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Live and let die: opiate overdose deaths in Chicago

Connie L. Smith
DePaul University, csmith7@depaul.edu

LIVE AND LET DIE: OPIATE OVERDOSE DEATHS IN CHICAGO

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Connie Smith

Department of Sociology

College of Liberal Arts and Sciences

DePaul University

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Abstract

The use of narcotics, particularly opiates, is a health and social problem that is prevalent worldwide. One serious outcome of opiate overdose is death. Chicago is an important urban center that has serious opiate overdose-induced death problem that is not clearly understood. The purpose of this study is to better understand factors contributing to death from opiate overdoses, and specifically age at death. To acquire a better understanding of overdose-induced death a comprehensive database of opiate-related deaths in Chicago between 1999 and 2003 was created, including only opiate-overdose incidents. Blacks constituted the largest number of opiate-related deaths. However, we found that, victims who were Black, male, married, and took the combination of heroin and cocaine died at an older age than other people who died of an overdose in our database. By contrast, Hispanics who experienced overdose died at significantly younger ages than others in the database. In addition, we found females and or non-married drug addicts, even if they were Black, lived shorter lives than others in this study. Extended longevity among opiate addicts might indicate the existence of resistance factors to death by opiate overdose. Investigating these factors might contribute to longer life expectancy and lower risk of death among opiate addicts. By identifying specific populations at risk, our results will further help health and policy officials design and implement efficient steps by targeting specific groups and preventing unnecessary deaths through education as well as rehabilitation.

Introduction and Literature Review

The Chicago Tribune reports that Chicago is a major stop in the global heroin trade, which brings a bountiful supply of the drug to the city's streets. Use of opiates has led to 12,982 emergency room visits in 2002 and 628 deaths from 2003 to 2004 (Bebow, 2004). The same report revealed that Chicago had the greatest number of opiate related emergency visits of any city in the country in the year of 2002. This has brought considerable media attention. In response to this public health problem, two Chicago-area organizations have joined together to build an opiate-overdose database by screening death records of Chicago residents who died of an opiate overdose. In collaboration with the Chicago Department of Public Health (CDPH), we at the DePaul University sociology department have worked to build an opiate overdose surveillance database that would help track opiate-related overdose deaths in Chicago.

The database includes demographic information, from death certificates about the overdose victims as well as information about the incident. In this study we hypothesized by using a regression model to analyze if there are significant predictor variables using age of death of addicts as a dependent variable and predicting if variables such as; race, gender, education, type of drug, and marital status will extend or shorten an addicts age of death. We asked a number of specific questions: do women addicts die at a later age than their male counterparts? Are there any characteristics that could keep a heroin addict alive longer? Are there differences between races? Is marriage a benefit even among drug users? Moreover, is Chicago different from the rest of the country? We set out to find some defined answers via this opiate surveillance database.

From 1988 to 1995, there had been more than 95% increase in heroin-related emergency department visits, with more than a third of them involving a drug overdose (NIDA, 1995). Opiate fatalities rose sharply in the United States in the 1990s, increasing 56 percent between 1990 and 1997, making overdose a leading cause of Injection Drug Users (IDU) accidental death (Garfield 2001). According to the data from the Drug Abuse Warning Network (DAWN), in 2001 the Substance Abuse and Mental Health Administration cited more than 2,600 fatalities that involved heroin in the emergency departments of 18 major cities around the United States.

There has been a steady increase of heroin-related overdoses in major metropolitan cities around the U.S. Overdoses on average do not appear to be related to inexperienced heroin use. Contrary to popular belief that a typical overdose victim is a young novice, the average age of death is between late twenties and early thirties (Darke, 1996). People who die of heroin-related overdoses are experienced users of five years or more. Heroin-related overdoses have been increasing among older, more experienced IDU (Injecting Drug User) males. This suggests that victims of overdose have been using heroin for a while. The Darke et al. study concluded that the longer a heroin addict uses heroin, the higher the tolerance they develop for the drug, meaning that the addict needs to increase the amount of heroin and that increases the risk of a fatal overdose. Since their tolerance level is high, they need additional heroin to receive the euphoric feeling, and tend to inject more heroin than their body can endure causing the cardiovascular system to fail. Why is heroin so addictive?

The pharmacology of heroin

Heroin produces feelings of reward and activates several regions of the brain that produce physical dependence. "Together, these actions account for the user's loss of control and the drug's habit-forming action" (Zaldor et al. 1996). Understanding the properties of heroin explains why it is so addictive and how it affects the cardiovascular system when taken in excess.

"The pharmacology of heroin (diacetylmorphine) is rapidly hydrolyzed to 6-monoacetylmorphine which in turn is hydrolyzed to morphine following intravenous administration in humans" (Goodman & Gilman 1991). "The blood concentration of morphine, the metabolite of heroin, is dependent on the route of administration, drug dose, body weight, time elapsed since last dose, and the individual pharmacokinetics" (Aderjan et al. 1995). Heroin does not store in the body but when taken in considerable amounts it can be fatal. "Heroin is water-soluble, which passes through the cardiovascular system and is released from the body through urine" (Goodman & Gilman, 1991). "The signs of heroin toxicity include drowsiness, extreme miosis: pinpoint pupils, and a depressed respiratory rate. Cyanosis, hypotension, bradycarardia, low resting heart rate, less than 60 bpm, and hypothermia may be present as well. Death is usually caused by respiratory failure" (Goodman & Gilman, 1991). Heroin depresses the cardiovascular system, causing the victim to stop breathing and die of a heart attack.

The pharmacology of cocaine

One of the variables in our study was cocaine. We found 32.1% of the opiate overdoses had cocaine in their system at the time of their death. Cocaine has many street names: coke, blow, candy, crack, jack, jimmy, rock, nose candy, and whitecoat. Cocaine

causes a sense of energy, alertness, talkativeness, and well-being users find pleasurable. At the same time, they experience sympathetic nervous system stimulation, including an increased heart rate and blood pressure and dilation of bronchioles (breathing tubes) in the lungs. When injected or smoked, these drugs cause an intense feeling of euphoria (Goodman & Gilman 1991).

Cocaine is a substance that is found in the leaves of a shrubby plant (*Erythoxylum coca*) commonly found growing wild in Peru, Bolivia, and Ecuador and cultivated in many countries. Cocaine, as it is known today, was first synthesized in 1855 although it was not until 1880 that its effects were recognized in the medical field. Cocaine is an alkaloid derivative of the coca plant, generally available in a powder form, which can be zero to 90 percent pure, or "rock" which is normally 25 to 40 percent pure. Cocaine is often cut with other substances, such as lactose (milk sugar), mannitol (barley laxative), or amphetamines (Goodman & Gilman 1991).

The leaves of the coca plant are processed into a paste and its contents are heated with hydrochloric acid to produce cocaine hydrochloride. This most common form of cocaine is a white, crystalline powder, freely soluble in water, but rarely used internally or injected. The most popular method of use is to separate the powder into fine "lines" of approximately 1/4 gram and 4-6 inches long. A small straw is then used to "snort" the cocaine into the nose (Goodman & Gilman 1991).

