 12%) AIs/ANs utilized marijuana/hashish weekly, 1,089 (or 46%) AIs/ANs never used marijuana/hashish, and

531 (or 23%) did not use marijuana/hashish in the last 12 months (see Table 8). For the independent variable of weekly cocaine use, four (or > 1%) AIs/ANs utilized cocaine weekly, 2,034 (or 86%) AIs/ANs never used cocaine, and 269 (or 11%) did not use cocaine in the last 12 months (see Table 8). For the independent variable of weekly crack use, two (or > 1%) AIs/ANs utilized crack weekly, 2,251 (or 95%) AIs/ANs never used crack, and 107 (or 5%) did not use crack in the last 12 months (see Table 8). For the independent variable of weekly heroin use, four (or > 1%) AIs/ANs utilized heroin weekly, 2,299 (or 97%) AIs/ANs never used heroin, and 47 (or 2%) did not use heroin in the last 12 months (see Table 4). For the independent variable of weekly hallucinogen use, 13 (or >1%) AIs/ANs utilized hallucinogens weekly, 1,891 (or 70%) AIs/ANs never used hallucinogens and 357 (or 15%) did not use hallucinogens in the last 12 months (See *Table 8*). For the independent variable of weekly inhalant use, 4 (or >1%) AIs/ANs utilized inhalants weekly, 2,069 (or 88%) AIs/ANs never used inhalants, and 250 (or 11%) did not use inhalants in the last 12 months (see Table 8). For the independent variable of weekly methamphetamines use, 21 (or >1%) AIs/ANs utilized methamphetamines weekly, 2,084 (or 88%) AIs/ANs never used methamphetamines, and 196 (or 8%) did not use methamphetamines in the last 12 months (see Table 8).

**Table 8***Independent Variables by Frequency of Use of American Indians/Alaska Natives*

Variable	Frequency of use		
	Utilized	Never	Not in last 12 months
ALCPRWK	384	718	380
MRDAYPWK	278	1,089	531
CCDAYPWK	4	2,034	269
CRDAYPWK	2	2,251	107
HRDAYPWK	4	2,299	47
HALLDYPWK	13	1,891	357
INHDPWK	4	2,069	250
METHDYPWK	21	2,084	196

Missing data is an unfortunate consequence of data gathered on very sensitive behaviors, many of which respondents do not want to answer. Questions concerning the dependent and independent variables appeared to yield low participant responses that were under investigation for this study. For suicidal ideation, missing data is when participants provided answers beyond the standard binary responses of “Yes” or “No.” For illicit drug use, missing data is when participants provided answers beyond the standard discrete responses of “1 day,” “2 days,” “3 days,” “4 days,” “5 days,” “6 days,” and “7 days.” As seen in Appendices A-M, there are large numbers of missing data for the dependent and independent variables. The data is considered missing because it is not



useful for the purposes of this study. This study focuses on the interaction between suicidal ideation and certain behaviors – those certain behaviors require legitimate responses from AIs/ANs.

### **Results**

All statistical analyses were performed in SPSS (IBM SPSS version 27). Through binary logistic regression, suicidal ideation was measured against weekly alcohol and illicit drug use among American Indians and Alaska Natives while controlling for age, gender, education level, and poverty level.

For the first hypothesis, the binary logistic regression analysis was conducted through a stepwise technique while controlling for age, gender, education level, and poverty level, this yielding Age as the only significant variable with a significant odds ratio from the 2017, 2018 and 2019 NSDUH data sets (See Table 9 A binary logistic regression analysis was conducted to evaluate how weekly alcohol use predicted suicidal ideation among American Indians/Alaska Natives (AIs/ANs) and the SPSS output can be found in Appendix N. Among the control variables, only Age was significant ( $\beta = 0.423$ ,  $p = 0.02$ ,  $OR = 1.527$  [95% CI: 1.075, 2.267]), thus the predicted odds of suicidal ideation are 1.527 as great for an AI/AN who is one year older that uses alcohol weekly than a comparative AI/AN. As shown in Table 9, age, not weekly alcohol use, gender, educational level, or poverty level, significantly contributed to the model. The Hosmer-Lemeshow Test was not significant, which indicates the binary logistic regression model was a good fit (see Appendix N).

**Table 9**

*Summary of 2017, 2018, and 2019 National Survey on Drug Use and Health Odds Ratio Results for Research Question 1*

Variable	$\beta$	SE	Wald	p-value	Odds ratio	95% CI for OR	
						Lower	Upper
ALDAYPW	-0.065	0.102	0.407	0.523	0.937	0.767	1.144
CATAG6	0.423	0.179	5.602	0.018	1.527	1.075	2.167
IRSEX	-0.398	0.347	1.311	0.252	0.672	0.340	1.327
EDUHIGHCAT	0.058	0.203	0.081	0.776	1.060	0.712	1.578
POVERTY3	0.129	0.202	0.409	0.523	1.138	0.765	1.693

For the second hypothesis, the binary logistic regression analysis was conducted through a stepwise technique while controlling for age, gender, education level, and poverty level, thus yielding no significant odds ratio for the dependent variables in the 2017-2019 NSDUH data. Data from all weekly illicit drug use variables (marijuana/hashish, cocaine, crack, inhalants, heroin, and hallucinogens variables did not yield significant odds ratios (See Table 10) as most did not have enough participants/respondents to conduct the SPSS binary logistic regression analysis. Among the control variables, only Gender was significant for suicidal ideation in the weekly marijuana/hashish use model ( $\beta = -0.770$ ,  $p = 0.04$ ,  $OR = 0.463$  [95% CI: 0.225, 0.954]), thus the predicted odds of suicidal ideation are 0.463 less likely for an AI/AN female who uses marijuana/hashish weekly than an AI/AN male. As shown in Table 10, weekly marijuana/hashish use, weekly cocaine use, weekly crack use, weekly heroin use, weekly

hallucinogen use, weekly inhalant use, weekly methamphetamines use, gender in all illicit drug use models except for marijuana/hashish use, age in all illicit drug use models, educational level in all illicit drug use models, and poverty level in all illicit drug use models were not significantly significant. The Hosmer-Lemeshow Test was conducted on weekly marijuana/hashish use and weekly methamphetamines use and were not significant, which indicates the binary logistic regression models were a good fit (see Appendix O-U).

**Table 10**

*Summary of 2017, 2018, and 2019 National Survey on Drug Use and Health Odds Ratio*

*Results for Research Question 2*

Variable	$\beta$	SE	Wald	p-value	Odds ratio	95% CI for OR	
						Lower	Upper
Marijuana/hashish model							
MRDAYPWK	-0.056	0.086	0.426	0.514	0.945	0.799	1.119
CATAG6	0.288	0.196	2.153	0.142	1.334	0.908	1.959
IRSEX	-0.770	0.369	4.359	0.037	0.463	0.225	0.954
EDUHIGHCAT	0.110	0.223	0.243	0.622	1.116	0.721	1.727
POVERTY3	-0.128	0.209	0.373	0.541	0.880	0.584	1.326
Cocaine model							
CCDAYPWK	*	*	*	*	*	*	*
Crack model							
CRDAYPWK	_*	*	*	*	*	*	*_
Heroin model							
HRDAYPWK	*	*	*	*	*	*	*
Hallucinogens model							
HALLDYPWK	*	*	*	*	*	*	*_
Inhalants model							
INDYPWK	*	*	*	*	*	*	*
Methamphetamines model							
METHDYPWK	0.000	0.399	0.000	0.999	1.000	0.457	2.189
CATAG6	-1.408	0.931	2.288	0.130	0.245	0.039	1.517
IRSEX	-0.888	1.388	0.409	0.523	0.412	0.027	6.253
EDUHIGHCAT	-1.272	0.861	2.182	0.140	0.280	0.052	1.516
POVERTY3	0.628	0.939	0.448	0.504	1.874	0.298	11.793

\* SPSS output not available due to low number of observations.

For the third hypothesis, the binary logistic regression analysis was conducted through a stepwise technique while controlling for age, gender, education level, and poverty level as an additive interaction between weekly alcohol use and illicit drug use. Illicit drug use includes the weekly use of marijuana/hashish, cocaine, crack, heroin, inhalants, hallucinogens, and methamphetamines as indicated in the NSDUH data codebook and data collection records. As shown in Table 11, alcohol/marijuana hashish weekly use, alcohol/cocaine additive weekly use, alcohol/crack additive weekly use, alcohol/heroin additive weekly use, alcohol/hallucinogens additive weekly use, alcohol/inhalants additive weekly use, alcohol/methamphetamines additive weekly use, gender in all additive interactions, educational level in all additive interactions, and poverty in all additive interactions were not statistically significant. Among the target population in the 2017-2019 NSDUH data, the weekly alcohol and marijuana/hashish use model yielded an incorrect significant odds ratio, ( $\beta = 0.000$ ,  $p = 0.01$ ,  $OR = 1.000$  [95% CI: 1.000, 1.000]) as determined by a zero beta coefficient. Thus, this is determined to be an insignificant finding (See Table 11). Among the control variables, Age was significant in the additive weekly alcohol and marijuana/hashish use model, ( $\beta = 0.293$ ,  $p = 0.00$ ,  $OR = 1.347$  [95% CI: 1.109, 1.635]), thus the predicted odds of suicidal ideation are 1.347 greater for an AI/AN who is one year older that uses alcohol and marijuana/hashish weekly than a comparative AI/AN (see Table 11). Age was significant in the additive weekly alcohol and cocaine use model, ( $\beta = 0.318$ ,  $p = 0.00$ ,  $OR = 1.375$  [95% CI: 1.129, 1.674]), thus the predicted odds of suicidal ideation are 1.375 greater for an AI/AN who is one year older that uses alcohol and cocaine weekly than a comparative AI/AN (see

Table 11). Age was significant in the additive weekly alcohol and crack use model, ( $\beta = 0.307, p = 0.00, OR = 1.360$  [95% CI: 1.119, 1.653]), thus the predicted odds of suicidal ideation are 1.360 greater for an AI/AN who is one year older that uses alcohol and crack weekly than a comparative AI/AN (see Table 11). Age was significant in the additive weekly alcohol and heroin use model, ( $\beta = 0.298, p = 0.00, OR = 1.347$  [95% CI: 1.190, 1.634]), thus the predicted odds of suicidal ideation are 1.347 greater for an AI/AN who is one year older that uses alcohol and heroin weekly than a comparative AI/AN (see Table 11). Age was significant in the additive weekly alcohol and hallucinogens use model, ( $\beta = 0.305, p = 0.00, OR = 1.356$  [95% CI: 1.116, 1.649]), thus the predicted odds of suicidal ideation are 1.356 greater for an AI/AN who is one year older that uses alcohol and hallucinogens weekly than a comparative AI/AN (see Table 11). Age was significant in the additive weekly alcohol and inhalants use model, ( $\beta = 0.316, p = 0.00, OR = 1.375$  [95% CI: 1.129, 1.675]), thus the predicted odds of suicidal ideation are 1.375 greater for an AI/AN who is one year older that uses alcohol and inhalants weekly than a comparative AI/AN (see Table 11). Age was significant in the additive weekly alcohol and methamphetamines use model, ( $\beta = 0.295, p = 0.00, OR = 1.344$  [95% CI: 1.108, 1.630]), thus the predicted odds of suicidal ideation are 1.344 greater for an AI/AN who is one year older that uses alcohol and methamphetamines weekly than a comparative AI/AN (see Table 11). The Hosmer-Lemeshow Test on all models was not significant, which indicates the binary logistic regression models were a good fit (see Appendix V-BB).

