2013

THE IMPACT OF SUBSTANCE ABUSE IN HIGH RISK, RURAL VIRGINIA COUNTIES

CHARLETTE T. WOOLRIDGE
Virginia Commonwealth University

THE IMPACT OF SUBSTANCE ABUSE IN HIGH RISK, RURAL VIRGINIA COUNTIES

A dissertation submitted in partial fulfillment of the requirements for the degree
of Doctor of Philosophy at Virginia Commonwealth University

BY

CHARLETTE TENISE WOOLRIDGE

L. DOUGLAS WILDER SCHOOL OF PUBLIC AFFAIRS
PUBLIC POLICY AND ADMINISTRATION

Director: Robyn L. Diehl, Ph.D.
Associate Professor
L. Douglas Wilder School of Public Affairs

Virginia Commonwealth University
Richmond, Virginia
August 2013

ABSTRACT

THE IMPACT OF SUBSTANCE ABUSE IN HIGH RISK, RURAL VIRGINIA COUNTIES

Charlette Tenise Woolridge

The purpose of this study was to examine the relationship between drug-related crimes in high-risk, rural Virginia counties (Brunswick County and Grayson County) and efforts to reduce them with a particular focus on a cost-benefit analysis of expenditures. Four independent variables were assessed in relation to drug-related crime: expenditures associated with (1) drug abuse prevention and (2) drug abuse treatment, (3) economic development, and (4) education. Drug abuse prevention and drug abuse treatment are traditional approaches to address the drug use and crime relationship, while economic development and education represent social determinants of health (economic and social factors that impact the health of people in communities). The literature suggests that strategies that build on traditional approaches to reduce substance use and addiction, while simultaneously addressing social determinants of health, are most effective at mitigating the drug use/crime relationship. The following demographic variables were also analyzed: unemployment rates, educational achievement, homeownership rates, median household income, and poverty rates.

The theoretical framework used in this research was Paul Goldstein's tripartite framework for explaining the drug use/violent crime relationship (psychopharmacological violence, economic compulsive violence, and systemic violence). Exploratory, descriptive and explanatory research designs were employed for examining the relationship between drug-related crimes and amelioration efforts in the areas of drug abuse prevention/treatment, economic development, and education. The research used a variety of secondary data amassed by local, state and federal governments, including basic demographic information, homeownership rates,

median household income, poverty rates, and unemployment stastics. For example, audit documents from both Brunswick County and Grayson County, and the Virginia Tobacco and Indemnification and Community Revitalization Commission (VTICRC) were utilized to determine expenditures for the dependent and independent variables. The data collected from the secondary sources were reviewed and analyzed.

The researcher found that drug abuse prevention was inversely correlated with drug-related crime expenditures and drug-related crimes for juveniles. In other words, drug abuse prevention expenditures predicted reductions in drug-related crime expenditures and drug-related crimes for juveniles. The researcher recommends that policymakers reprioritize limited funding to ensure maximum impact of reducing drug-related crimes and its consequences through drug abuse prevention policies and increased funding allocations.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS

AEDC	American Economic Development Council
BGD	Black Gangsta Disciples
CASA	The National Center on Addiction at Columbia University
CBA	Cost-Benefit Analysis
CDC	Center for Disease Control
CEA	Cost-Effectiveness Analysis
CSB	Community Services Board
CSDH	Commission on Social Determinants of Health
CUED	Council of Urban Economic Development
DARE	Drug Abuse Resistance Education
DARP	Drug Abuse Reporting Program
DATOS	Drug Abuse Treatment Outcome Study
DAWN	Drug Abuse Warning Network
DOJ	Department of Justice
FY	Fiscal Year
HJR	House Joint Resolution
IDA	Industrial Development Authority
IEDC	International Economic Development Council
JLARC	Joint Legislative Audit and Review Committee
LAUS	Local Area Unemployment Statistics
LST	Life Skills Training
MSA	Tobacco Master Settlement Agreement

MTF	Monitoring The Future
NHSDA	National Household Survey on Drug Abuse
NIDA	National Institute on Drug Abuse
NLC	National League of Cities
ODF	Out-Patient Drug-Free Program
ONDCP	Office of National Drug Control Policy
PCP	Phencyclidine
SAMHSA	Substance Abuse and Mental Health Services Administration
SJR	Senate Joint Resolution
SDH	Social Determinants of Health
SPECDA	School Program to Educate and Control Drug Abuse
SSVA	Southside Virginia
SWVA	Southwest Virginia
TAP	Treatment Alternative Program
TASC	Treatment Alternative to Street Crime
TC	Therapeutic Community
TEDS	Treatment Episode Data Set
TOPS	Treatment Outcome Prospective Study
WHO	World Health Organization
VEC	Virginia Employment Commission
VTICRC	Virginia Tobacco Indemnification and Community Revitalization Commissions
YBI	Young Boys Incorporated

ACKNOWLEDGEMENTS

I would like to first give honor, praise and glory to The Most High God for His unfailing love and for providing me with the endurance and blessings to complete this dissertation. With Him, all things are possible!

So many individuals contributed to this effort and I want to humbly and sincerely thank them for their unwavering support and words of encouragement during my graduate studies. To my son Quechan, daughter-in-law, and grandchildren, I thank you for your prayers and your patience throughout this long and sometimes arduous journey. You gave me the drive to complete this dissertation. I love you all more than words can express.

To my mother, Florine W. Gordon, you have been my inspiration throughout my entire life. I thank you for always believing in me. Through you I have learned that I can accomplish anything that I set out to do, with God.