Cocaine is best known for its ability to increase focus and mental alertness, eliminate fatigue, and decrease the appetite. Cocaine users are often talkative, full of energy, confident to the point of being restless and nervous. In the body, cocaine initiates all the symptoms of the fight-or-flight syndrome: it increases the heart rate and blood

pressure, constricts blood vessels, dilates the bronchioles (breathing tubes), increases blood sugar, and generally prepares the body for emergency. It also improves the symptoms of asthma, breaks down fat to create energy and, therefore, contributes to weight loss. It can have excessive effects on the heart, leading to a disordered heartbeat or, eventually, failure of the cardiovascular system and can increase body temperature to a dangerous extent (Goodman & Gilman 1991).

The prolonged or uncontrollable use of cocaine in any of its purified forms can cause severe personality disturbance, inability to sleep and loss of appetite. A personality psychosis from toxicity can develop involving paranoid delusions and disturbing tactile hallucinations in which the user feels insects crawling under the skin. When taken in larger amounts and with prolonged use, cocaine can produce depression, anxiety, irritability, sleep problems, chronic fatigue, mental confusion, paranoia, and convulsions that can untimely cause death.

Combination of heroin and cocaine: speedball

A combination of two extremely different substances to get a unique feeling called a speedball. “Injecting a combination of cocaine and heroin, known as 'Speedball' is one of the most dangerous cocktails one can put in a human body, and is potentially deadly” (Goodman & Gilman, 1991). Speedballing (alternatively known as snowballing) is a term commonly referring to the intravenous use of heroin or morphine and cocaine together in the same needle. The combination is also known as moon rocks when smoked. This is a potentially lethal concoction: the cocaine acts as a stimulant, raising the pulse, but its effects wear off more quickly than those of either heroin or morphine, which in turn slows the heart down. As a result, it is possible to experience a delayed "overdose"

(technically, severe respiratory depression) when the stimulant wears off and the full effects of the morphine are felt in isolation (U.S. Office of National Drug Policy, 2006). In our database, we found that there were people who had the combination in their system at the time of death.

Potential treatments for overdose: methadone

Methadone is a rigorously well-tested medication that is safe and efficacious for the treatment of narcotic withdrawal and dependence. For more than 30 years, this synthetic narcotic has been used to treat opioid addiction (Novick 1991). "Heroin releases an excess of dopamine in the body and causes users to need an opiate continuously occupying the opioid receptor in the brain. Methadone occupies this receptor and is the stabilizing factor that permits addicts on methadone to change their behavior and to discontinue heroin use" (Zaldor et al. 1996). Methadone treatment is effective in suppressing narcotic withdrawal symptoms for 24 to 36 hours and is effective in detoxifying heroin addicts. Unfortunately, patients become physically dependent on opioids and have to take methadone on a regular basis for the rest of their life. Methadone allows the patient to function in society without having the uncontrolled, compulsive, and disruptive behavior seen in heroin addicts (Zaldor et al. 1996). Methadone treatment is effective in cases of addiction to opioid drugs such as heroin and morphine, and is not an effective treatment for non-opioids (Zaldor et al. 1996). However, methadone treatment programs are hard to get into and there are not many in the United States (Novick 1991). In many states, funding for methadone programs has been cut, forcing addicts to self-medicate by adding combinations of cocaine and alcohol to maintain their habit, which may result in a hasty death.

Potential treatments for overdose: naloxone

Naloxone is a prescription drug that counteracts an opiate overdose and it has been shown that it can save lives.

> Naloxone is a drug used to counter the effects of overdosing on opiates such as heroin and morphine. It is marketed under trade names including Narcan, Nalone, and Narcanti. The drug interacts with the brain and has an extremely high affinity for μ-opioid receptors in the central nervous system. Naloxone is a μ-opioid receptor competitive antagonist, and its rapid blockade of those receptors often produces rapid onset of withdrawal symptoms. Naloxone also has an antagonist action, though with a lower affinity, at κ- and δ-opioid receptors. Naloxone is injected initially intravenously for fastest action. The drug acts after about two minutes, and its effects may last about 45 minutes (Strang et al., 1999).

In some parts of the United States, Naloxone has been distributed as part of emergency kits to heroin addicts, and has been shown to reduce death rates (Strang et al., 1999). However, the kits with Naloxone are limited and require a prescription. Knowing how Naloxone saves lives, there should be a campaign to allow Naloxone to be more readily obtained without a prescription and sold over the counter with no questions asked. High mortality of heroin addicts is one of the distressing consequences of addiction. Heroin does not discriminate; it is in every socioeconomic status from professionals to general laborers and from doctors to dishwashers. There is a way to stop heroin overdoses by administering a shot of Naloxone to a person who is overdosing (Strang et al., 1999).

Overdose contexts

Studies have found that people who inject drugs are likely to overdose (Darke & Zador, 1996). Heroin is a highly social drug and there is evidence that the majority of deaths that are attributed to overdose were in the company of others (Manning et al., 1983; Zaldor et al., 1996). Others were present at the time of death in 58 percent of the

cases as reported by Zador et al., (1996). Most studies typically focus on the toxicology and epidemiology of fatalities attributed to overdoses. In this study, we examined some of the surrounding circumstances of overdose. Since it is a highly social drug, and if others are present when someone is overdosing, then why do people die of overdoses?

What is a fatal overdose?

The classic depiction of a fatal overdose, as a result of a quantity or quality such as the purity level of heroin, is the dose taken in excess of the person's tolerance to the drug? That is the most long standing and widely accepted explanation for death due to heroin (Goodman & Gilman, 1991). Toxicity levels that determine a fatal dose are undefined. Lethal doses of heroin are based on individual distinctiveness, i.e., the individuals' tolerance level to the drug if they will overdose or not. The Zaldor et al. (1996) study concluded that morphine levels are no higher in dead victims than in those who survive. Whether the dose is lethal or not, it all depends on the tolerance level and the amount of time a person has been using heroin. Once the person has developed a tolerance level, one needs more heroin. In turn, it costs more to support a habit and to maintain the feeling of 'normalcy'. If addicts make the decision to stop taking heroin, if it is available, they can enroll in a methadone maintenance program as a form of addiction treatment.

The characteristics of individuals whose deaths are attributed to heroin overdose

Reviews of the circumstances and risk factors of heroin overdose have been provided by Garfield and Drucker E (2001), Sporer (1999), Zador (1996), Darke et al (1996), and Darke et al (1995). Significant risk factors for overdose fatalities include being male, single, unemployed, having a history of heroin dependence and not being in

treatment for the dependence. The male to female ratio of overdoses is significantly higher in terms of fatalities attributed to overdose (Cherubin *et al.*, 1972; Harlow, 1990; Frischer *et al.*, 1993; National Institute on Drug Abuse, 1994; Zador, Sunjic and Darke, 1996) ranging up to 80 percent greater (Cherubin *et al.*, 1972; Zador *et al.*, 1996). This finding is in agreement with the over-representation of males among heroin users throughout the world (Ball & Ross, 1991; Griffiths *et al.*, 1994; Darke & Hall, 1995). The above studies found that males are most likely to die from a fatal overdose of heroin and our database reflects the same.