**Table 11**

*Summary of 2017, 2018, and 2019 National Survey on Drug Use and Health Odds Ratio*

*Results for Research Question 3*

Variable	$\beta$	SE	Wald	p-value	Odds ratio	95% CI for OR	
						Lower	Upper
Alcohol & marijuana/hashish interactive model							
ALCXMARIHASH	0.000	0.000	6.722	0.010*	1.000	1.000	1.000
CATAG6	0.298	0.099	9.027	0.003	1.347	1.109	1.635
IRSEX	-0.279	0.214	1.697	0.193	0.756	0.497	1.151
EDUHIGHCAT	-0.135	0.127	1.370	0.287	0.874	0.682	1.120
POVERTY3	0.150	0.128	1.370	0.242	1.162	0.904	1.494
Alcohol & cocaine interactive model							
ALCXCOCaine	0.000	0.000	0.556	0.456	1.000	1.000	1.000
CATAG6	0.318	0.101	10.010	0.002	1.375	1.129	1.674
IRSEX	-0.207	0.217	0.909	0.340	0.813	0.531	1.244
EDUHIGHCAT	-0.141	0.130	1.185	0.276	0.868	0.673	1.120
POVERTY3	0.162	0.131	1.518	0.218	1.175	0.909	1.520
Alcohol & crack interactive model							
ALCXCRAcK	0.000	0.000	0.611	0.434	1.000	1.000	1.000
CATAG6	0.307	0.100	9.529	0.002	1.360	1.119	1.653
IRSEX	-0.224	0.217	1.066	0.302	0.800	0.523	1.222
EDUHIGHCAT	-0.138	0.129	1.134	0.287	0.871	0.676	1.123
POVERTY3	0.174	0.131	1.773	0.183	1.190	0.921	1.538
Alcohol & heroin interactive model							
ALCXHEROIN	0.000	0.000	1.488	0.223	1.000	1.000	1.000
CATAG6	0.298	0.099	9.065	0.003	1.347	1.190	1.634
IRSEX	-0.200	0.215	0.860	0.354	0.819	0.537	1.249
EDUHIGHCAT	-0.152	0.129	1.402	0.236	0.859	0.667	1.105
POVERTY3	0.196	0.130	2.274	0.132	1.217	0.943	1.571
Alcohol & hallucinogens interactive model							
ALCXHALLUC	0.000	0.000	0.371	0.543	1.000	1.000	1.000
CATAG6	0.305	0.100	9.368	0.002	1.356	1.116	1.649
IRSEX	-0.173	0.216	0.641	0.423	0.841	0.551	1.284
EDUHIGHCAT	-0.155	0.129	1.443	0.230	0.856	0.665	1.103
POVERTY3	0.179	0.131	1.871	0.171	1.196	0.926	1.544
Alcohol & inhalants interactive model							
ALCXINHALANTS	0.000	0.000	0.651	0.420	1.000	1.000	1.000
CATAG6	0.316	0.101	10.030	0.002	1.375	1.129	1.675
IRSEX	-0.209	0.217	0.921	0.337	0.812	0.530	1.243
EDUHIGHCAT	-0.141	0.130	1.189	0.276	0.868	0.673	1.119
POVERTY6	0.163	0.131	1.535	0.215	1.177	0.910	1.522
Alcohol & methamphetamines interactive model							
ALCXMETH	0.000	0.000	2.473	0.116	1.000	1.000	1.000
CATAG6	0.295	0.099	8.984	0.003	1.344	1.108	1.630
IRSEX	-0.176	0.214	0.673	0.412	0.839	0.551	1.276
EDUHIGHCAT	-0.171	0.128	1.779	0.182	0.843	0.656	1.084
POVERTY3	0.214	0.130	2.714	0.099	1.239	0.960	1.598

\* Although *p*-value is seemingly significant due to the Odds Ratio, there seems to be a discrepancy, and therefore is considered non-significant.

**Table 12**

*Weekly Alcohol and Illicit Drug Use and Suicidal Ideation SPSS Cross Tabulations Among American Indians and Alaska Natives in the United States, National Survey on Drug Use and Health (n = 1,737)*

	Alcohol and illicit drug use							
	Alcohol use	Marijuana use	Cocaine use	Crack use	Heroin use	Hallucinogens use	Inhalants use	Meth use
Suicidal ideation present	41	40	1	1	3	1	1	6
Suicidal ideation not present	316	176	3	1	1	10	2	12
<b>Total (N)</b>	<b>357</b>	<b>216</b>	<b>4</b>	<b>2</b>	<b>4</b>	<b>11</b>	<b>3</b>	<b>18</b>
Missing cases	1,380	1,521	1,733	1,735	1,733	1,726	1,734	1,719
Total	1,737	1,737	1,737	1,737	1,737	1,737	1,737	1,737
% of valid cases	26%	12%	> 1%	> 1%	> 1%	> 1%	> 1%	> 1%

### Summary

This study has yielded interesting, unexpected results. Most of the predictors were not found statistically significant, which is mainly for the lack of participants providing valid responses to the identified survey questions in the NSDUH (See Table 4-6). Based on the data analysis of the first research question, the null hypothesis was accepted. Analysis of the second research question suggests that the null hypothesis is accepted as none of the single illicit drug groups produced a significant odds ratio. Analysis of the third research question suggests that no additive interaction model had an effect on



suicidal ideation among AI/ANs, so the null hypothesis is accepted for this research question.

## Chapter 5: Discussion, Conclusions, and Recommendations

### Introduction

Considering the large sample size of participants within the NSDUH, there was an adequate representation by American Indians and Alaska Natives (AI/ANs). Primary research studies in which researchers have collected their own data have demonstrated that there is little representation of AI/ANs in scientific research and studies. Secondary research studies on AI/ANs in which a researcher can merge several years of data to achieve a higher sample size are more promising. AI/ANs in general are a small population within the greater United States population that is poorly understood and understudied. Although this study utilized secondary data, this study was able to include a sample of 2,365 AI/ANs from the 2017–2019 NSDUH.

Alcohol and illicit drug use are a problem among AI/ANs. With the influence from behaviors, such as alcohol and illicit drug use, suicide becomes an option for many AI/ANs—mainly due to the environment around them. The environment and the risk factors that surround most AI/ANs are similar: diabetes, domestic violence, physical abuse, sexual abuse, poverty, low educational attainment, high unemployment rates, geographic isolation, and substance abuse (Skewes & Blume, 2019). Substance abuse is a general term for abusing substances such as alcohol, cocaine, heroin, marijuana, methamphetamines, inhalants, hallucinogens, or prescription drugs. The environment includes several exposures, and among those in AI/AN communities is alcohol and illicit drug use. This study focused on alcohol and illicit drug use for their prevalent

consumption among the target population and their effect on suicidal ideation among AIs/ANs.

Suicide has been allowed to prosper within AI/AN communities because there is lack of hope—hope that a new, innovative technique will emerge to help AIs/ANs address suicide. All that AIs/ANs see around their community, or in their environment, is alcoholism, homelessness, and violence—regardless of the tribal nation or reservation to which they belong. Chronic stress can accumulate because of health adversities, thus increasing the allostatic load (O’Shields & Gibbs, 2021) for each AI/AN. Every AI/AN, like any other individual, experiences allostatic load in their lifetime; however, individuals who experience more stressors in their environment have more allostatic load, or “the overactivation of the body’s biological regulatory systems” (O’Shields & Gibbs, 2021, p. 2). Li and colleagues (2021) suggested that ethnic diversity influences allostatic load but could not conclusively identify a significant connection due to several limitations, namely adaption. People experience the effects of allostatic load so much that their bodies have adapted and absorbed the effects to where biomarkers cannot detect a physiological response through a cross-sectional analysis (Li et al., 2021)—this further highlights the need for AI/AN societies to improve and reduce the constant stressors that individuals are exposed to in their communities due to their gruesome historical traumas or time perspectives (Bourdon et al., 2020).

In this study, age was statistically significant in regard to weekly alcohol use among AIs/ANs with an odds ratio of 1.527, indicating a higher association to suicidal ideation among older AIs/ANs. Gender was statistically significant to weekly

marijuana/hashish use with an odds ratio of 0.463, indicating a lower association to suicidal ideation among female AIs/ANs. Weekly alcohol and marijuana/hashish use was statistically insignificant with an inaccurate odds ratio and *p*-value. In all of the additive interaction models, age was statistically significant for all combinations of weekly alcohol and illicit drug use with odds ratios above 1.300, indicating a higher association with suicidal ideation among older AIs/ANs.

### **Interpretations of Findings**

This study might have been improved by increasing power. The lack of inadequate frequencies across the various categories led to some loss of power (see Table 7). With the inclusion of 2,365 AIs/ANs and encouraging research on the topics under observation, all three research questions did not yield significant odds ratios. Hypothesis 1 assumed that weekly alcohol use would be a predictor of suicidal ideation but only yielded a significant odds ratio for age (CATAG6; see Table 9). Hypothesis 2 predicted that all weekly illicit drug use would influence suicidal ideation, in which none of the seven illicit drug variables yielded a potential significant odds ratio. Only the gender (IRSEX) control variable yielded a statistically significant odds ratio (see Table 10). Hypothesis 3 surmised that weekly alcohol use in addition to weekly illicit drug use would have an additive effect on suicidal ideation. All 7 interaction variables produced insignificant odds ratios (see Table 11). Notably, the weekly alcohol and marijuana/hashish additive interaction model appeared to produce a significant odds ratio with a *p*-value of 0.10 (see Table 11), however this is inaccurate. In interaction models, sometimes some categories have zero respondents that yield inaccurate beta estimates in

regression models. Yet in all 7 additive interactive models, age (or IRSEX) was found to have a higher association to suicidal ideation for all combinations of weekly alcohol and illicit drug use.

Among AIs/ANs, while there is the presence of suicidal ideation, alcohol use, and illicit drug use, there is also a significant majority who do not think about suicide, have never used alcohol or illicit drugs, or have not used alcohol or illicit drugs in the last year. The findings on AIs/ANs who have never used alcohol or illicit drugs are enlightening; however, this could also be attributed to resistance to answering truthfully.

Nearly all of the odds ratios for the binary logistic regression analyses were around 1.00, whether they were significant or not. This could further lead to the conclusion that suicidal ideation is slightly affected by alcohol or illicit drug use. However, there was an exclusion of analyses for 6 of the 7 illicit drug variables due to very low response rates from AIs/ANs participating in the NSDUH (see Chapter 4, Table 5). It is possible that with more AIs/ANs providing a valid answer, there might be more usable responses for statistical analysis. However, this could be a presumptuous prediction because it would imply that any missing data were usable data.

According to social cognitive theory, the surroundings or environmental factors influence an individual's behaviors. An individual's surroundings include everything and everyone around them. Swaim (2016) found that positive social factors have an influence on the initiation of inhalant use among American Indians. The environment around each AI/AN matters because there is a combination of negative and positive factors (Prince et al., 2021). Alcohol, illicit drugs, and suicide can impact many lives and communities of

AIs/ANs. In all hypotheses presented in this study, it was predicted that weekly alcohol and illicit drug use would impact the presence of suicidal ideation among AIs/ANs—furthermore, this study found no evidence that alcohol in combination with illicit drug use significantly influences suicidal ideation. Alcohol and illicit drug use continue to exist in AI/AN communities, and if there is that presence, there is exposure and the continued potential interaction with suicidal ideation. Suicidal ideation can lead to suicide, and suicide is a constant threat among AIs/ANs.

There was an expectation for alcohol to significantly impact suicidal ideation among AIs/ANs given the presence of this substance in the communities and the assumption that AIs/ANs are alcoholics or abusive of substances. It was also unexpected that not even inhalants had an impact on suicide ideation because inhalants are utilized within AIs/ANs as well as within the general U.S. population when there is limited or no access to other preferred illicit drugs (Stanley & Swaim, 2015). Perhaps if suicide attempts or completions were used as the dependent variables, there might be more insight, as there would be differences in the behavior or action under observation: ideation versus attempt or completion. Above all, the topic of suicide is very sensitive, especially among AIs/ANs—respondents might not answer questions on suicide or be honest. The same concern is shared when collecting data on alcohol and illicit drug use in which AIs/ANs who participate in such studies may not provide truthful information on their utilization.

Although the data did not produce significant odds ratios for the alcohol and illicit drug models, the risk scoring tool is a feasible next step to help health practitioners flag

an AI/AN patient if they report or display weekly usage of alcohol and illicit drugs *with* suicidal ideations. The health practitioner could move forward and maybe provide home visits to the patient's home to check on welfare and family life, counseling therapy, career advisement, or social services referrals. Each time the patient visits, they would be offered resources and assistance until they no longer report suicidal ideations or weekly use of alcohol and marijuana/hashish use. If a growing problem is detected early, each at-risk AI/AN may receive preventative interventions that do not require pharmaceutical drugs. In most AI/AN clinics or hospitals, there may not be the time or the space for mental or behavioral health services. Weatherly and Smith (2019) further suggested that emergency department providers can benefit from screening tools for suicide as they see patients every day but are not able to give each patient the time that they may need. By generating a more robust model, a risk scoring tool can be further developed for assist health care facilities that are lacking in resources recognize the risks for suicides among AIs/ANs.

Pharmaceuticals are another issue among the general U.S, population, and due to their availability (Bhatt et al., 2018), many people have become addicted to these doctor-prescribed medicines and get worse when they try to stop the medications, with side effects usually not present before taking such medications (Brush, 2012). It is a disastrous cycle that many families have faced but could possibly be prevented with simpler actions such as therapy, counseling, or building familial support. In my personal experience, I was immediately offered/recommended prescription antidepressants when I felt that I needed someone to talk to after my father passed away in 2012. It could have been due to

low staffing at the Indian Health Service hospital where I sought care or low funds for a therapist, but I felt unimportant, and so my own mental health concerns became so, and I did not complete those services in that facility. I am thankful that I rejected the prescription drugs/medications because I might have become dependent. All I needed was therapy in which a trained psychologist listened to me and helped me understand my feelings—I feel there are many AIs/ANs who are presented with the same obstacle and do not want to say anything about their mental state because the treatment is the same: medication. Replacing one drug problem with another is not an effective treatment method.