The age of overdose fatalities

It has been commonly believed that many overdose deaths occur among the young. However, in reality victims of fatal overdoses have consistently been found to be in their late 20s and early 30s, generally with a history of drug abuse. In a study of 2708 heroin related deaths in Italy from 1985 to 1998, Quaglio et al. found the average deaths due to an opiate overdose remained almost constant, yet the average age at death per year rose from 26 in the mid eighties to 34 in 1998. One possible explanation for the age patterns observed in overdose fatalities is that the risk of overdose is consistent for any given user regardless of age, tolerance, or experience and that the patterns being observed are simply a reflection of the age distribution of opiate users. This is not like in the U.S. where the average age of an overdose fatality has been increasing while the age of initiation into heroin use has been decreasing. In their study of 1200 heroin users Lynskey and Hall established that the average age of initiation into heroin use has decreased from 26.1 years in the cohort born between 1940 and 1949 to 17.5 years in the cohort born between 1970 and 1979. This suggests that the while heroin using population

has been getting younger and the users are living longer (Lynskey and Hall 1998). This conclusion was supported by key informant interviews from the Australian Illicit Drugs Reporting Scheme (IDRS). If the age of first heroin use is declining while the average age of overdose decedents is increasing, it may be that addicts are becoming better able to survive addiction over longer periods of time and is strongly suggestive of an increased risk among older users (Lynskey and Hall 1998).

The survivors of overdose

The proportion of heroin IDUs reporting at least one non-fatal overdose in their lifetime was 48 percent in San Francisco (Seal 2001), 41 percent in Baltimore (Tobin 2003), 42 percent in New York City (Bryant et al 2004), 68 percent in Sydney, Australia (Darke 1996), and 38 percent in London (Powis 1999). In the United States, there was a 48 percent increase in heroin-related emergency department (ED) mentions between 1994 and 2002, reaching nearly 200,000 mentions in 2002 (Substance Abuse and Mental Health Administration, 2003). In studies in Europe and Australia, approximately one-third of injectors sampled witnessed an overdose within the prior year (Darke et al. 1996; Powis et al 1999).

In one of the few published studies of non-fatal overdose conducted in the United States, among 1,427 street-recruited heroin IDUs in San Francisco, 48 percent reported having at least one and 33 percent reported having two or more overdoses in their lifetime (Seal et al. 2001).

Not only do heroin users experience at least one overdose, they also witness others overdosing on heroin. In Europe and Australia, approximately one-third of injectors sampled witnessed an overdose within the prior year. However, little is

understood about the frequency of overdose experiences, witnessing and reactions to overdoses in the United States (Ochoa et al., 2001). Although several studies have found that most overdose-related deaths occur in the company of others, few studies have thoroughly examined drug users' responses when witnessing overdoses and experiences with medical help for overdose.

Studies have shown that overdosing happens in the company of others with a high incidence among adult, single, unemployed males. However, the significance of these variables with respect the age of death induced by overdosing in the city of Chicago is still unknown.

The effect of marriage:

It seems that benefits of marriage may help an IDU live longer. Sociologists and psychologists have studied the multiple effects of marriage. Married couples are much happier and likely to be less unhappy than any other group of people (Waite, 2000). Dr. Linda Waite found that the incidence of mental illness is lower among married people as compared to unmarried or divorced couples. Married people live up to eight years longer than divorced or never-married people. Married people suffer from long-term illnesses much less than those who are unmarried (Murphy et al., 1997). Married men are more financially successful and make more money than unmarried men (Waite & Gallagher, 2000). So, we ask the question: does marriage help addicts? If marriage improves the quality of a person's life, does it also reduce the risk of overdose for IDU's?

Gender, Ethnicity and Age:

According to Centers for Disease Control and Prevention (CDC) 2006, age-adjusted death rates were higher for males (924.6 per 100,000 populations) than females

(657.8 per 100,000 populations) overall and within black and white populations. By race, death rates were higher for blacks than for whites (Centers for Disease Control, 2006).

The CDC reported, in 2004, that life expectancy was at 76 years for white males compared to 70 years for black males, a difference of six years. For Females, life expectancy at birth was 81years for white females compared to 76 years for Black females, a difference of five years. Between genders of the same race, white females outlived their male counterparts by five years, black females outlived their male counterparts by six years.

The national Survey on Drug Use and Health conducted a survey on drug usage and age. The survey asked participants 12 years and older if they used illicit drugs within the past month, illicit drugs refer to marijuana/hashish, cocaine(including crack), inhalants, hallucinogens, heroin, or prescription-type drugs used non medically. They found the usage rates were 9.2% for Black, 8.1% for White, 7.4 % for Hispanic (NSDUH, 2007).

Drug Combinations:

We selected only deaths where heroin (opiate), methadone, and/or morphine were in the victim's system when they died, and may have been the main cause of death. There often were other drugs present such as cocaine and alcohol, so we built a new database for this study out of these certificates. The new database only included heroin overdoses along with drug combinations of heroin (opiates) and methadone or with other drugs. Combinations of drugs are as follows, opiate and alcohol, opiate and cocaine, and finally, opiate, alcohol, and cocaine.

Research Questions

First, I want to make clear that overdoses do not appear to be related to the inexperienced heroin user, since most overdoses are occurring among seasoned users not novices (Darke, 1996). In the Darke 1996 study, they found that a typical overdose victim is an experienced user and has used heroin for more than five years. Heroin-related overdoses have been increasing among older, more experienced IDU males. Being a male IDU, is a strong predictor of overdose.

Are African Americans overrepresented in our study? By contrast, are Hispanic underrepresented in our study? Are there any characteristics such as: gender, race education, drug combination, and marital status at related to older age at time of death? Stated in the literature above, the affect of marriage is a positive benefit and prolongs life and therefore, we hypothesis that marriage may prolong the life an opiate user. After addressing these questions using the regression model then we will compare the findings of our data to the U.S. Census Bureau Census 2000 summary data for the City of Chicago to answer these questions.

Question 1: In terms of age, gender, races and education: how are the people who die from opiate overdose different from Chicago residents?

Question 2: Are there any characteristics such as age, gender, race different between the opiate overdose data and Chicago data relating to age of death?

Methods and Data

Working with the CDPH, we spent 120 hours screening death certificates that were from a CDPH list between years 1994-2002 using a list from the International Classification of Disease (ICD) diagnostic codes over several drugs, e.g., in ICD-9, code

965.0 for “opiates and related narcotics”. The ICD-9, code 965.0 covers codeine, heroin, methadone, morphine, pethidine, and opium. We selected only deaths that were coded 965.0 which covered heroin (opiate), methadone, and/or morphine. Along with the code 965.0, which is the main cause of death there were other drugs present such as cocaine and alcohol. The new database only included heroin overdoses along with drug combinations of heroin (opiates) and methadone or other drugs. Combinations of drugs are as follows, opiate and alcohol, opiate and cocaine, and finally, opiate, alcohol, and cocaine.

With permission from the Office of the Coroner’s Medical Examiners (OCME) in Chicago to screen death certificate records, we screened all the death certificates for the years 1993-2003. From that pool, we selected 1,522 records that were opiate-related deaths. Afterwards, we created a database of variables that were not previously incorporated by the CDPH department of epidemiology surveillance system. The database included the following variables: the main cause of death, drug(s) type, date of death, date of birth, marital status, education level, race, age, mother’s name, and gender. Furthermore, we merged the newly created database with the CDPH database and the outcome was the first opiate overdose database in Chicago.