### **Limitations of the Study**

Due to the study's design, there was a specific allocation of participants from defined age groups. No more than 25% of participants were older than 17 (NSDUH Codebook, p. i-4). The number of valid responses from the illicit drug utilization questions was lower than expected, even after 3 years' data were combined. There was a hope that with 2,365 of AI/AN participants included in the data analysis, more AIs/ANs would provide more valid responses to better analyze the study variables; there was a considerable percentage of AI/AN participants who chose not to answer the questions or skipped them. This could possibly signify the sensitivity of questions regarding illicit drug use and limitations in people responding to such questions. Some participants probably chose not to answer the sensitive questions about their alcohol use, illicit drug use, or presence of suicidal ideations in an attempt to appear more desirable as opposed to exposing their true behaviors. Data on illicit drug use could possibly be better collected



and analyzed within each health care facility, as each facility maintains its own patient data with more reliable patient information on illicit drug use (i.e., toxicology tests) to better determine the level of usage and the possible presence of suicidal ideation.

Due to usage of the NSDUH data, the data available were secondary. I did not personally implement the survey or collect the data. NSDUH data sets were downloaded from the NSDUH public website into the SPSS program for data analysis. This type of secondary data was preferable for this study due to the challenging nature of proper inclusion of AI/AN participants in epidemiological studies—past studies that have involved AI/AN suicide or related topics generally included fewer than 100 participants. The inclusion of more participants increases the power of a study and thus the generalizations that can be made from the results. Combined data from the 2017, 2018, and 2019 NSDUH surveys allowed for 2,365 AIs/ANs to be included in this study through the merging of datasets.

Although there were 2,365 AIs/ANs included in this study, not all AIs/ANs provided valid responses for the independent and dependent variables. Out of the 2,365 AIs/ANs who participated, 1,737 or fewer provided a valid response to at least one question or variable. There were approximately 25% of AIs/ANs providing bad responses, skipping the questions, or refusing to answer questions that were used to measure suicidal ideation, alcohol use, or illicit drug use. By providing these types of responses, they were automatically excluded from the logistic regression analysis on the interactions—if a respondent did not answer yes or no to the suicidal ideation questions or did not provide a response between 1 and 5 on the alcohol or illicit drug questions.

Even those AIs/ANs who never used alcohol or drugs, or who had not used either in the last year, were not included in the crosstabs or binary logistic regression analysis on the interactions between alcohol and illicit drug use.

All of the independent variables were measured by frequency as opposed to presence. Instead of running analyses by simply utilizing the presence of alcohol or illicit drug use, this study utilized self-reported frequency. Each respondent had multiple opportunities to reiterate their usage or nonusage of alcohol or illicit drugs. For this study, the NSDUH questions that focused on weekly use, or frequency, included the option for the respondent to say “no” they did not partake in the behavior or “yes” they did partake, in addition to how many days per week they used alcohol or illicit drugs. Other frequency options available in the NSDUH were monthly and yearly use; however, in this study, weekly use was chosen as a simpler means for patients to report to their healthcare provider.

The category of illicit drug use included several NSDUH variables. Due to my preference to examine illicit drug use, there were seven variables used to measure the independent variables (marijuana/hashish, cocaine, heroin, crack, inhalants, hallucinogens, and methamphetamines). Marijuana and hashish use were included within the same variable, which could have made an impact on the data if the two substances could have been separated into two variables. Hallucinogens was a variable that included several different hallucinogenic drugs, including peyote, which is used as a ceremonial medicine within AIs/ANs. The variable that measured hallucinogens use included a wide spectrum of substances that make an individual hallucinate, and maybe respondents were

not aware of all the substances that would qualify as hallucinogens. In the 2019 NSDUH code book, hallucinogens were identified as “LSD, PCP, peyote, mescaline, psilocybin, ecstasy, ketamine, DMT, AMT, foxy, and salvia divinorum” (NSDUH Codebook, 2019, p. 36). The same concern is seen for the variable used to measure weekly inhalant use, as the NSDUH codebook identified inhalants as

amyl nitrate, “poppers,” locker room deodorizers, “rush,” correction fluid, greaser, or cleaning fluid, gasoline fluid, lighter fluid, glue, shoe polish, toluene, halothane, ether, other aesthetics, lacquer thinner, other paint solvents, lighter gases, nitrous oxide, felt-tip pens, felt-tip markers, magic markers, spray paints, computer keyboard cleaner, and other aerosols. (NSDUH Codebook, 2019, p. 51)

Researchers have attempted to study the impact of emotional factors on inhalant use, and the closest behavioral comparison to suicide that could be made was that of low self-esteem and the use of inhalants at a young age (Swaim, 2016). Within the NSDUH, there are several ways in which illicit drug use is measured and different questions that are asked—this study utilized seven of the available variables that focused on weekly use. Weekly use was preferred because it would allow for any person to report, if present, their alcohol or illicit drug use as well as not having to think back to last month or year to calculate usage. It is possible that this study could have utilized monthly or yearly usage variables available within the NSDUH datasets; however, the need to keep questions simple for the local health care professional was the priority.

The self-identification or reporting of being an AI/AN on the NSDUH was a large limitation because the study involved the assumption that each respondent who labeled

themselves as AI/AN was indeed of that heritage. However, there is also the question of whether a participant is a member of a federally or non-federally recognized tribe—overall, what is the proper way to positively identify someone as AI/AN? There was also no distinction between AIs/ANs who lived on or off a reservation, as the environment is different and can have differing effects on an individual.

### **Recommendations**

Future research recommendations include a larger research study involving more AIs/ANs focusing on suicide and the interaction with alcohol and illicit drug use. In three separate national studies of this NSDUH there were still only 2,365 AI/AN participants – there needs to be more opportunities to include AIs/ANs. Since there is the influence of alcohol and illicit drug use within the environments of AIs/ANs, there is a constant threat and interaction. There needs to be more research on the topic of suicide among AIs/ANs as well as the risk factors. In another study by Caetano and colleagues (2020), AIs/ANs were found to have alcohol problems prior to suicide as verified by postmortem tests. There is still evidence that alcohol impacts suicide among AIs/ANs (Caetano et al., 2020).

Future research could focus on the potential impact of the additive effect of alcohol and illicit drug use has on AIs/ANs as well as its effect on suicide. From the results of this study, there was no additive interaction model that yielded a high or low effect suicidal ideation; this may have been due to the low response rate from the participants. More conclusive information might be ascertained from a larger study or a qualitative study involving AIs/ANs focusing on alcohol and illicit drug use. Qualitative

studies can be particularly more advantageous because it allows the researcher to build a theory rather than trying to prove one. Recently, Skewes and Blume (2020) conducted a qualitative analysis involving substance use among 25 American Indians with resulting themes that add to the evolution of a more modern theory. Since this topic of alcohol, illicit drug use and suicidal ideation among AIs/ANs are new and there are limited established theories, it would be beneficial for the foundation to be built through more qualitative studies.

In general, more qualitative studies are needed on the topic of suicide among AIs/ANs – to answer general questions about why one would think or attempt suicide or what is the general opinion of suicide within a community or communities, what does each respondent believe is the cause of suicide or what they think can help. Perhaps case studies can be conducted in clustered cases of suicide within an AI/AN community to better understand the situation and possibly identify warning signs or help develop a current theory on suicide among AIs/ANs.

### **Implications**

The true impact of social change from this study comes from not only from the prevention of suicide among AIs/ANs, but also the recognition of this issue and insightful ways to address it. The more people talk about it, the more solutions come available, and a beneficial tool can be provided to the health care professionals that have day-to-day contact with AI/AN patients. In AI/AN cultures, suicide is a very sensitive and sacred topic; many are not allowed to talk about or openly discuss it in AI/AN societies or families. The stigma of suicide needs to be eliminated in AI/AN communities so that

open and honest discussion can happen. Once the stigma is removed, there could be the creation of social circles that have honest discussions about suicide which can help build trust among the participants. Until the trust is established, there is the opportunity to create phone applications where participants can use forms of anonymity to talk about suicide and find ways to get help. Eventually, every AI/AN community should initiate a suicide surveillance system with collaboration from tribal, state and federal partners. With more data and knowledge, AI/AN communities can begin to address suicide as a public health issue and prevent the loss of more people.

Nearly all variables under examination in this study did not yield significant odds ratios, but there was awareness showcased on the potential suicidal ideation risk factors and the potential for advocacy on addressing alcohol and illicit drug use. Much like the general population, AIs/ANs have similar issues with substances, and it is part of their environment unfortunately. Contrary to popular belief the majority of AIs/ANs in the 2017-2019 NDSUH did not use alcohol or illicit drugs. This could be considered a major finding as well as vindication for AIs/ANs. This study showed a small percentage of the AI/AN population engaging in alcohol and illicit drug use – this type of positive reinforcement could be a source of positive behavioral change and confidence among this target population. Children in AIs/ANs communities need to hear that their people are not alcoholics or drug addicts and all the negative propaganda that is portrayed about AIs/ANs in the media is a falsehood. Negative social imagery can be detrimental to the mental health of children, especially AIs/ANs who have survived genocide and violent assimilation attempts to erase the history of AIs/ANs and continued to experience the

aftereffects. Every family placed a high value on the younger generation because they are the hope for societal changes and can positively impact the trajectory of their communities. Children are the light and energy to lead disadvantaged communities out of the darkness.

### **Conclusion**

Suicide is a public health issue among AIs/ANs and it impacts communities. There is an opportunity to prevent suicide among this target population by recognizing it sooner and providing the assistance to address it with the patient; particularly those who utilize alcohol and illicit drugs weekly. All additive interactive models for alcohol and illicit drugs yielded significant or insignificant odds ratios of 1.00. Analysis of weekly illicit drug use for 5 of the 7 identified illicit drug categories were not possible due to the low sample size for those that provided valid answers to the questions on suicidal ideation and weekly illicit drug use; see Appendices P-U for further SPSS output. A larger mixed study such as that of Prince and colleagues (2021) could yield more insight into the predictors of usage for more specific illicit drugs, by themselves without the additive influence of alcohol. Although this study could not conclusively identify a complete risk scoring tool as there are still missing analyses for illicit drugs (cocaine, crack, heroin, inhalants, and hallucinogens) with very low sample sizes, similar regression models can easily be converted to risk prediction and diagnostic tools; this is underutilized and important.

The influences of the illicit drugs under review (marijuana/hashish, heroin, methamphetamines, crack, cocaine, inhalants, and hallucinogens) encompasses a group

of drugs that need further review and research among AIs/ANs. Prince et al. (2021) found further evidence to suggest that cocaine use among young American Indians should be a concern—as well as being an American Indian and that being the *most important predictor* of opioid usage. Perhaps health care facilities that serve AIs/ANs can be more cognizant of those that display suicidal ideation and the usage of alcohol and illicit drug use. There are time constraints that health care practitioners have to consider when they try to screen for suicide (Prickett et al., 2020; Weatherly & Smith, 2019) among their many daily patients. Weatherly and Smith (2019) utilized two quick screening tools that totaled 15-questions for teens on their risk for suicide in addition to reviewing each participant's health charts. Prickett and colleagues (2020) created an electronic survey as a universal suicide screening tool among adolescents. There are emerging, innovative public health tools becoming available, and researchers are forced to develop them according to the changes in the populations and the behaviors.

Much like the scoring that Weatherly and Smith (2019) initiated in their study, the data from this study can be used to further develop a risk scoring tool to screen for suicidal ideation risk among AIs/ANs. As this study's results suggest, an older, male AI/AN who utilized alcohol and illicit drugs weekly was more likely to have suicidal ideations and could receive a score for two or more. The AI/AN Suicidal Ideation Risk Scoring Tool sample in Table 13 could be utilized by local health care facilities and used to determine if there is a need to inquire with an older, male AI/AN patient if there are suicidal ideations present as most people are not asked if they have suicidal ideations during their visit to the clinic or hospital. If there are suicidal ideations present, the



AI/AN can be further assessed for suicide, referred for counseling, and provided further information about their mental health condition and how they may help prevent suicide or talk to their families.

**Table 13**

*American Indian/Alaska Native Suicidal Ideation Risk Scoring Tool*

Self-reported behavior	Score	Action recommended
Weekly alcohol and illicit drug use in an older, male AI/AN	2	Ask patient if they have suicidal ideations

This study has also highlighted in the continued sensitivity of all variables under investigation within the target population. If patients or respondents will not be truthful how can a health practitioner help them or catch it early (Pickett et al., 2020). There was the hope that this study would provide more data on the impact that some illicit drugs have on suicidal ideations among AIs/ANs, but without a larger sample size the binary logistic regression analysis could not be performed (see Appendices P-U). Instead, the study indicated the need for more valid participants, especially those are who willing to answer all questions instead of skipping or refusing to answer. There might have been a better picture or indication of the true effect of weekly cocaine, crack, heroin, inhalants, methamphetamines, and hallucinogens use among AIs/ANs.