Regression Model:

A multi regression is used to test the predictive power of a set of variables and to assess the relative contribution of each individual variable. In my study, I want to find out what variables that are collected in the death records of opiate overdoses are significant predictors of age of overdose death.

I choose a multiple regression over an independent t-test, because it allows prediction of a single dependent continuous variable (Age of Death) from a group of independent variables such as: gender, types of drugs, marital status, and race. With the regression tables, we ran a collinearity statistic and all the variation in inflation factors were at or below the 1.00 level. The value was not greater than 1.00; therefore, the impact of multi-collinearity was not a factor and did not violate the assumptions of a regression equation and we felt comfortable to use all the independent variables. We used the P (<.05), in the regression table, and F (large) in the regression ANOVA table values to indicate statistical significance.

This study has limitations. The Office of Medical Examiner's (OCME) determinations of cause of death are based on several factors, including but not limited to, toxicology making it difficult to determine the relative contributions of heroin to overdose deaths when heroin was deemed to contribute to the overdose by the OCME. OCME of Chicago works toward insuring consistency in classification of death. The certificates showed when there were opiates in the system when the victim died; however, there were other health issues present at the time of death such as emphysema and heart failure. Was it because of the opiates in their system or was it the chronic disease that caused their death? Since gathering information about disease is taken at the time of death, whether the disease was chronic or not stays undetermined.

The police or OCME will ask questions at the scene or hospital where the victim died. Variables, such as occupation, were operationally hard to define. For example, there was one occupation that was called 'general laborer', which could mean panhandling, or odd jobs. There was no distinct job description, thus making it hard to determine what the

deceased line of work was or where to classify them occupationally. The education variable is also problematic, there are no records indicating that they actually completed high school. Probing these undefined variables warrants further studies.

In addition, the degree to which the results of this study are applicable outside of Chicago remains unknown a limitation that is beyond the scope of this report. However, big urban centers in the country like New York City, Detroit, Atlanta, and Los angles, all have, more or less, similar demographics and social problems such as crime, homicide, and drug use. I believe this study's findings can be generalized into these major cities and used to create an effective approach to a common problem, death due to drug overdose. Further work needs to be performed in other cities to clarify the trends.

Results and Analysis

The age range in this study is from 11 years old to76 years old (Appendix Table 21). In table 1, among the 1522 dead people in the study, 81.5 % were males and 18.5 % were females. The drug-overdose death indicated a wide gender gap with a male to female ratio of four to one. A gender disparity among drug addicts who died of an overdose with males outnumbering females is in striking contrast to the 1:1 male to female ratio that existed for all the deaths in the City of Chicago (Table 2). Out of all the deaths 42.8% died of an opiate overdose alone, 25.2 % died of an opiate and alcohol together, 22.5 % died of a combination of opiate and cocaine, and 9.6 % died because of combining all three drugs together: opiate, alcohol and cocaine. Being married was an advantage among opiate users in terms of longevity; never-married individuals were more susceptible to drug-related deaths at 56.6 %, married 19.3 %, divorced 17.3 %, widowed 3.6 % and missing 2.8 %. African Americans comprised 57.8 % of the dead

compared to other major ethnicities such as White 29.6 % and Hispanic 12.6 % in this study (Table 1).

Table 1. Frequency Distribution

	Frequency	Percentage	Valid Percentage
Male	1240	81.5	81.5
Female	282	18.5	18.5
Opiate	651	42.8	42.8
Opiate and Alcohol	383	25.2	25.2
Opiate, Alcohol and Cocaine	146	9.6	9.6
Opiate and Cocaine	342	22.5	22.5
Never Married	862	56.6	56.9
Married	293	19.3	19.3
Divorced	263	17.3	17.3
Widowed	55	3.6	3.6
Unknown	49	3.2	3.2
Black	879	57.8	57.8
White	451	29.6	29.6
Hispanic	192	12.6	12.6
Black Female	194	12.7	12.7
White Female	70	4.6	4.6
Hispanic Female	18	1.2	1.2
Black Male	685	45	45
White Male	381	25	25
Hispanic Male	174	11.4	11.4

Note: Number of Missing Cases: 0.

Table 2. Gender Race ages 10-79 years for City of Chicago

	Frequency	Percentage	Valid Percentage
Female Black	470,365	19.02	19.02
Female White	512,221	20.71	20.71
Female Hispanic	281,811	11.39	11.39
Male Black	378,310	15.29	15.29
Male White	522,034	21.10	21.10
Male Hispanic	308,865	12.49	12.49
Total Male	1,209,209	48.88	48.88
Total Female	1,264,397	51.12	51.12

Source: U.S. Census Bureau, Census 2000 Summary File 3, Matrices P18, P19, P21, P22, P24, P36, P37, P39, P42, PCT8, PCT16, PCT17, and PCT19 Population: city of Chicago Source: 2000 Census Summary File 1 (Table P8) Universe: Population 25 years and over in City of Chicago

As shown in Tables 1 and 2, Chicago's major races between the ages 10-79 including both male and female are 34.31% Black, 23.88 Hispanic and 41.81 White. Our data obviously shows that Blacks are overrepresented among the overdosed dead in our study of Chicago.

Examining the data further looking at the mean ages of our study 39 $\pm$ 9.28 years and comparing them to the Chicago data we find that people who died of a heroin overdose were disproportionately men, African Americans in their late thirties, never married and had less than a high school education level (Tables 1 and 3).

The prevalence of Blacks (57.8%) compared to all males (81.5%) in this study is in sharp contrast to their percentage in the city of Chicago itself (34.31%), a similarity that cannot escape our notice, just as the size of the Black population in prison at the national and local levels. For new drug offence conviction, Human Rights Watch reported that 53.5% of all 2003 inmates were black. In the same report that was recently released (May 2008), a black man had a 12 fold greater likelihood to enter prison than a white man for drug offences.

Table 2a. Comparing City to Study Pop by Age 10-79, Race and Gender						
	*City Pop	N	%	Study	N	%
Ages 10-79	Black Male:	378,310	15.29%	Black Male:	685	45.00%
	White Male:	522,034	21.10%	White Male:	381	25.00%
	Hispanic Male:	308,865	12.49%	Hispanic Male:	174	11.40%
	Total Male:	1,209,209	48.88%	Total Male:	1,240	81.40%
Ages 10-79	Black Female:	470,365	19.02%	Black Female:	194	12.70%
	WhiteFemale:	512,221	20.71%	WhiteFemale:	70	4.60%
	Hispanic Female:	281,811	11.39%	Hispanic Female:	18	1.20%
	Total Female:	1,264,397	51.12%	Total Female:	282	18.50%

Table 2b. Comparing City to Study Pop. By Age 30-49, Race and Gender						
	*City Pop	N	%	Study	N	%
Ages 30-49	Black Male:	130,611	5.28%	Black Male:	491	32.30%
	White Male:	209,683	8.48%	White Male:	267	17.20%
	Hispanic Male:	112,533	4.55%	Hispanic Male:	121	8.00%
	Total Male:	452,827	18.31%	Total Male:	879	57.50%
Ages 30-49	Black Female:	165,513	6.69%	Black Female:	154	10.10%
	WhiteFemale:	186,973	7.56%	WhiteFemale:	45	3.00%
	Hispanic Female:	100,412	4.06%	Hispanic Female:	11	0.80%
	Total Female:	452,898	18.31%	Total Female:	210	13.90%

*Source: U.S. Census Bureau, Census 2000 Summary File 3, Matrices P18, P19, P21, P22, P24, P36, P37, P39, P42, PCT8, PCT16, PCT17, and PCT19 Population: city of Chicago Source: 2000 Census Summary File 1 (Table P8) Universe: Population 25 years and over in City of Chicago

Exploring Table 2a it compares the age category of our study 11-79 to the city of Chicago population 10-79 by gender and race. For the city of Chicago, Black males were 15.29% and our study had 45%. Between White males, the city had 21.1% and we had 25. %. Between Hispanic males, the city had 12.49% and we had 11.40%. For the city of Chicago, Black women were 19.02% and our study had 12.70%, Between Whites females the city had 20.71% and our study had 4.60% and for Hispanics 11.39% and our study had 1.20%

Examining the data further, Table 2b compares the mean age for overdose death is 39± 9.28 to the city of Chicago population 30-49 by gender and race. For the city of

Chicago, Black males were 5.28 % and our study had 32.30 %. For White males, the city had 8.48 % and we had 17.20 %. For Hispanic males, the city had 4.55 % and we had 8.00 %. For the city of Chicago, Black women were 6.69 % and our study had 10.10%, For White females the city had 7.56 % and our study had 3.0 % and for Hispanics females 4.06% and our study had .80%

As shown above, Chicago's major races between the ages 30-49 are 5.28% Black men, 8.48 white men and 4.55% Hispanic men. Our data obviously shows that Black males 32.30% are overrepresented among the mean age of 39± 9.28 overdosed dead in our study compared to Chicago. People who died of a heroin overdose were disproportionally men in our study.

Table 3 describes the mean age of all people in our study their mean age at death was 39 years old + 9.28 years and the mean education level in this study was 11.5 years + 2.4 years, which means that the subjects were generally between the ninth grade and college sophomores. The minimum was zero (illiterate) and the maximum period for the respondent was 17 years of education (college level). The age of death was education-independent.

Table 3. Descriptive statistics of respondent's age, education

	N	Mean	Standard Deviation	Confidence Interval
Age[a]	1522	39.00	9.28	38.52-39.47
Education[b]	1463	11.50	2.40	11.38-11.63

Note: [a] Number of Missing Cases: 0, [b] Number of Missing Cases: 59,

Table 3a is a snapshot of the 2000 Census data of cook county education attainment ages 25+ by gender and race. I used only three races, White , Black and Hispanic, males and females to compare the education level to our study. I compared the

percentages of the three races and found that 24.64% of 3,473,295, the cook county population had a high school education , 20.19% had some college but no degree, 15.63% had a bachelors degree, 13.37% had a 9^{th}-12^{th} grade education with no diploma, 11.24% had less than a 9^{th} grade education, 9.83% had a graduate or professional degree and 5.10% had an associate's degree. The population in my study has an education length of 11.5 $\pm$ 2.4 years; therefore, my population spans the level of high school 9^{th} grade through college sophomores. In table 3a, the equivalent percentages that have the characteristics of my population is (13.37+24.64+20.19+5.1) which is 63.3%. Therefore, 63.3% represents the majority of the population of Cook County from which my smaller population came. Which means my population spans the majority of cook county population. They mostly do not have a college degree, which agrees with cook county census.

Table 3a

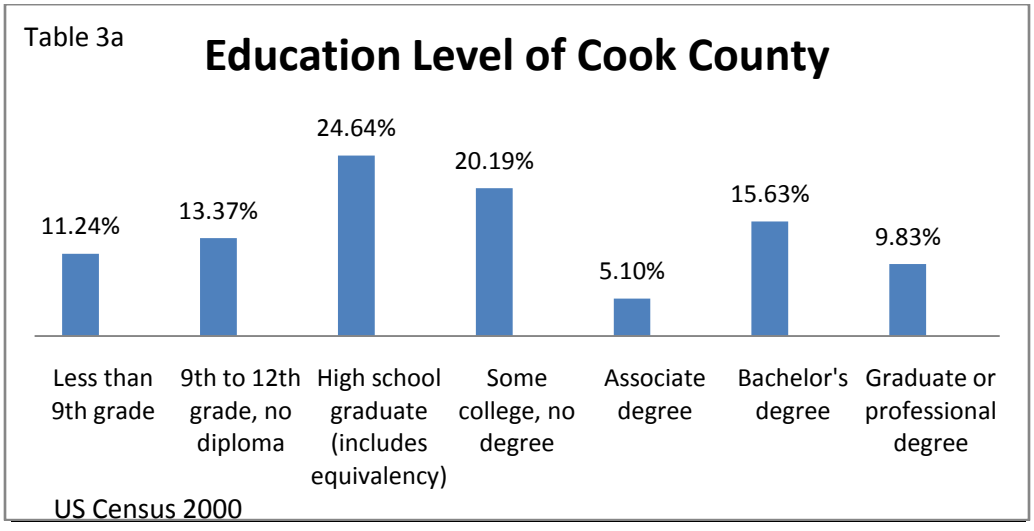

Table 4. ANOVA: Education

Education	Sum of Squares	df	Mean Square	F	P
Regression	20.861	1	20.861	**.244**	.622
Residual	125160.139	1461	85.667		
Total	125180.999	1462			

Note: Predictors: Education. Dependent variable: Age.

On the first bivariate regression, we looked at age at death as a dependent variable and education (Table 5). We found that there was no linear relationship between age and education (P >.05).

Table 5. Bivariate regression coefficient for education with age

	Unstandardized Coefficients		Standardized Coefficients		
Model	**B**	**Standard Error**	**Beta**	**t**	**P**
Constant	39.572	1.185	--	33.405	0
Education	-.050	.101	-.013	-.493	**.622**

Note Dependent variable: Age.

Then we looked at the Black-age relationship and found that it was linear and the Blacks lived significantly longer than Whites and Hispanics by .38 $\pm$ .47 years (~10 months maximum. Tables 6 and 7).

Table 6. ANOVA: Race (Black)

Education	Sum of Squares	df	Mean Square	F	P
Regression	5358.259	1	5358.259	**64.841**	0
Residual	125607.691	1520	82.637		
Total	130965	1521			

Note: Predictors: Race (Black). Dependent variable: Age.

Table 7. Bivariate regression coefficient: race (Black) with age

	Unstandardized Coefficients		Standardized Coefficients		
Model	**B**	**Standard Error**	**Beta**	**t**	**P**
Constant	36.988	.358		103.175	0
Black	.3799	.472	.202	8.052	**0**

Note Dependent variable: Age.

Looking at Hispanics and the age of death (Table 8 and 9), we found that Hispanics are dying 3.7 $\pm$ .71 years significantly (P < .05) earlier than Blacks and Whites in the study with a negative linear relationship.

Table 8. ANOVA: Race (Hispanic)

Education	**Sum of Squares**	**df**	**Mean Square**	**F**	**P**
Regression	2417.083	1	2417.083	**25.580**	0
Residual	128548.867	1520	84.572		
Total	130965.950	1521			

Note: Predictors: Hispanic, Dependent Variable: Age.