The model identified one set of possible predictors for suicidal ideation among AIs/ANs: older males. This highlighted result may assist health care professionals

working on AI/AN land or with AI/AN patients. If an older male patient demonstrates or self-reports weekly alcohol and illicit drug use, the attending health care professional can proceed to use the AI/AN Suicidal Ideation Risk Scoring Tool (see Table 13) to gauge the action needed to possibly prevent suicide. Furthermore, additional social services resources can be offered and encouraged each time the patient visits. It may not make an impact the first time the risk scoring technique is applied but over time it may prove to prevent instances of suicide among AIs/ANs because of the opportunity to screen (Pickett et al., 2020). As demonstrated in past research there are positive and negative predictors for suicide among AIs/ANs, the next step is to utilize the current data to develop tools for local, practical use.

In line with the social cognitive theory, environmental factors influence the outcome of behaviors, such as mental health and one's environment interacting with one another. The mental health of an individual is fragile and the environmental exposures, such as alcohol and illicit drug use, can be of negative influence. By understanding what triggers certain behavior, a population can design strategies, health promotion propaganda, or funding streams to address those areas. Prevention is the first line of public health defense and for disadvantaged populations, like AIs/ANs, it is the best defense and advantage. AIs/ANs experience many negative environment factors daily and consistently. One of the most profound that deserves more advocacy is the presence of historical trauma for every AI/AN and it can be experienced as prejudice, racism, forced participation in a boarding/residential school, colonization, and attempts at

assimilation. AIs/ANs are unlike no other racial or ethnic group in the United States and their public health initiatives and strategies need to address it.

With research on AIs/ANs becoming more available, there is a growing pool of empirical, peer-reviewed data on this understudied population. There is opportunity for other researchers interested in AI/AN research to cite this study to advance the research on these topics—thus transforming the epidemiological evolution of suicide among AIs/ANs. Some studies may not yield groundbreaking results, but they can provide insight into understudied topics and help researchers build their references and learn from such studies. When there is knowledge available, researchers and the public alike can utilize it and grow intellectually. Maybe someone reading this paper may begin to think differently about the AIs/ANs stereotypes or begin to envision future research that could address suicide and save more lives. With more study opportunities that include more AIs/ANs into the sample size, we can begin to understand the relationship between suicide and weekly substance use as both are plaguing public health issues among this target population. AIs/ANs communities experience the social consequences of alcohol and substance use. The more this issue is ignored, the more lives are claimed, and families and communities impacted.

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## Appendix A: SPSS Crosstabulation of Gender by Race

**GENDER - IMPUTATION REVISED \* RC-RACE/HISPANICITY RECODE (7 LEVELS) Crosstabulation**

Count		RC-RACE/HISPANICITY RECODE (7 LEVELS)							Total
		1 - NonHispanic White	2 - NonHispanic Black/African American	3 - NonHispanic Native American/Alaska Native	4 - NonHispanic Native Hawaiian/Other Pacific Islander	5 - NonHispanic Asian	6 - NonHispanic more than one race	7 - Hispanic	
GENDER - IMPUTATION REVISED	1 - Male	47251	9841	1125	428	3916	3165	15054	80780
	2 - Female	50716	11660	1240	417	4082	3343	16487	87945
Total		97967	21501	2365	845	7998	6508	31541	168725

## Appendix B: SPSS Crosstabulation of Age by Race

**RC-AGE CATEGORY RECODE (6 LEVELS) \* RC-RACE/HISPANICITY RECODE (7 LEVELS) Crosstabulation**

Count		RC-RACE/HISPANICITY RECODE (7 LEVELS)							Total
		1 - NonHispanic White	2 - NonHispanic Black/African American	3 - NonHispanic Native American/Alaska Native	4 - NonHispanic Native Hawaiian/Other Pacific Islander	5 - NonHispanic Asian	6 - NonHispanic more than one race	7 - Hispanic	
RC-AGE CATEGORY RECODE (6 LEVELS)	1 - 12-17 Years Old	21037	5396	599	200	1661	2267	9246	40406
	2 - 18-25 Years Old	22097	5785	652	222	2135	1864	8948	41703
	3 - 26-34 Years Old	15081	3302	379	134	1504	854	4927	26181
	4 - 35-49 Years Old	20585	4156	455	190	1899	926	5825	34036
	5 - 50-64 Years Old	10140	1821	188	68	454	372	1772	14815
	6 - 65 or Older	9027	1041	92	31	345	225	823	11584
<b>Total</b>		<b>97967</b>	<b>21501</b>	<b>2365</b>	<b>845</b>	<b>7998</b>	<b>6508</b>	<b>31541</b>	<b>168725</b>

## Appendix C: SPSS Crosstabulation of Education Level by Race

RC-EDUCATION CATEGORIES \* RC-RACE/HISPANICITY RECODE (7 LEVELS) Crosstabulation

Count		RC-RACE/HISPANICITY RECODE (7 LEVELS)							Total
		1 - NonHispanic White	2 - NonHispanic Black/African American	3 - NonHispanic Native American/Alaska Native	4 - NonHispanic Native Hawaiian/Other Pacific Islander	5 - NonHispanic Asian	6 - NonHispanic more than one race	7 - Hispanic	
RC-EDUCATION CATEGORIES	1 - Less high school	6596	2491	354	103	361	488	5674	16067
	2 - High school grad	18922	5401	670	249	876	1283	6569	33970
	3 - Some coll/Assoc Dg	26473	5539	579	213	1603	1685	6950	43042
	4 - College graduate	24939	2674	163	80	3497	785	3102	35240
	5 - 12 to 17 year olds	21037	5396	599	200	1661	2267	9246	40406
Total	97967	21501	2365	845	7998	6508	31541	168725	

## Appendix D: SPSS Crosstabulation of Poverty Level by Race

### RC-POVERTY LEVEL-NEW INC (% OF US CENSUS POVERTY THRESHOLD) \* RC-RACE/HISPANICITY RECODE (7 LEVELS) Crosstabulation

Count

		RC-RACE/HISPANICITY RECODE (7 LEVELS)							Total
		1 - NonHispanic White	2 - NonHispanic Black/African American	3 - NonHispanic Native American/Alaska Native	4 - NonHispanic Native Hawaiian/Other Pacific Islander	5 - NonHispanic Asian	6 - NonHispanic more than one race	7 - Hispanic	
RC-POVERTY LEVEL-NEW INC (% OF US CENSUS POVERTY THRESHOLD)	1 - Living in Poverty	11403	7118	922	273	1132	1302	8680	30830
	2 - Income Up to 2X Fed Pov Thresh	17228	5710	554	220	1321	1489	9540	36062
	3 - Income More Than 2X Fed Pov Thresh	68533	8457	879	349	5467	3651	13183	100519
<b>Total</b>		<b>97164</b>	<b>21285</b>	<b>2355</b>	<b>842</b>	<b>7920</b>	<b>6442</b>	<b>31403</b>	<b>167411</b>

## Appendix E: SPSS Crosstabulation of Race by Suicidal Ideation

## RC-RACE/HISPANICITY RECODE (7 LEVELS) \* SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS Crosstabulation

Count

		SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS							Total
		1 - Yes	2 - No	85 - BAD DATA Logically assigned	94 - DON T KNOW	97 - REFUSED	98 - BLANK	99 - LEGITIMATE SKIP	
RC-RACE/HISPANICITY RECODE (7 LEVELS)	1 - NonHispanic White	5239	71282	20	91	275	23	21037	97967
	2 - NonHispanic Black/African American	862	15031	13	62	135	2	5396	21501
	3 - NonHispanic Native American/Alaska Native	154	1583	2	4	21	2	599	2365
	4 - NonHispanic Native Hawaiian/Other Pacific Islander	44	585	2	6	8	0	200	845
	5 - NonHispanic Asian	284	5992	2	26	33	0	1661	7998
	6 - NonHispanic more than one race	485	3707	2	12	31	4	2267	6508
	7 - Hispanic	1330	20737	8	71	139	10	9246	31541
<b>Total</b>	<b>8398</b>	<b>118917</b>	<b>49</b>	<b>272</b>	<b>642</b>	<b>41</b>	<b>40406</b>	<b>168725</b>	

## Appendix F: SPSS Crosstabulation of Weekly Alcohol Use by Race

# DAYS PER WEEK DRANK ALCOHOL IN PAST 12 MOS \* RC-RACE/HISPANICITY RECODE (7 LEVELS) Crosstabulation

Count		RC-RACE/HISPANICITY RECODE (7 LEVELS)							Total
		1 - NonHispanic White	2 - NonHispanic Black/African American	3 - NonHispanic Native American/American Indian	4 - NonHispanic Native Hawaiian/Other Pacific Islander	5 - NonHispanic Asian	6 - NonHispanic more than one race	7 - Hispanic	
# DAYS PER WEEK DRANK ALCOHOL IN PAST 12 MOS	1	4535	936	93	48	340	249	1605	7806
	2	5829	844	91	41	283	251	1219	8558
	3	5236	701	78	22	196	223	867	7323
	4	3072	319	49	10	95	117	407	4069
	5	2647	296	47	12	78	89	355	3524
	6	1302	107	15	2	34	33	148	1641
	7	1263	152	11	5	29	59	167	1686
	85 - BAD DATA Logically assigned	47	15	4	1	2	5	19	93
	91 - NEVER USED ALCOHOL	21859	8008	718	329	3301	2107	11250	47572
	93 - DID NOT USE ALCOHOL IN THE PAST 12 MOS	11247	2332	380	113	672	731	3344	18819
	94 - DON'T KNOW	375	126	17	6	41	35	206	806
	97 - REFUSED	90	47	6	1	11	10	81	246
98 - BLANK	457	189	22	9	42	51	348	1118	
99 - LEGITIMATE SKIP	40008	7429	834	246	2874	2548	11525	65464	
Total		97967	21501	2365	845	7998	6508	31541	168725



## Appendix G: SPSS Crosstabulation of Weekly Illicit Drug Use (Marijuana/Hashish) by

## Race

# DAYS PER WEEK USED MARIJUANA/HASHISH PAST 12 MOS \* RC-RACE/HISPANICITY RECODE (7 LEVELS) Crosstabulation

Count		RC-RACE/HISPANICITY RECODE (7 LEVELS)							Total
		1 - NonHispanic White	2 - NonHispanic Black/African American	3 - NonHispanic Native American/American Indian/Alaska Native	4 - NonHispanic Native Hawaiian/Other Pacific Islander	5 - NonHispanic Asian	6 - NonHispanic more than one race	7 - Hispanic	
# DAYS PER WEEK USED MARIJUANA/HASHISH PAST 12 MOS	1	841	271	36	9	46	61	325	1589
	2	657	236	33	7	35	60	189	1217
	3	878	266	49	9	25	71	297	1595
	4	682	215	24	4	19	69	204	1217
	5	1044	310	38	9	27	124	314	1866
	6	796	134	29	6	20	85	183	1253
	7	2313	520	69	6	50	237	580	3775
	85 - BAD DATA Logically assigned	88	35	1	2	2	20	40	188
	91 - NEVER USED MARIJUANA	50609	12840	1089	510	6238	3276	20782	95344
	93 - DID NOT USE MARIJUANA IN THE PAST 12 MOS	26668	3901	591	186	925	1412	5029	38712
94 - DON'T KNOW	132	67	13	3	8	14	74	311	
97 - REFUSED	84	37	4	5	5	7	40	182	
98 - BLANK	315	183	16	9	36	39	218	816	
99 - LEGITIMATE SKIP	12860	2486	373	80	562	1033	3266	20660	
<b>Total</b>		<b>97967</b>	<b>21501</b>	<b>2365</b>	<b>845</b>	<b>7998</b>	<b>6508</b>	<b>31541</b>	<b>168725</b>

## Appendix H: SPSS Crosstabulation of Weekly Illicit Drug Use (Cocaine) by Race

# DAYS PER WEEK USED COCAINE PAST 12 MONTHS \* RC-RACE/HISPANICITY RECODE (7 LEVELS) Crosstabulation

Count		RC-RACE/HISPANICITY RECODE (7 LEVELS)							Total
		1 - NonHispanic White	2 - NonHispanic Black/African American	3 - NonHispanic Native American/Alaska Native	4 - NonHispanic Native Hawaiian/Other Pacific Islander	5 - NonHispanic Asian	6 - NonHispanic more than one race	7 - Hispanic	
# DAYS PER WEEK USED COCAINE PAST 12 MONTHS	1	126	30	3	1	5	15	64	244
	2	41	14	0	0	2	4	20	81
	3	33	22	0	0	4	0	9	68
	4	22	8	1	0	1	4	6	42
	5	20	5	0	1	0	3	10	39
	6	15	6	0	0	0	0	3	24
	7	11	7	0	0	1	2	5	26
	85 - BAD DATA Logically assigned	14	2	0	0	0	0	1	17
	89 - LEGITIMATE SKIP Logically assigned	3	2	0	0	0	0	1	6
	91 - NEVER USED COCAINE	83589	20262	2034	758	7663	5651	28694	148651
	93 - DID NOT USE COCAINE IN THE PAST 12 MOS	11581	899	269	62	227	621	2062	15721
	94 - DON'T KNOW	4	3	0	1	0	1	5	14
	97 - REFUSED	25	6	0	1	3	4	9	48
	98 - BLANK	136	26	5	5	11	13	67	263
99 - LEGITIMATE SKIP	2347	209	53	16	81	190	585	3481	
<b>Total</b>	<b>97967</b>	<b>21501</b>	<b>2365</b>	<b>845</b>	<b>7998</b>	<b>6508</b>	<b>31541</b>	<b>168725</b>	