Table 9. Bivariate regression coefficient: Race (Hispanic) with age

	Unstandardized Coefficients		**Standardized Coefficients**		
Model	**B**	**Standard Error**	**Beta**	**t**	**P**
Constant	39.660	.252		157.278	0
Hispanic	**-3.796**	.710	-.136	-5.346	**0**

Note: Dependent variable: Age.

Then we looked at the gender-age relationship and found that males and females had a similar life span (P > .05), there was no linear relationship between males and age and males lived .78 years longer than females (Tables 10 and 11).

Table 10. ANOVA: Gender (sex)

Education	**Sum of Squares**	**df**	**Mean Square**	**F**	**P**
Regression	139.675	1	139.675	**1.623**	.203
Residual	130826.275	1520	86.070		
Total	130965.950	1521			

Note: Predictors: Education. Dependent variable: Age. Dummy Variable: 1 = Male.

Table 11. Bivariate regression coefficient: Gender (sex) with age

	Unstandardized Coefficients		Standardized Coefficients		
Model	B	Standard Error	Beta	t	P
Constant	38.546	.552		69.772	0
Gender	.780	.612	.033	1.274	**.203**

Note: Dummy Variable: 1 = Male. Dependent variable: Age.

Marital status has great effect on age of death as we found that married people lived significantly longer (2.5 years) than non-married ones (P < .05), and the relationship between these two factors is linear (Tables 12 and 13).

Table 12. ANOVA: Marital status

Education	**Sum of Squares**	**df**	**Mean Square**	**F**	**P**
Regression	1515.850	1	1515.850	**17.799**	0
Residual	129450.100	1520	85.165		
Total	130965.950	1521			

Note: Predictors: Education. Dependent variable: Age. Dummy variable: Marital status: 1= Married.

Table 13. Bivariate regression coefficient: Marital status with age

	Unstandardized Coefficients		**Standardized Coefficients**		
Model	**B**	**Standard Error**	**Beta**	**t**	**P**
Constant	38.694	.263		146.991	0
Marital Status	2.531	.600	.108	4.219	**0**

Note: Dependent variable: Age.

Among the heroin-alcohol users, there was no linear relationship to the age of death, and there was no significant difference between this group and the rest of the population in the database (P > .05) (Tables 14 and 15).

Table 14. ANOVA: Heroin and alcohol

Education	**Sum of Squares**	**df**	**Mean Square**	**F**	**P**
Regression	.843	1	.843	**.010**	.921
Residual	130965.107	1520	86.161		
Total	130965.950	1521			

Note: Predictors: Heroin and alcohol. Dependent variable: Age. Dummy variable: 1 = Heroin and alcohol.

Table 15. Bivariate regression coefficient: Poly drugs (heroin and alcohol) with age

	Unstandardized Coefficients		**Standardized Coefficients**		
Model	**B**	**Standard Error**	**Beta**	**T**	**P**
Constant	39.168	.275		142.408	0
Poly Drugs Heroin and Alcohol	.054	.054	.003	.099	**.921**

Note: Dependent variable: Age.

In contrast to heroin–alcohol users, heroin-cocaine users lived almost two years longer than the rest of the people in our database. This death delay is significant ($P < .05$) and the relationship is linear between these two factors (Tables 16 and 17).

Table 16. ANOVA: Poly drugs (heroin and cocaine)

Education	**Sum of Squares**	**df**	**Mean Square**	**F**	**P**
Regression	1004.095	1	1004.095	**11.744**	.001
Residual	129961.855	1520	85.501		
Total	130965.950	1521			

Note: Predictors: Poly drugs. Dependent variable: Age. Dummy variable : Heroin and cocaine =1.

Table 17. Bivariate regression coefficient: Poly drugs (heroin and cocaine) with age

	Unstandardized Coefficients		**Standardized Coefficients**		
Model	**B**	**Standard Error**	**Beta**	**T**	**P**
Constant	38.744	.269		143.933	0
Poly Drugs Heroin and Cocaine	1.946	.568	.088	.3.427	**.001**

Note Dependent variable: Age.

Though the heroin-cocaine-alcohol users lived 1.2 years less than others did, this difference is not significant (P > .05), and the relationship is not linear between these two factors (Tables 18 and 19).

Table 18. ANOVA: Poly drugs (heroin, alcohol and cocaine)

Education	Sum of Squares	df	Mean Square	F	P
Regression	183.134	1	183.134	**2.128**	.145
Residual	130782.816	1520	86.041		
Total	130965.950	1521			

Note: Predictors: Poly drugs (heroin, alcohol, and cocaine), Dependent variable: Age.

Table 19. Bivariate regression coefficient: Poly drugs (heroin, alcohol and cocaine) with age

	Unstandardized Coefficients		Standardized Coefficients		
Model	**B**	**Standard Error**	**Beta**	**T**	**P**
Constant	39.294	.250		157.140	0
Poly Drugs Heroin, Alcohol and Cocaine	-1.178	.807	-.037	-1.459	**.145**

Note Dependent variable: Age. Dummy variable: heroin, alcohol and cocaine = 1.

In the multivariate analysis (table 22) the following predictor variables are significantly related to age of death and these variables are, Black, male, married and used a combination of heroin and cocaine were positively significant and Hispanic was negatively significant which means they died at a considerably younger age than the Blacks. None of the other variables were significant in the multivariate regression education, poly-AOH, and poly-HAC.

Table 20. ANOVA

	Sum of Squares	df	Mean Square	F	P
Regression	8382	11	762.031	**9.46**	0
Residual	116798.659	1451	80.495		
Total	125181.999	1462			

Note: Predictors: Education, Dum Black, Dum Hispanic, Dum sex, Dum marry, d polyOA, d polyOC, d polyOAC, dum in1, dum in2, dum in3 Dependent variable: Age.

Table 21. Multi-variate regression coefficient

	Unstandardized Coefficients	Standardized Coefficients			
Model	**B**	**Standard Error**	**Beta**	**T**	**P**
Constant	36.694	2.142		17.134	0
Education	-.137	.101	-.036	-1.353	.176
Black	2.377	.622	.127	3.819	0
Hispanic	-1.967	.835	-.071	-2.357	.019
Sex Male	1.281	.613	.054	2.091	.037
Married	2.435	.592	.105	4.110	0
Heroin and Alcohol	.483	.598	.023	.807	.420
Heroin and Cocaine	1.717	.614	.078	2.796	.005
Heroin, Alcohol and Cocaine	-.492	.831	-.016	-.593	.553

Dependent Variable: Age.

Discussion

Our major finding in this study addresses our first research question. When we surveyed the death certificates of people who died of an opiate overdose, and using a linear regression, we found variable characteristics may have the possible protective/risk factors for overdose death among heroin users. These characteristics were being Black, male, married and a heroin/cocaine combination user lived significantly longer than others who lacked these characteristics. In contrast, when we looked at Hispanics who experienced an opiate overdose death, they lived significantly shorter life than others did. As we stated in our research question, marriage is a protective factor related to the age of overdose death but a relatively short period. Since we have by now an approximate profiling of the people who died of an overdose, we can begin to think of designing and implementing rehabilitation programs for this defined sector of society. For example, the

different combinations of drugs had different effects on the lifespan of the user. Notably, heroin-cocaine use delayed death measurably, in combination with other factors. This effect needs further medical and social investigation.

In our database, Black males were over represented, could this be a byproduct of racism, which is deeply imbedded in the structure of American life. Since Chicago is highly segregated and Blacks are among the poorest in the city, could their death rate be, at least in part, a result of racial oppression?

> As Douglass S. Massey and Nancy A. Denton eloquently stated in their book, American Apartheid; --[T]he ghetto is part and parcel of American Society; it was manufactured by whites earlier in the century to isolate and control the growing urban black populations, and it was maintained today by a set of institutions, attitudes and practices that are deeply embedded in the structure of American life. As conditions in the ghetto has worsened and as the poor black have adapted socially and culturally to this deteriorating environment, the ghetto has assumed even greater importance as an institutional tool for isolating the byproducts of racial oppression: crime, drugs, violence, illiteracy, poverty, despair and their growing social and economic costs.

Implications and Prevention:

The information we obtained from the data could help health officials reach overdose victims who did not die of the overdose and help in programs for heroin users. Many studies have concluded that most drug users are aware of the signs of an overdose (Darke et al, 1996b; Sporer, 1999; Strang et al., 1999). Knowing that heroin is a highly social drug, having social support may help save a life. Education on how to obtain and administer Naloxone can also be a positive tool in reducing the risk of drug overdose.

Ultimately, we need to form our findings into an effective policy that, in practice, will dramatically reduce the premature death of opiate users. A drug policy change is needed by making drugs that can reverse the overdose effects, such as Naloxone,

available over the counter (Darke & Hall, 1997). Since heroin use is stigmatized and is deemed illegal not everyone knows that a person is using heroin and if every household had a first aid kit that contained Naloxone it could save someone from dying of an unnecessary death from heroin. Allowing programs such as: needle exchange to give their participants Naloxone when they come in for their new needles and supplies would also help, and permitting pharmacies to distribute Naloxone to anyone who needs it. Methadone programs should also consent to their participants obtaining Naloxone because they are also in jeopardy of overdosing.

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Appendix I
Tables

Table 1. Frequency Distribution

	Frequency	Percentage	Valid Percentage
Male	1240	81.5	81.5
Female	282	18.5	18.5
Opiate	651	42.8	42.8
Opiate and Alcohol	383	25.2	25.2
Opiate, Alcohol and Cocaine	146	9.6	9.6
Opiate and Cocaine	342	22.5	22.5
Never Married	862	56.6	56.9
Married	293	19.3	19.3
Divorced	263	17.3	17.3
Widowed	55	3.6	3.6
Unknown	49	3.2	3.2
Black	879	57.8	57.8
White	451	29.6	29.6
Hispanic	192	12.6	12.6
Black Female	194	12.7	12.7
White Female	70	4.6	4.6
Hispanic Female	18	1.2	1.2
Black Male	685	45	45
White Male	381	25	25
Hispanic Male	174	11.4	11.4

Note: Number of Missing Cases: 0.

Table 2a. Comparing City to Study Pop by Age 10-79, Race and Gender

	*City Pop	N	%	Study	N	%
Ages 10-79	Black Male:	378,310	15.29%	Black Male:	685	45.00%
	White Male:	522,034	21.10%	White Male:	381	25.00%
	Hispanic Male:	308,865	12.49%	Hispanic Male:	174	11.40%
	Total Male:	1,209,209	48.88%	Total Male:	1,240	81.40%
Ages 10-79	Black Female:	470,365	19.02%	Black Female:	194	12.70%
	White Female:	512,221	20.71%	White Female:	70	4.60%
	Hispanic Female:	281,811	11.39%	Hispanic Female:	18	1.20%
	Total Female:	1,264,397	51.12%	Total Female:	282	18.50%

Table 2b. Comparing City to Study Pop. By Age 30-49, Race and Gender

	*City Pop	N	%	Study	N	%
Ages 30-49	Black Male:	130,611	5.28%	Black Male:	491	32.30%
	White Male:	209,683	8.48%	White Male:	267	17.20%
	Hispanic Male:	112,533	4.55%	Hispanic Male:	121	8.00%
	Total Male:	452,827	18.31%	Total Male:	879	57.50%
Ages 30-49	Black Female:	165,513	6.69%	Black Female:	154	10.10%
	White Female:	186,973	7.56%	White Female:	45	3.00%
	Hispanic Female:	100,412	4.06%	Hispanic Female:	11	0.80%
	Total Female:	452,898	18.31%	Total Female:	210	13.90%

*Source: U.S. Census Bureau, Census 2000 Summary File 3, Matrices P18, P19, P21, P22, P24, P36, P37, P39, P42, PCT8, PCT16, PCT17, and PCT19 Population: city of Chicago Source: 2000 Census Summary File 1 (Table P8) Universe: Population 25 years and over in City of Chicago

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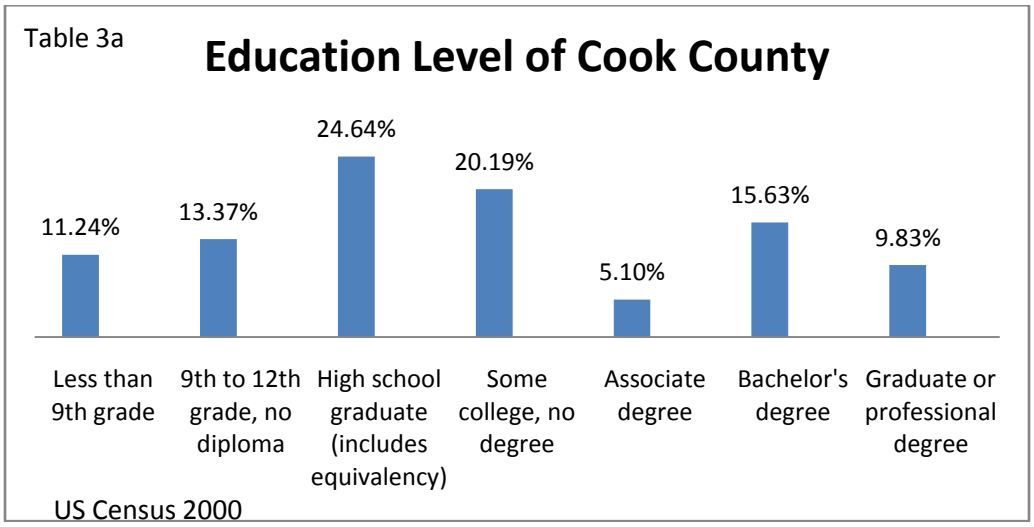
Table 3a



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Note: Predictors: Race (Black). Dependent variable: Age.

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Note: Dependent variable: Age.

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Note: Predictors: Hispanic, Dependent Variable: Age.

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Residual	129450.100	1520	85.165		
Total	130965.950	1521			

Note: Predictors: Education. Dependent variable: Age. Dummy Variable: Marital status: 1= Married.

Table 13. Bivariate regression coefficient: Marital status with age

	Unstandardized Coefficients		Standardized Coefficients		
Model	B	Standard Error	Beta	t	P
Constant	38.694	.263		146.991	0
Marital Status	2.531	.600	.108	4.219	0

Note: Dependent variable: Age.

Table 14. ANOVA: Heroin and alcohol

Education	Sum of Squares	df	Mean Square	F	P
Regression	.843	1	.843	.010	.921
Residual	130965.107	1520	86.161		
Total	130965.950	1521			

Note: Predictors: Heroin and alcohol. Dependent variable: Age. Dummy variable: 1 = Heroin and alcohol.