## Appendix I: SPSS Crosstabulation of Weekly Illicit Drug Use (Crack) by Race

# DAYS PER WEEK USED CRACK PAST 12 MONTHS \* RC-RACE/HISPANICITY RECODE (7 LEVELS) Crosstabulation

Count		RC-RACE/HISPANICITY RECODE (7 LEVELS)							Total
		1 - NonHispanic White	2 - NonHispanic Black/African American	3 - NonHispanic Native American/Alaska Native	4 - NonHispanic Native Hawaiian/Other Pacific Islander	5 - NonHispanic Asian	6 - NonHispanic more than one race	7 - Hispanic	
# DAYS PER WEEK USED CRACK PAST 12 MONTHS	1	22	6	2	1	0	2	5	38
	2	12	4	0	0	0	1	2	19
	3	6	6	0	0	0	0	2	14
	4	12	2	0	0	1	0	0	15
	5	10	6	0	0	0	0	4	20
	6	8	2	0	0	0	0	1	11
	7	4	4	0	0	0	0	1	9
	85 - BAD DATA Logically assigned	4	0	0	0	0	0	1	5
	91 - NEVER USED CRACK	94757	21058	2251	811	7937	6263	31060	164137
	93 - DID NOT USE CRACK IN THE PAST 12 MOS	2855	352	107	29	48	213	415	4019
	94 - DON'T KNOW	0	0	0	0	1	0	2	3
97 - REFUSED	23	5	0	1	1	4	6	40	
98 - BLANK	37	5	0	0	7	6	17	72	
99 - LEGITIMATE SKIP	217	51	5	3	3	19	25	323	
Total	97967	21501	2365	845	7998	6508	31541	168725	

## Appendix J: SPSS Crosstabulation of Weekly Illicit Drug Use (Heroin) by Race

# DAYS PER WEEK USED HEROIN PAST 12 MONTHS \* RC-RACE/HISPANICITY RECODE (7 LEVELS) Crosstabulation

Count

		RC-RACE/HISPANICITY RECODE (7 LEVELS)							Total
		1 - NonHispanic White	2 - NonHispanic Black/African American	3 - NonHispanic Native American/Alaska Native	4 - NonHispanic Native Hawaiian/Other Pacific Islander	5 - NonHispanic Asian	6 - NonHispanic more than one race	7 - Hispanic	
# DAYS PER WEEK USED HEROIN PAST 12 MONTHS	1	9	6	3	0	0	1	3	22
	2	10	4	0	0	1	1	3	19
	3	16	3	1	0	0	0	5	25
	4	12	1	0	0	0	0	1	14
	5	22	1	0	0	0	2	5	30
	6	20	1	0	0	0	0	3	24
	7	45	4	0	0	0	1	2	52
	85 - BAD DATA Logically assigned	16	0	0	0	0	0	1	17
	91 - NEVER USED HEROIN	95710	21315	2299	836	7968	6365	31186	165679
	93 - DID NOT USE HEROIN IN THE PAST 12 MOS	1773	135	47	7	14	113	265	2354
94 - DON'T KNOW	2	0	0	0	0	0	0	2	
97 - REFUSED	2	1	0	0	0	2	1	6	
98 - BLANK	54	13	3	1	8	7	29	115	
99 - LEGITIMATE SKIP	276	17	12	1	7	16	37	366	
Total	97967	21501	2365	845	7998	6508	31541	168725	

## Appendix K: SPSS Crosstabulation of Weekly Illicit Drug Use (Hallucinogen) by Race

## # DAYS PER WEEK USED HALLUCINOGEN PAST 12 MONTHS \* RC-RACE/HISPANICITY RECODE (7 LEVELS) Crosstabulation

Count

		RC-RACE/HISPANICITY RECODE (7 LEVELS)							Total
		1 - NonHispanic White	2 - NonHispanic Black/African American	3 - NonHispanic Native American/Alaska Native	4 - NonHispanic Native Hawaiian/Other Pacific Islander	5 - NonHispanic Asian	6 - NonHispanic more than one race	7 - Hispanic	
# DAYS PER WEEK USED HALLUCINOGEN PAST 12 MONTHS	1	141	37	9	1	5	20	42	255
	2	25	6	1	0	2	2	8	44
	3	16	11	1	0	1	2	7	38
	4	11	4	1	0	1	1	2	20
	5	2	5	1	0	0	1	0	9
	6	2	3	0	0	0	0	3	8
	7	7	1	0	0	0	2	5	15
	85 - BAD DATA Logically assigned	4	1	0	0	0	0	2	7
	91 - NEVER USED HALLUCINOGENS	80133	19894	1891	742	7371	5244	28276	143551
	93 - DID NOT USE HALLUCINOGENS IN THE PAST 12 MOS	14174	1116	357	71	375	895	2229	19217
94 - DON'T KNOW	13	5	0	0	0	0	8	26	
97 - REFUSED	7	4	1	0	0	1	4	17	
98 - BLANK	613	156	41	17	100	63	252	1242	
99 - LEGITIMATE SKIP	2819	258	62	14	143	277	703	4276	
Total	97967	21501	2365	845	7998	6508	31541	168725	

## Appendix L: SPSS Crosstabulation of Weekly Illicit Drug Use (Inhalant) by Race

# DAYS PER WEEK USED INHALANT PAST 12 MONTHS \* RC-RACE/HISPANICITY RECODE (7 LEVELS) Crosstabulation

Count

		RC-RACE/HISPANICITY RECODE (7 LEVELS)							Total
		1 - NonHispanic White	2 - NonHispanic Black/African American	3 - NonHispanic Native American/Alaska Native	4 - NonHispanic Native Hawaiian/Other Pacific Islander	5 - NonHispanic Asian	6 - NonHispanic more than one race	7 - Hispanic	
# DAYS PER WEEK USED INHALANT PAST 12 MONTHS	1	84	22	3	3	5	10	38	165
	2	21	6	1	0	0	6	11	45
	3	16	5	0	0	1	3	8	33
	4	8	1	0	0	1	0	2	12
	5	5	1	0	2	0	2	1	11
	6	3	0	0	0	1	0	2	6
	7	4	2	0	0	1	2	2	11
	85 - BAD DATA Logically assigned	1	2	0	0	0	0	1	4
	91 - NEVER USED INHALANTS	86332	20384	2069	779	7547	5679	29181	151971
	93 - DID NOT USE INHALANTS IN THE PAST 12 MOS	10025	807	250	44	305	653	1769	13853
94 - DON'T KNOW	34	13	1	1	2	4	16	71	
97 - REFUSED	8	5	0	1	2	1	5	22	
98 - BLANK	469	143	16	9	83	58	236	1014	
99 - LEGITIMATE SKIP	957	110	25	6	50	90	269	1507	
Total		97967	21501	2365	845	7998	6508	31541	168725

## Appendix M: SPSS Crosstabulation of Weekly Illicit Drug Use (Methamphetamine) by

## Race

# DAYS PER WK USED METHAMPHETAMINE PAST 12 MONTHS \* RC-RACE/HISPANICITY RECODE (7 LEVELS) Crosstabulation

Count

		RC-RACE/HISPANICITY RECODE (7 LEVELS)							Total
		1 - NonHispanic White	2 - NonHispanic Black/African American	3 - NonHispanic Native American/Alaska Native	4 - NonHispanic Native Hawaiian/Other Pacific Islander	5 - NonHispanic Asian	6 - NonHispanic more than one race	7 - Hispanic	
# DAYS PER WK USED METHAMPHETAMINE PAST 12 MONTHS	1	36	4	1	0	0	4	8	53
	2	20	3	2	0	0	2	12	39
	3	43	2	2	1	3	5	8	64
	4	35	1	4	0	0	4	10	54
	5	51	3	4	0	1	2	11	72
	6	20	1	1	0	1	0	2	25
	7	55	1	7	1	1	5	9	79
	85 - BAD DATA Logically assigned	13	0	0	1	0	0	1	15
	91 - NEVER USED METHAMPHETAMINE	92192	21252	2084	785	7860	6136	30576	160885
	93 - DID NOT USE METHAMPHETAMINE IN THE PAST 12 MOS	4800	168	196	43	91	283	734	6315
94 - DON'T KNOW	11	2	0	0	0	2	4	19	
97 - REFUSED	9	1	1	2	1	4	3	21	
98 - BLANK	111	35	12	4	35	12	40	249	
99 - LEGITIMATE SKIP	571	28	51	8	5	49	123	835	
Total	97967	21501	2365	845	7998	6508	31541	168725	

## Appendix N: Binary Logistic Regression for Suicidal Ideation and Weekly Alcohol Use

## LOGISTIC REGRESSION VARIABLES SUICTHNK

/SELECT=NEWRACE2 EQ 3

/METHOD=ENTER CATAG6 IRSEX EDUHIGHCAT POVERTY3

/METHOD=ENTER ALDAYPWK

/PRINT=GOODFIT CI(95)

/CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).

**Case Processing Summary**

Unweighted Cases <sup>a</sup>		N	Percent
Selected Cases	Included in Analysis	357	.2
	Missing Cases	2008	1.2
	Total	2365	1.4
Unselected Cases		166360	98.6
Total		168725	100.0

a. If weight is in effect, see classification table for the total number of cases.

**Omnibus Tests of Model Coefficients**

		Chi-square	df	Sig.
Step 1	Step	.402	1	.526
	Block	.402	1	.526
	Model	10.032	5	.074

**Model Summary**

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	244.529 <sup>a</sup>	.028	.054

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.



### Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	4.101	8	.848

### Contingency Table for Hosmer and Lemeshow Test

		SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS = 1 - Yes		SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS = 2 - No		Total
		Observed	Expected	Observed	Expected	
Step 1	1	8	8.277	31	30.723	39
	2	9	6.400	27	29.600	36
	3	3	5.573	34	31.427	37
	4	4	4.659	32	31.341	36
	5	4	4.026	32	31.974	36
	6	5	3.564	32	33.436	37
	7	3	2.988	33	33.012	36
	8	3	2.493	33	33.507	36
	9	1	2.023	36	34.977	37
	10	1	.995	26	26.005	27

### Classification Table<sup>a</sup>

Observed	SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS	Predicted						
		Selected Cases <sup>b</sup>			Unselected Cases <sup>c,d</sup>			
		1 - Yes	2 - No	Percentage Correct	1 - Yes	2 - No	Percentage Correct	
Step 1	SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS	1 - Yes	0	41	.0	0	2013	.0
		2 - No	0	316	100.0	0	30776	100.0
	Overall Percentage				88.5			93.9

a. The cut value is .500

b. Selected cases RC-RACE/HISPANICITY RECODE (7 LEVELS) EQ 3

c. Unselected cases RC-RACE/HISPANICITY RECODE (7 LEVELS) NE 3

d. Some of the unselected cases are not classified due to either missing values in the independent variables or categorical variables with values out of the range of the selected cases.

## Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
								Lower	Upper
Step 1 <sup>a</sup>	RC-AGE CATEGORY RECODE (6 LEVELS)	.423	.179	5.602	1	.018	1.527	1.075	2.167
	GENDER - IMPUTATION REVISED	-.398	.347	1.311	1	.252	.672	.340	1.327
	RC-POVERTY LEVEL-NEW INC (% OF US CENSUS POVERTY THRESHOLD)	.129	.202	.409	1	.523	1.138	.765	1.693
	RC-EDUCATION CATEGORIES	.058	.203	.081	1	.776	1.060	.712	1.578
	# DAYS PER WEEK DRANK ALCOHOL IN PAST 12 MOS	-.065	.102	.407	1	.523	.937	.767	1.144
	Constant	1.176	.938	1.569	1	.210	3.240		

a. Variable(s) entered on step 1: # DAYS PER WEEK DRANK ALCOHOL IN PAST 12 MOS.

## Appendix O: Binary Logistic Regression for Suicidal Ideation and Weekly

## Marijuana/Hashish Use

## LOGISTIC REGRESSION VARIABLES SUICHTNK

/SELECT=NEWRACE2 EQ 3

/METHOD=ENTER CATAG6 IRSEX EDUHIGHCAT POVERTY3

/METHOD=ENTER MRDAYPWK

/PRINT=GOODFIT CI(95)

/CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).

**Case Processing Summary**

Unweighted Cases <sup>a</sup>		N	Percent
Selected Cases	Included in Analysis	215	.1
	Missing Cases	2150	1.3
	Total	2365	1.4
Unselected Cases		166360	98.6
Total		168725	100.0

a. If weight is in effect, see classification table for the total number of cases.

**Omnibus Tests of Model Coefficients**

		Chi-square	df	Sig.
Step 1	Step	.429	1	.512
	Block	.429	1	.512
	Model	8.628	5	.125

### Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	197.961 <sup>a</sup>	.039	.064

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

### Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	14.037	8	.081

### Contingency Table for Hosmer and Lemeshow Test

		SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS = 1 - Yes		SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS = 2 - No		Total
		Observed	Expected	Observed	Expected	
Step 1	1	8	7.234	14	14.766	22
	2	9	6.259	13	15.741	22
	3	2	5.304	20	16.696	22
	4	2	4.537	20	17.463	22
	5	8	4.006	14	17.994	22
	6	3	3.520	19	18.480	22
	7	1	3.117	21	18.883	22
	8	2	2.668	20	19.332	22
	9	3	2.113	19	19.887	22
	10	2	1.242	15	15.758	17

**Classification Table<sup>a</sup>**

Observed		Predicted						
		Selected Cases <sup>b</sup>			Unselected Cases <sup>c,d</sup>			
		SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS		Percentage Correct	SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS		Percentage Correct	
	1 - Yes	2 - No		1 - Yes	2 - No			
Step 1	SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS	1 - Yes	0	40	.0	0	1562	.0
		2 - No	0	175	100.0	0	8896	100.0
Overall Percentage					81.4			85.1

a. The cut value is .500

b. Selected cases RC-RACE/HISPANICITY RECODE (7 LEVELS) EQ 3

c. Unselected cases RC-RACE/HISPANICITY RECODE (7 LEVELS) NE 3

d. Some of the unselected cases are not classified due to either missing values in the independent variables or categorical variables with values out of the range of the selected cases.

**Variables in the Equation**

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Step 1 <sup>a</sup>								
RC-AGE CATEGORY RECODE (6 LEVELS)	.288	.196	2.153	1	.142	1.334	.908	1.959
GENDER - IMPUTATION REVISED	-.770	.369	4.359	1	.037	.463	.225	.954
RC-POVERTY LEVEL-NEW INC (% OF US CENSUS POVERTY THRESHOLD)	-.128	.209	.373	1	.541	.880	.584	1.326
RC-EDUCATION CATEGORIES	.110	.223	.243	1	.622	1.116	.721	1.727
# DAYS PER WEEK USED MARIJUANA/HASHISH PAST 12 MOS	-.056	.086	.426	1	.514	.945	.799	1.119
Constant	2.074	.996	4.336	1	.037	7.959		

a. Variable(s) entered on step 1: # DAYS PER WEEK USED MARIJUANA/HASHISH PAST 12 MOS.

## Appendix P: Binary Logistic Regression for Suicidal Ideation and Weekly Cocaine Use

## LOGISTIC REGRESSION VARIABLES SUICTHNK

/SELECT=NEWRACE2 EQ 3

/METHOD=ENTER CATAG6 IRSEX EDUHIGHCAT POVERTY3

/METHOD=ENTER CCDAYPWK

/PRINT=GOODFIT CI(95)

/CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).

**Case Processing Summary**

Unweighted Cases <sup>a</sup>		N	Percent
Selected Cases	Included in Analysis	4	.0
	Missing Cases	2361	1.4
	Total	2365	1.4
Unselected Cases		166360	98.6
Total		168725	100.0

a. If weight is in effect, see classification table for the total number of cases.

**Classification Table<sup>a,b</sup>**

Observed		Predicted						
		Selected Cases <sup>c</sup>			Unselected Cases <sup>d,e</sup>			
		SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS		Percentage Correct	SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS		Percentage Correct	
	1 - Yes	2 - No		1 - Yes	2 - No			
Step 0	SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS	1 - Yes	0	1	.0	0	102	.0
		2 - No	0	3	100.0	0	374	100.0
	Overall Percentage				75.0			78.6

a. Constant is included in the model.

b. The cut value is .500

c. Selected cases RC-RACE/HISPANICITY RECODE (7 LEVELS) EQ 3

d. Unselected cases RC-RACE/HISPANICITY RECODE (7 LEVELS) NE 3

e. Some of the unselected cases are not classified due to either missing values in the independent variables or categorical variables with values out of the range of the selected cases.

### Variables in the Equation<sup>a</sup>

- 
- a. Model cannot be fitted because number of observations is less than or equal to number of model parameters.

## Appendix Q: Binary Logistic Regression for Suicidal Ideation and Weekly Crack Use

```
LOGISTIC REGRESSION VARIABLES SUICTHNK
/SELECT=NEWRACE2 EQ 3
/METHOD=ENTER CATAG6 IRSEX EDUHIGHCAT POVERTY3
/METHOD=ENTER CRDAYPWK
/PRINT=GOODFIT CI (95)
/CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5) .
```

### Case Processing Summary

Unweighted Cases <sup>a</sup>		N	Percent
Selected Cases	Included in Analysis	2	.0
	Missing Cases	2363	1.4
	Total	2365	1.4
Unselected Cases		166360	98.6
Total		168725	100.0

a. If weight is in effect, see classification table for the total number of cases.

### Classification Table<sup>a,b</sup>

Observed	SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS	Predicted					
		Selected Cases <sup>c</sup>		Percentage Correct	Unselected Cases <sup>d,e</sup>		Percentage Correct
		1 - Yes	2 - No		1 - Yes	2 - No	
Step 0	1 - Yes	0	154	.0	0	8244	.0
	2 - No	0	1583	100.0	0	117334	100.0
Overall Percentage				91.1			93.4

a. Constant is included in the model.

b. The cut value is .500

c. Selected cases RC-RACE/HISPANICITY RECODE (7 LEVELS) EQ 3

d. Unselected cases RC-RACE/HISPANICITY RECODE (7 LEVELS) NE 3

e. Some of the unselected cases are not classified due to either missing values in the independent variables or categorical variables with values out of the range of the selected cases.



### Variables in the Equation<sup>a</sup>

- 
- a. Model cannot be fitted because number of observations is less than or equal to number of model parameters.

## Appendix R: Binary Logistic Regression for Suicidal Ideation and Weekly Heroin Use

```
LOGISTIC REGRESSION VARIABLES SUICTHNK
  /SELECT=NEWTRACE2 EQ 3
  /METHOD=ENTER CATAG6 IRSEX EDUHIGHCAT POVERTY3
  /METHOD=ENTER HRDAYPWK
  /PRINT=GOODFIT CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5) .
```

### Case Processing Summary

Unweighted Cases <sup>a</sup>		N	Percent
Selected Cases	Included in Analysis	4	.0
	Missing Cases	2361	1.4
	Total	2365	1.4
Unselected Cases		166360	98.6
Total		168725	100.0

a. If weight is in effect, see classification table for the total number of cases.

### Warnings

Due to redundancies, degrees of freedom have been reduced for one or more variables.

Due to redundancies, degrees of freedom have been reduced for one or more variables.

### Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Model	1.726	2	.422

### Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	2.773 <sup>a</sup>	.350	.519

a. Estimation terminated at iteration number 20 because maximum iterations has been reached. Final solution cannot be found.

### Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	.000	1	1.000

### Contingency Table for Hosmer and Lemeshow Test

		SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS = 1 - Yes		SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS = 2 - No		Total
		Observed	Expected	Observed	Expected	
		Step 1	1	1	1.000	
	2	1	1.000	0	.000	1
	3	1	1.000	1	1.000	2

### Classification Table<sup>a</sup>

Observed		Selected Cases <sup>b</sup>		Percentage Correct	Unselected Cases <sup>c,d</sup>		Percentage Correct	
		SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS			SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS			
		1 - Yes	2 - No		1 - Yes	2 - No		
Step 1	SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS	1 - Yes	2	1	66.7	22	21	51.2
		2 - No	0	1	100.0	87	46	34.6
	Overall Percentage				75.0			38.6

a. The cutvalue is .500

b. Selected cases RC-RACE/HISPANICITY RECODE (7 LEVELS) EQ 3

c. Unselected cases RC-RACE/HISPANICITY RECODE (7 LEVELS) NE 3

d. Some of the unselected cases are not classified due to either missing values in the independent variables or categorical variables with values out of the range of the selected cases.

## Variables in the Equation

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Step 1 <sup>a</sup>								
RC-AGE CATEGORY RECODE (6 LEVELS)	.000	56841.371	.000	1	1.000	1.000	.000	.
GENDER - IMPUTATION REVISED	21.203	40192.962	.000	1	1.000	1615476246	.000	.
Constant	-42.406	179748.185	.000	1	1.000	.000		

a. Variable(s) entered on step 1: RC-AGE CATEGORY RECODE (6 LEVELS), GENDER - IMPUTATION REVISED.

## Appendix S: Binary Logistic Regression for Suicidal Ideation and Weekly Hallucinogen

### Use

```
LOGISTIC REGRESSION VARIABLES SUICTHNK
  /SELECT=NEWRACE2 EQ 3
  /METHOD=ENTER CATAG6 IRSEX EDUHIGHCAT POVERTY3
  /METHOD=ENTER HALLDYPWK
  /PRINT=GOODFIT CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

### Warnings

The parameter covariance matrix cannot be computed.  
Remaining statistics will be omitted.

### Case Processing Summary

Unweighted Cases <sup>a</sup>		N	Percent
Selected Cases	Included in Analysis	11	.0
	Missing Cases	2354	1.4
	Total	2365	1.4
Unselected Cases		166360	98.6
Total		168725	100.0

a. If weight is in effect, see classification table for the total number of cases.

**Classification Table<sup>a,b</sup>**

Observed		Selected Cases <sup>c</sup>			Unselected Cases <sup>d,e</sup>			
		1 - Yes	2 - No	Percentage Correct	1 - Yes	2 - No	Percentage Correct	
Step 0	SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS	1 - Yes	0	1	.0	0	55	.0
		2 - No	0	10	100.0	0	238	100.0
Overall Percentage					90.9			81.2

a. Constant is included in the model.

b. The cut value is .500

c. Selected cases RC-RACE/HISPANICITY RECODE (7 LEVELS) EQ 3

d. Unselected cases RC-RACE/HISPANICITY RECODE (7 LEVELS) NE 3

e. Some of the unselected cases are not classified due to either missing values in the independent variables or categorical variables with values out of the range of the selected cases.

### Variables not in the Equation

Step 0	Variables	Score	df	Sig.
	RC-AGE CATEGORY RECODE (6 LEVELS)	2.396	1	.122
	GENDER - IMPUTATION REVISED	.413	1	.521
	RC-EDUCATION CATEGORIES	2.017	1	.156
	RC-POVERTY LEVEL-NEW INC (% OF US CENSUS POVERTY THRESHOLD)	.535	1	.464
Overall Statistics		7.724	4	.102

### Omnibus Tests of Model Coefficients

Step 1		Chi-square	df	Sig.
	Step	6.702	4	.152
	Block	6.702	4	.152
	Model	6.702	4	.152

### Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	.000 <sup>a</sup>	.456	1.000

a. Estimation terminated at iteration number 20 because a perfect fit is detected. This solution is not unique.

### Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	.000	7	1.000

### Contingency Table for Hosmer and Lemeshow Test

		SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS = 1 - Yes		SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS = 2 - No		Total
		Observed	Expected	Observed	Expected	
Step 1	1	1	1.000	0	.000	1
	2	0	.000	1	1.000	1
	3	0	.000	1	1.000	1
	4	0	.000	2	2.000	2
	5	0	.000	1	1.000	1
	6	0	.000	1	1.000	1
	7	0	.000	1	1.000	1
	8	0	.000	1	1.000	1
	9	0	.000	2	2.000	2

## Appendix T: Binary Logistic Regression for Suicidal Ideation and Weekly Inhalant Use

```
LOGISTIC REGRESSION VARIABLES SUICTHNK
  /SELECT=NEWRACE2 EQ 3
  /METHOD=ENTER CATAG6 IRSEX EDUHIGHCAT POVERTY3
  /METHOD=ENTER INHDYPWK
  /PRINT=GOODFIT CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5) .
```

### Warnings

Due to redundancies, degrees of freedom have been reduced for one or more variables.

### Case Processing Summary

Unweighted Cases <sup>a</sup>		N	Percent
Selected Cases	Included in Analysis	3	.0
	Missing Cases	2362	1.4
	Total	2365	1.4
Unselected Cases		166360	98.6
Total		168725	100.0

a. If weight is in effect, see classification table for the total number of cases.

### Variables in the Equation<sup>a</sup>

a. Model cannot be fitted because number of observations is less than or equal to number of model parameters.



### Variables not in the Equation<sup>a</sup>

Step 0	Variables	Score	df	Sig.
	RC-AGE CATEGORY RECODE (6 LEVELS)	.750	1	.386
	GENDER - IMPUTATION REVISED	3.000	1	.083
	RC-EDUCATION CATEGORIES	3.000	1	.083
	RC-POVERTY LEVEL-NEW INC (% OF US CENSUS POVERTY THRESHOLD)	2.250	1	.134

a. Residual Chi-Squares are not computed because of redundancies.

### Classification Table<sup>a,b</sup>

Step 0	Observed		Predicted					
			Selected Cases <sup>c</sup>			Unselected Cases <sup>d,e</sup>		
			SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS	Percentage Correct	SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS	Percentage Correct		
	1 - Yes	0	1	.0	0	20	.0	
	2 - No	0	2	100.0	0	94	100.0	
	Overall Percentage			66.7			82.5	

a. Constant is included in the model.

b. The cut value is .500

c. Selected cases RC-RACE/HISPANICITY RECODE (7 LEVELS) EQ 3

d. Unselected cases RC-RACE/HISPANICITY RECODE (7 LEVELS) NE 3

e. Some of the unselected cases are not classified due to either missing values in the independent variables or categorical variables with values out of the range of the selected cases.

## Appendix U: Binary Logistic Regression for Suicidal Ideation and Weekly

## Methamphetamine Use

```
LOGISTIC REGRESSION VARIABLES SUICTHNK
/SELECT=NEWRACE2 EQ 3
/METHOD=ENTER CATAG6 IRSEX EDUHIGHCAT POVERTY3
/METHOD=ENTER METHDYPWK
/PRINT=GOODFIT CI(95)
/CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

**Case Processing Summary**

Unweighted Cases <sup>a</sup>		N	Percent
Selected Cases	Included in Analysis	18	.0
	Missing Cases	2347	1.4
	Total	2365	1.4
Unselected Cases		166360	98.6
Total		168725	100.0

a. If weight is in effect, see classification table for the total number of cases.