Table 15. Bivariate regression coefficient: Poly drugs (heroin and alcohol) with age

	Unstandardized Coefficients		Standardized Coefficients		
Model	B	Standard Error	Beta	t	P
Constant	39.168	.275		142.408	0
Poly Drugs Heroin and Alcohol	.054	.054	.003	.099	.921

Note: Dependent variable: Age.

Table 16. ANOVA: Poly drugs (heroin and cocaine)

Education	Sum of Squares	df	Mean Square	F	P
Regression	1004.095	1	1004.095	11.744	.001
Residual	129961.855	1520	85.501		
Total	130965.950	1521			

Note: Predictors: Poly drugs. Dependent variable: Age. Dummy variable: Heroin and cocaine =1.

Table 17. Bivariate regression coefficient: Poly drugs (heroin and cocaine) with age

	Unstandardized Coefficients		Standardized Coefficients		
Model	**B**	**Standard Error**	**Beta**	**t**	**P**
Constant	38.744	.269		143.933	0
Poly Drugs Heroin and Cocaine	1.946	.568	.088	.3.427	.001

Note: Dependent variable: Age.

Table 18. ANOVA: Poly drugs (heroin, alcohol and cocaine)

Education	**Sum of Squares**	**df**	**Mean Square**	**F**	**P**
Regression	183.134	1	183.134	2.128	.145
Residual	130782.816	1520	86.041		
Total	130965.950	1521			

Note: Predictors: Poly drugs (heroin, alcohol, and cocaine), Dependent variable: Age.

Table 19. Bivariate regression coefficient: Poly drugs (heroin, alcohol and cocaine) with age

	Unstandardized Coefficients		Standardized Coefficients		
Model	**B**	**Standard Error**	**Beta**	**t**	**P**
Constant	39.294	.250		157.140	0
Poly Drugs Heroin, Alcohol and Cocaine	-1.178	.807	-.037	-1.459	.145

Note: Dependent variable: Age. Dummy variable: heroin, alcohol and cocaine = 1.

Table 20. ANOVA

	Sum of Squares	**df**	**Mean Square**	**F**	**P**
Regression	8382	11	762.031	9.46	0
Residual	116798.659	1451	80.495		
Total	125181.999	1462			

Note: Predictors: Education, Dum Black, Dum Hispanic, Dum sex, Dum marry, d polyOA, d polyOC, d polyOAC, dum in1, dum in2, dum in3 Dependent variable: Age.

Table 21. Multi-variate regression coefficient

	Unstandardized Coefficients		Standardized Coefficients		
Model	**B**	**Standard Error**	**Beta**	**t**	**P**
Constant	36.694	2.142		17.134	0
Education	-.137	.101	-.036	-1.353	.176
Black	2.377	.622	.127	3.819	0
Hispanic	-1.967	.835	-.071	-2.357	.019
Sex Male	1.281	.613	.054	2.091	.037
Married	2.435	.592	.105	4.110	0
Heroin and Alcohol	.483	.598	.023	.807	.420
Heroin and Cocaine	1.717	.614	.078	2.796	.005

Dependent Variable: Age.

Table 21 age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	11	1	.1	.1	.1
	14	2	.1	.1	.2
	16	1	.1	.1	.3
	17	2	.1	.1	.4
	18	1	.1	.1	.5
	19	8	.5	.5	1.0
	20	6	.4	.4	1.4
	21	12	.8	.8	2.2
	22	15	1.0	1.0	3.2
	23	16	1.1	1.1	4.2
	24	23	1.5	1.5	5.7
	25	35	2.3	2.3	8.0
	26	32	2.1	2.1	10.1
	27	29	1.9	1.9	12.0
	28	28	1.8	1.8	13.9
	29	44	2.9	2.9	16.8
	30	31	2.0	2.0	18.8
	31	45	3.0	3.0	21.7
	32	47	3.1	3.1	24.8
	33	56	3.7	3.7	28.5
	34	42	2.8	2.8	31.3
	35	49	3.2	3.2	34.5
	36	63	4.1	4.1	38.6
	37	46	3.0	3.0	41.7
	38	53	3.5	3.5	45.1
	39	55	3.6	3.6	48.8
	40	71	4.7	4.7	53.4
	41	60	3.9	3.9	57.4
	42	65	4.3	4.3	61.6
	43	80	5.3	5.3	66.9
	44	63	4.1	4.1	71.0
	45	69	4.5	4.5	75.6
	46	61	4.0	4.0	79.6
	47	50	3.3	3.3	82.9
	48	44	2.9	2.9	85.7
	49	34	2.2	2.2	88.0
	50	33	2.2	2.2	90.1
	51	29	1.9	1.9	92.0
	52	26	1.7	1.7	93.8
	53	16	1.1	1.1	94.8

	54	14	.9	.9	95.7
	55	12	.8	.8	96.5
	56	5	.3	.3	96.8
	57	4	.3	.3	97.1
	58	10	.7	.7	97.8
	59	5	.3	.3	98.1
	60	6	.4	.4	98.5
	61	2	.1	.1	98.6
	62	4	.3	.3	98.9
	63	3	.2	.2	99.1
	64	7	.5	.5	99.5
	65	3	.2	.2	99.7
	66	1	.1	.1	99.8
	70	1	.1	.1	99.9
	71	1	.1	.1	99.9
	76	1	.1	.1	100.0
	Total	1522	100.0	100.0	

educ2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-9.00 Missing	75	4.9	4.9	4.9
	1.00 More than High School	284	18.7	18.7	23.6
	2.00 High School	651	42.8	42.8	66.4
	3.00 Less than High School	512	33.6	33.6	100.0
	Total	1522	100.0	100.0	

Appendix II Syntax

```
FREQUENCIES
  VARIABLES=racec sex marital drugs
  /ORDER=  ANALYSIS .
EXAMINE
  VARIABLES=agec edreg
  /PLOT NONE
  /STATISTICS DESCRIPTIVES
  /CINTERVAL 95
  /MISSING LISTWISE
  /NOTOTAL.
CORRELATIONS
  /VARIABLES=racec
  /PRINT=TWOTAIL NOSIG
  /MISSING=PAIRWISE .
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT agec
  /METHOD=ENTER edreg  .
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT agec
  /METHOD=ENTER dblck  .
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT agec
  /METHOD=ENTER dhisp  .
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT agec
  /METHOD=ENTER dumbsex  .
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
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  /NOORIGIN
  /DEPENDENT agec
  /METHOD=ENTER dumbmary  .
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  /DEPENDENT agec
  /METHOD=ENTER dpolyoa  .
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  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT agec
  /METHOD=ENTER dpolyoc  .
REGRESSION
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  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT agec
  /METHOD=ENTER dpolyoac  .
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REGRESSION
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  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT agec
  /METHOD=ENTER dumin1  .
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  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT agec
  /METHOD=ENTER dumin2  .
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  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT agec
  /METHOD=ENTER dumin3  .
REGRESSION
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  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT agec
  /METHOD=ENTER edreg dblck dhisp dumbsex dumbmary dpolyoa dpolyoc dpolyoac
  dumin1 dumin2 dumin3  .
```