**Omnibus Tests of Model Coefficients**

		Chi-square	df	Sig.
Step 1	Step	.000	1	.999
	Block	.000	1	.999
	Model	6.258	5	.282

**Model Summary**

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	16.657 <sup>a</sup>	.294	.408

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

**Hosmer and Lemeshow Test**

Step	Chi-square	df	Sig.
1	4.441	7	.728

### Contingency Table for Hosmer and Lemeshow Test

		SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS = 1 - Yes		SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS = 2 - No		Total
		Observed	Expected	Observed	Expected	
Step 1	1	1	1.669	1	.331	2
	2	2	1.318	0	.682	2
	3	1	1.014	1	.986	2
	4	1	.676	1	1.324	2
	5	1	.519	1	1.481	2
	6	0	.414	2	1.586	2
	7	0	.238	2	1.762	2
	8	0	.087	2	1.913	2
	9	0	.064	2	1.936	2

### Classification Table<sup>a</sup>

Observed	SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS	Predicted					
		Selected Cases <sup>b</sup>			Unselected Cases <sup>c,d</sup>		
		1 - Yes	2 - No	Percentage Correct	1 - Yes	2 - No	Percentage Correct
Step 1	1 - Yes	3	3	50.0	18	64	22.0
	2 - No	2	10	83.3	73	180	71.1
	Overall Percentage			72.2			59.1

a. The cut value is .500

b. Selected cases RC-RACE/HISPANICITY RECODE (7 LEVELS) EQ 3

c. Unselected cases RC-RACE/HISPANICITY RECODE (7 LEVELS) NE 3

d. Some of the unselected cases are not classified due to either missing values in the independent variables or categorical variables with values out of the range of the selected cases.

## Variables in the Equation

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Step 1 <sup>a</sup>								
RC-AGE CATEGORY RECODE (6 LEVELS)	-1.408	.931	2.288	1	.130	.245	.039	1.517
GENDER - IMPUTATION REVISED	-.888	1.388	.409	1	.523	.412	.027	6.253
RC-POVERTY LEVEL-NEW INC (% OF US CENSUS POVERTY THRESHOLD)	.628	.939	.448	1	.504	1.874	.298	11.793
RC-EDUCATION CATEGORIES	-1.272	.861	2.182	1	.140	.280	.052	1.516
# DAYS PER WK USED METHAMPHETAMINE PAST 12 MONTHS	.000	.399	.000	1	.999	1.000	.457	2.189
Constant	8.848	5.497	2.590	1	.108	6958.363		

a. Variable(s) entered on step 1: # DAYS PER WK USED METHAMPHETAMINE PAST 12 MONTHS.

## Appendix V: Binary Logistic Regression for Suicidal Ideation and Interaction Between Weekly Alcohol and Marijuana/Hashish Use

```
LOGISTIC REGRESSION VARIABLES SUICTHNK
/SELECT=NEWRACE2 EQ 3
/METHOD=ENTER CATAG6 IRSEX EDUHIGHCAT POVERTY3
/METHOD=ENTER ALCxMARIHASH
/PRINT=GOODFIT CI(95)
/CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

### Case Processing Summary

Unweighted Cases <sup>a</sup>		N	Percent
Selected Cases	Included in Analysis	1177	.7
	Missing Cases	1188	.7
	Total	2365	1.4
Unselected Cases		166360	98.6
Total		168725	100.0

a. If weight is in effect, see classification table for the total number of cases.

### Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	6.520	1	.011
	Block	6.520	1	.011
	Model	20.659	5	.001

### Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	677.867 <sup>a</sup>	.017	.039

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

### Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	10.604	8	.225

### Contingency Table for Hosmer and Lemeshow Test

		SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS = 1 - Yes		SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS = 2 - No		Total
		Observed	Expected	Observed	Expected	
Step 1	1	21	19.946	97	98.054	118
	2	18	14.929	101	104.071	119
	3	10	12.659	108	105.341	118
	4	4	11.224	114	106.776	118
	5	11	10.048	105	105.952	116
	6	12	9.117	106	108.883	118
	7	10	8.204	110	111.796	120
	8	10	7.035	108	110.965	118
	9	5	5.742	112	111.258	117
	10	2	4.096	113	110.904	115

### Classification Table<sup>a</sup>

Observed	SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS	Predicted						
		Selected Cases <sup>b</sup>			Percentage Correct	Unselected Cases <sup>c,d</sup>		
		1 - Yes	2 - No	1 - Yes		2 - No	Percentage Correct	
Step 1	SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS	1 - Yes	0	103	.0	0	5624	.0
		2 - No	0	1074	100.0	0	78360	100.0
	Overall Percentage				91.2			93.3

a. The cut value is .500

b. Selected cases RC-RACE/HISPANICITY RECODE (7 LEVELS) EQ 3

c. Unselected cases RC-RACE/HISPANICITY RECODE (7 LEVELS) NE 3

d. Some of the unselected cases are not classified due to either missing values in the independent variables or categorical variables with values out of the range of the selected cases.

## Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
								Lower	Upper
Step 1 <sup>a</sup>	RC-AGE CATEGORY RECODE (6 LEVELS)	.298	.099	9.027	1	.003	1.347	1.109	1.635
	GENDER - IMPUTATION REVISED	-.279	.214	1.697	1	.193	.756	.497	1.151
	RC-POVERTY LEVEL-NEW INC (% OF US CENSUS POVERTY THRESHOLD)	.150	.128	1.370	1	.242	1.162	.904	1.494
	RC-EDUCATION CATEGORIES	-.135	.127	1.133	1	.287	.874	.682	1.120
	ALCxMARIHASH	.000	.000	6.722	1	.010	1.000	1.000	1.000
	Constant	1.507	.524	8.269	1	.004	4.512		

a. Variable(s) entered on step 1: ALCxMARIHASH.

## Appendix W: Binary Logistic Regression for Suicidal Ideation and Interaction Between Weekly Alcohol and Cocaine Use

```
LOGISTIC REGRESSION VARIABLES SUICTHNK
/SELECT=NEWRACE2 EQ 3
/METHOD=ENTER CATAG6 IRSEX EDUHIGHCAT POVERTY3
/METHOD=ENTER ALCxCOCAINE
/PRINT=GOODFIT CI(95)
/CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

### Case Processing Summary

Unweighted Cases <sup>a</sup>		N	Percent
Selected Cases	Included in Analysis	1155	.7
	Missing Cases	1210	.7
	Total	2365	1.4
Unselected Cases		166360	98.6
Total		168725	100.0

a. If weight is in effect, see classification table for the total number of cases.

### Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	.541	1	.462
	Block	.541	1	.462
	Model	15.135	5	.010

### Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	660.559 <sup>a</sup>	.013	.029

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

### Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	14.895	8	.061



### Contingency Table for Hosmer and Lemeshow Test

		SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS = 1 - Yes		SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS = 2 - No		Total
		Observed	Expected	Observed	Expected	
Step 1	1	23	16.623	93	99.377	116
	2	13	13.758	102	101.242	115
	3	6	12.993	113	106.007	119
	4	11	11.452	105	104.548	116
	5	9	9.951	104	103.049	113
	6	6	9.219	111	107.781	117
	7	15	8.101	100	106.899	115
	8	7	6.997	109	109.003	116
	9	5	5.744	110	109.256	115
	10	4	4.162	109	108.838	113

### Classification Table<sup>a</sup>

	Observed		Selected Cases <sup>b</sup>		Percentage Correct	Unselected Cases <sup>c,d</sup>		Percentage Correct
			SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS 1 - Yes	2 - No		SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS 1 - Yes	2 - No	
Step 1	SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS	1 - Yes	0	99	.0	0	5461	.0
		2 - No	0	1056	100.0	0	77202	100.0
Overall Percentage					91.4			93.4

a. The cut value is .500

b. Selected cases RC-RACE/HISPANICITY RECODE (7 LEVELS) EQ 3

c. Unselected cases RC-RACE/HISPANICITY RECODE (7 LEVELS) NE 3

d. Some of the unselected cases are not classified due to either missing values in the independent variables or categorical variables with values out of the range of the selected cases.

## Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
								Lower	Upper
Step 1 <sup>a</sup>	RC-AGE CATEGORY RECODE (6 LEVELS)	.318	.101	10.010	1	.002	1.375	1.129	1.674
	GENDER - IMPUTATION REVISED	-.207	.217	.909	1	.340	.813	.531	1.244
	RC-POVERTY LEVEL-NEW INC (% OF US CENSUS POVERTY THRESHOLD)	.162	.131	1.518	1	.218	1.175	.909	1.520
	RC-EDUCATION CATEGORIES	-.141	.130	1.185	1	.276	.868	.673	1.120
	ALCxCOCAINE	.000	.000	.556	1	.456	1.000	1.000	1.000
	Constant	1.573	.553	8.095	1	.004	4.821		

a. Variable(s) entered on step 1: ALCxCOCAINE.

## Appendix X: Binary Logistic Regression for Suicidal Ideation and Interaction Between

## Weekly Alcohol and Crack Use

```
LOGISTIC REGRESSION VARIABLES SUICTHNK
/SELECT=NEWRACE2 EQ 3
/METHOD=ENTER CATAG6 IRSEX EDUHIGHCAT POVERTY3
/METHOD=ENTER ALCxCRACK
/PRINT=GOODFIT CI(95)
/CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

**Case Processing Summary**

Unweighted Cases <sup>a</sup>		N	Percent
Selected Cases	Included in Analysis	1156	.7
	Missing Cases	1209	.7
	Total	2365	1.4
Unselected Cases		166360	98.6
Total		168725	100.0

a. If weight is in effect, see classification table for the total number of cases.

**Omnibus Tests of Model Coefficients**

		Chi-square	df	Sig.
Step 1	Step	.594	1	.441
	Block	.594	1	.441
	Model	15.023	5	.010

**Model Summary**

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	665.576 <sup>a</sup>	.013	.029

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

**Hosmer and Lemeshow Test**

Step	Chi-square	df	Sig.
1	9.792	8	.280

### Contingency Table for Hosmer and Lemeshow Test

		SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS = 1 - Yes		SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS = 2 - No		Total
		Observed	Expected	Observed	Expected	
Step 1	1	22	16.813	94	99.187	116
	2	14	14.220	104	103.780	118
	3	7	12.674	109	103.326	116
	4	11	11.949	110	109.051	121
	5	9	10.202	106	104.798	115
	6	8	9.118	108	106.882	116
	7	14	8.263	103	108.737	117
	8	6	7.034	110	108.966	116
	9	6	5.809	110	110.191	116
	10	3	3.917	102	101.083	105

### Classification Table<sup>a</sup>

Observed		Predicted						
		Selected Cases <sup>b</sup>			Percentage Correct	Unselected Cases <sup>c,d</sup>		Percentage Correct
		SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS		SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS				
1 - Yes	2 - No	1 - Yes	2 - No	1 - Yes	2 - No			
Step 1	SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS	1 - Yes	0	100	.0	0	5445	.0
		2 - No	0	1056	100.0	0	77147	100.0
Overall Percentage					91.3			93.4

a. The cut value is .500

b. Selected cases RC-RACE/HISPANICITY RECODE (7 LEVELS) EQ 3

c. Unselected cases RC-RACE/HISPANICITY RECODE (7 LEVELS) NE 3

d. Some of the unselected cases are not classified due to either missing values in the independent variables or categorical variables with values out of the range of the selected cases.

## Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
								Lower	Upper
Step 1 <sup>a</sup>	RC-AGE CATEGORY RECODE (6 LEVELS)	.307	.100	9.529	1	.002	1.360	1.119	1.653
	GENDER - IMPUTATION REVISED	-.224	.217	1.066	1	.302	.800	.523	1.222
	RC-POVERTY LEVEL-NEW INC (% OF US CENSUS POVERTY THRESHOLD)	.174	.131	1.773	1	.183	1.190	.921	1.538
	RC-EDUCATION CATEGORIES	-.138	.129	1.134	1	.287	.871	.676	1.123
	ALCxCRACK	.000	.000	.611	1	.434	1.000	1.000	1.000
	Constant	1.582	.551	8.225	1	.004	4.863		

a. Variable(s) entered on step 1: ALCxCRACK.

## Appendix Y: Binary Logistic Regression for Suicidal Ideation and Interaction Between Weekly Alcohol and Heroin Use

```
LOGISTIC REGRESSION VARIABLES SUICTHNK
/SELECT=NEWRACE2 EQ 3
/METHOD=ENTER CATAG6 IRSEX EDUHIGHCAT POVERTY3
/METHOD=ENTER ALCxHEROIN
/PRINT=GOODFIT CI(95)
/CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

### Case Processing Summary

Unweighted Cases <sup>a</sup>		N	Percent
Selected Cases	Included in Analysis	1157	.7
	Missing Cases	1208	.7
	Total	2365	1.4
Unselected Cases		166360	98.6
Total		168725	100.0

a. If weight is in effect, see classification table for the total number of cases.

### Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	1.431	1	.232
	Block	1.431	1	.232
	Model	15.635	5	.008

### Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	669.849 <sup>a</sup>	.013	.030

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

### Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	12.151	8	.145

### Contingency Table for Hosmer and Lemeshow Test

		SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS = 1 - Yes		SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS = 2 - No		Total
		Observed	Expected	Observed	Expected	
Step 1	1	20	17.431	97	99.569	117
	2	17	14.225	100	102.775	117
	3	8	12.684	108	103.316	116
	4	6	11.488	110	104.512	116
	5	13	10.472	104	106.528	117
	6	7	9.110	108	105.890	115
	7	14	8.216	101	106.784	115
	8	8	7.169	108	108.831	116
	9	5	5.932	111	110.068	116
	10	3	4.273	109	107.727	112

### Classification Table<sup>a</sup>

Observed		Predicted						
		Selected Cases <sup>b</sup>			Unselected Cases <sup>c,d</sup>			
		SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS	Percentage Correct	SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS	Percentage Correct			
Step 1	SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS	1 - Yes	0	101	.0	0	5442	.0
		2 - No	0	1056	100.0	0	77142	100.0
Overall Percentage				91.3			93.4	

a. The cut value is .500

b. Selected cases RC-RACE/HISPANICITY RECODE (7 LEVELS) EQ 3

c. Unselected cases RC-RACE/HISPANICITY RECODE (7 LEVELS) NE 3

d. Some of the unselected cases are not classified due to either missing values in the independent variables or categorical variables with values out of the range of the selected cases.

## Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
								Lower	Upper
Step 1 <sup>a</sup>	RC-AGE CATEGORY RECODE (6 LEVELS)	.298	.099	9.065	1	.003	1.347	1.109	1.634
	GENDER - IMPUTATION REVISED	-.200	.215	.860	1	.354	.819	.537	1.249
	RC-POVERTY LEVEL-NEW INC (% OF US CENSUS POVERTY THRESHOLD)	.196	.130	2.274	1	.132	1.217	.943	1.571
	RC-EDUCATION CATEGORIES	-.152	.129	1.402	1	.236	.859	.667	1.105
	ALCxHEROIN	.000	.000	1.488	1	.223	1.000	1.000	1.000
	Constant	1.474	.546	7.289	1	.007	4.367		

a. Variable(s) entered on step 1: ALCxHEROIN.



## Appendix Z: Binary Logistic Regression for Suicidal Ideation and Interaction Between Weekly Alcohol and Hallucinogen Use

```
LOGISTIC REGRESSION VARIABLES SUICTHNK
/SELECT=NEWRACE2 EQ 3
/METHOD=ENTER CATAG6 IRSEX EDUHIGHCAT POVERTY3
/METHOD=ENTER ALCxHALLUC
/PRINT=GOODFIT CI(95)
/CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

### Case Processing Summary

Unweighted Cases <sup>a</sup>		N	Percent
Selected Cases	Included in Analysis	1159	.7
	Missing Cases	1206	.7
	Total	2365	1.4
Unselected Cases		166360	98.6
Total		168725	100.0

a. If weight is in effect, see classification table for the total number of cases.

### Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	.363	1	.547
	Block	.363	1	.547
	Model	14.436	5	.013

### Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	666.705 <sup>a</sup>	.012	.028

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

### Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	7.911	8	.442

### Contingency Table for Hosmer and Lemeshow Test

		SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS = 1 - Yes		SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS = 2 - No		Total
		Observed	Expected	Observed	Expected	
Step 1	1	19	16.938	100	102.062	119
	2	18	14.892	108	111.108	126
	3	6	12.561	110	103.439	116
	4	10	11.296	105	103.704	115
	5	13	10.182	103	105.818	116
	6	7	9.322	111	108.678	118
	7	11	8.245	106	108.755	117
	8	8	7.038	108	108.962	116
	9	5	5.830	111	110.170	116
	10	3	3.696	97	96.304	100

### Classification Table<sup>a</sup>

Observed	SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS	Predicted						
		Selected Cases <sup>b</sup>			Percentage Correct	Unselected Cases <sup>c,d</sup>		
		1 - Yes	2 - No	1 - Yes		2 - No	Percentage Correct	
Step 1	SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS	1 - Yes	0	100	.0	0	5446	.0
		2 - No	0	1059	100.0	0	77168	100.0
	Overall Percentage				91.4			93.4

a. The cut value is .500

b. Selected cases RC-RACE/HISPANICITY RECODE (7 LEVELS) EQ 3

c. Unselected cases RC-RACE/HISPANICITY RECODE (7 LEVELS) NE 3

d. Some of the unselected cases are not classified due to either missing values in the independent variables or categorical variables with values out of the range of the selected cases.

## Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
								Lower	Upper
Step 1 <sup>a</sup>	RC-AGE CATEGORY RECODE (6 LEVELS)	.305	.100	9.368	1	.002	1.356	1.116	1.649
	GENDER - IMPUTATION REVISED	-.173	.216	.641	1	.423	.841	.551	1.284
	RC-POVERTY LEVEL-NEW INC (% OF US CENSUS POVERTY THRESHOLD)	.179	.131	1.871	1	.171	1.196	.926	1.544
	RC-EDUCATION CATEGORIES	-.155	.129	1.443	1	.230	.856	.665	1.103
	ALCxHALLUC	.000	.000	.371	1	.543	1.000	1.000	1.000
	Constant	1.582	.549	8.309	1	.004	4.866		

a. Variable(s) entered on step 1: ALCxHALLUC.

## Appendix AA: Binary Logistic Regression for Suicidal Ideation and Interaction Between Weekly Alcohol and Inhalant Use

```
LOGISTIC REGRESSION VARIABLES SUICTHNK
  /SELECT=NEWRACE2 EQ 3
  /METHOD=ENTER CATAG6 IRSEX EDUHIGHCAT POVERTY3
  /METHOD=ENTER ALCxINHALANTS
  /PRINT=GOODFIT CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5) .
```

### Case Processing Summary

Unweighted Cases <sup>a</sup>		N	Percent
Selected Cases	Included in Analysis	1155	.7
	Missing Cases	1210	.7
	Total	2365	1.4
Unselected Cases		166360	98.6
Total		168725	100.0

a. If weight is in effect, see classification table for the total number of cases.

### Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	.633	1	.426
	Block	.633	1	.426
	Model	15.227	5	.009

### Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	660.468 <sup>a</sup>	.013	.030

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

### Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	8.418	8	.394

### Contingency Table for Hosmer and Lemeshow Test

		SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS = 1 - Yes		SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS = 2 - No		Total
		Observed	Expected	Observed	Expected	
Step 1	1	22	16.659	94	99.341	116
	2	14	14.012	103	102.988	117
	3	6	12.755	111	104.245	117
	4	11	11.922	110	109.078	121
	5	10	10.393	109	108.607	119
	6	8	9.019	108	106.981	116
	7	12	8.067	104	107.933	116
	8	7	6.945	110	110.055	117
	9	6	5.646	110	110.354	116
	10	3	3.582	97	96.418	100

### Classification Table<sup>a</sup>

Observed	SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS	Predicted					
		Selected Cases <sup>b</sup>			Unselected Cases <sup>c,d</sup>		
		1 - Yes	2 - No	Percentage Correct	1 - Yes	2 - No	Percentage Correct
Step 1	1 - Yes	0	99	.0	0	5443	.0
	2 - No	0	1056	100.0	0	77147	100.0
	Overall Percentage			91.4			93.4

a. The cut value is .500

b. Selected cases RC-RACE/HISPANICITY RECODE (7 LEVELS) EQ 3

c. Unselected cases RC-RACE/HISPANICITY RECODE (7 LEVELS) NE 3

d. Some of the unselected cases are not classified due to either missing values in the independent variables or categorical variables with values out of the range of the selected cases.

## Variables in the Equation

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Step 1 <sup>a</sup>								
RC-AGE CATEGORY RECODE (6 LEVELS)	.319	.101	10.030	1	.002	1.375	1.129	1.675
GENDER - IMPUTATION REVISED	-.209	.217	.921	1	.337	.812	.530	1.243
RC-POVERTY LEVEL-NEW INC (% OF US CENSUS POVERTY THRESHOLD)	.163	.131	1.535	1	.215	1.177	.910	1.522
RC-EDUCATION CATEGORIES	-.141	.130	1.189	1	.276	.868	.673	1.119
ALCxINHALANTS	.000	.000	.651	1	.420	1.000	1.000	1.000
Constant	1.560	.553	7.956	1	.005	4.760		

a. Variable(s) entered on step 1: ALCxINHALANTS.

## Appendix BB: Binary Logistic Regression for Suicidal Ideation and Interaction Between Weekly Alcohol and Methamphetamine Use

```
LOGISTIC REGRESSION VARIABLES SUICTHNK
  /SELECT=NEWRACE2 EQ 3
  /METHOD=ENTER CATAG6 IRSEX EDUHIGHCAT POVERTY3
  /METHOD=ENTER ALCxMETH
  /PRINT=GOODFIT CI (95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5) .
```

### Case Processing Summary

Unweighted Cases <sup>a</sup>		N	Percent
Selected Cases	Included in Analysis	1160	.7
	Missing Cases	1205	.7
	Total	2365	1.4
Unselected Cases		166360	98.6
Total		168725	100.0

a. If weight is in effect, see classification table for the total number of cases.

### Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	2.365	1	.124
	Block	2.365	1	.124
	Model	16.919	5	.005

### Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	673.802 <sup>a</sup>	.014	.032

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

### Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	12.333	8	.137

### Contingency Table for Hosmer and Lemeshow Test

		SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS = 1 - Yes		SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS = 2 - No		Total
		Observed	Expected	Observed	Expected	
Step 1	1	16	17.719	98	96.281	114
	2	19	14.523	99	103.477	118
	3	13	12.894	104	104.106	117
	4	4	11.548	112	104.452	116
	5	10	10.429	107	106.571	117
	6	10	9.248	107	107.752	117
	7	13	8.358	104	108.642	117
	8	10	7.156	106	108.844	116
	9	4	5.921	112	110.079	116
	10	3	4.206	109	107.794	112

### Classification Table<sup>a</sup>

Observed		Predicted						
		Selected Cases <sup>b</sup>			Unselected Cases <sup>c,d</sup>			
		SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS 1 - Yes	2 - No	Percentage Correct	SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS 1 - Yes	2 - No	Percentage Correct	
Step 1	SERIOUSLY THINK ABOUT KILLING SELF PST 12 MOS	1 - Yes	0	102	.0	0	5447	.0
	2 - No	0	1058	100.0	0	77164	100.0	
Overall Percentage				91.2			93.4	

a. The cutvalue is .500

b. Selected cases RC-RACE/HISPANICITY RECODE (7 LEVELS) EQ 3

c. Unselected cases RC-RACE/HISPANICITY RECODE (7 LEVELS) NE 3

d. Some of the unselected cases are not classified due to either missing values in the independent variables or categorical variables with values out of the range of the selected cases.



## Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
								Lower	Upper
Step 1 <sup>a</sup>	RC-AGE CATEGORY RECODE (6 LEVELS)	.295	.099	8.984	1	.003	1.344	1.108	1.630
	GENDER - IMPUTATION REVISED	-.176	.214	.673	1	.412	.839	.551	1.276
	RC-POVERTY LEVEL-NEW INC (% OF US CENSUS POVERTY THRESHOLD)	.214	.130	2.714	1	.099	1.239	.960	1.598
	RC-EDUCATION CATEGORIES	-.171	.128	1.779	1	.182	.843	.656	1.084
	ALCxMETH	.000	.000	2.473	1	.116	1.000	1.000	1.000
	Constant	1.390	.539	6.653	1	.010	4.017		

a. Variable(s) entered on step 1: ALCxMETH.