To Chief Apostle, Sharmaine Thomas, Deliverance Prayer Ministry, and Pastor Dr. Michael Jones, Village of Faith Ministries, and Rev. Delores McQuinn -- thank you for your continued prayers and for reminding me of God's promise for my life.

Dr. Cynthia Newbille, my sister-friend, thank you for walking this walk with me. Your support, encouraging words, and guidance helped me to get through this process.

Many thanks to Malinda Brown, Jane Talley, and Angel Jones for your motivating words and for always being in my corner.

Finally, my deepest gratitude is to my committee, Dr. Robyn Diehl, Chair, Dr. William Bosher, Dr. Kenneth Daniels, and Dr. Ivan Suen for your wisdom, support and guidance. Words cannot express how grateful I am to each of you.

CHAPTER I:

INTRODUCTION

Substance abuse remains a major health and economic problem in the United States (CASA, 2000a; CASA, 2011b), despite a multi-pronged effort from a number of public and private agencies to reduce its prevalence. In addition to the potentially lethal personal consequences of substance abuse, there are huge economic costs associated with this pervasive problem in terms of law enforcement, under/unemployment, treatment programs, social services, child protective services, and so forth. In the face of the many negative economic and social risks associated with substance abuse, governmental spending efforts to mitigate its effects have historically been somewhat negligible in comparison to the widespread need for action. In fact, as linkages between substance abuse and crime/violence and other negative social outcomes are revealed, policymakers are increasingly accepting the urgency of addressing the problem in terms of heightened local, state, and national spending efforts (Foster & Modi, 2001). In short, in order to lessen the burden of substance abuse, government agencies must invest in cost-effective approaches for reducing its prevalence and damaging consequences.

For the past several decades researchers have been investigating the economic burden of substance abuse in the United States. According to Harwood (1991), this is complex undertaking since estimating the cost of a disease or a social problem requires synthesizing many disparate impacts using a single measure—the dollar. Compounding the dilemma of arriving at an exact cost estimate is that many studies provide approximations that take into account multiple substances such as drugs, alcohol, and tobacco. Nonetheless, estimates are available. In their longitudinal study, Rice, Kelman, Miller and Dunmeyer (1990) estimated the cost of substance abuse at $44.1 billion in 1985, increasing to approximately $58.3 billion in 1988. These figures

include direct treatment and support costs (5 percent), indirect morbidity costs (14 percent), indirect mortality costs (6 percent), other related costs (74 percent), and cost of AIDS research and treatment (2 percent). Rice and coworkers also reported that the societal costs associated with drug abuse—in the form of police protection, legal costs, unemployment productivity losses, incarceration, etc.—annually exceed $32 billion, which represent almost three-fourths of the total "bill" for substance abuse.

A study by the Lewin Group (Harwood, Fountain & Livermore, 1998) for the National Institute on Drug Abuse (NIDA) and the National Institute on Alcohol Abuse and Alcoholism (NIAAA), both institutes of the National Institutes of Health (NIH), estimated the cost of alcohol and substance abuse to be $245.7 billion in 1992. This study indicated that alcohol abuse and alcoholism accounted for about 60 percent of the estimated costs ($148 billion), while substance abuse/dependence represented the remaining 40 percent ($98 billion). Additionally, the report indicated that criminal justice expenditures more than doubled in comparison to 1985 expenditures due to increases in the prison population.

In terms of more recent findings, the Office of National Drug Control Policy (2004) estimated the total costs associated with illegal drugs to be $180.9 billion in 2002. According to this analysis the cost of substance abuse increased an average of 5.3 percent per year from 1992 through 2002. The most rapid increases in substance abuse costs are associated with criminal justice efforts, particularly increased rates of incarceration for drug-related offenses and increased spending on law enforcement and adjudication.

Cost analyses of substance abuse have also focused on certain types of drugs. Mark, Woody, Juday and Kleber (2001) conducted an economic study of heroin addiction in the United States—both in terms of the addict and society at large. Heroin addiction costs were estimated in

four broad areas (medical care, lost productivity, crime, and social welfare), which totaled about $21.9 billion in 1996. Of these costs, productivity losses accounted for $11.5 billion (53%), criminal activities represented the second largest cost at $5.2 billion (24%), medical care accounted for $5.0 billion (23%) and social welfare expenditures accounted for $0.1 billion (0.5%).

The RAND Drug Policy Research Center (Nicosia, Pacula, Kilmer, Lundberg, & Chiesa, 2009) conducted the first (and only) national estimate of costs associated with methamphetamine use (i.e., premature death, crime and criminal justice costs, child maltreatment and foster care, lost productivity, and treatment/health care expenditures) in the U.S. to date. The report estimated the cost of methamphetamine use to be $23.4 billion in 2005. According to the RAND study, crime and criminal justice costs represent the second-largest expense category, ranging from $2.5 to $15.8 billion—with a "best estimate" of $4.2 billion.

Over time, the staggering estimates of the cost of substance abuse and addiction reflect an obvious pattern of increase across the various expense categories. However, one of the most significant contributors to these escalating costs has to do with substance abuse-related violent crime (Watts & Wright, 1990), whose cause-effect associations remain somewhat controversial. In fact, despite persuasive evidence of an association between drug use and violent crime, empirical proof of a causal relationship between the two has consistently yielded contradictory results (De La Rosa, Lambert & Gropper, 1990; Reiss & Roth, 1993; White, 1997). On the one hand, some researchers have concluded that there is no causal relationship between drug use and violent crime. For example, after studying the effects of heroin, amphetamine, cocaine, and phencyclidine use on violence, Parker and Auerhahn (1998) found no evidence that these drugs promote violence. Similarly, Anglin (1984) also reported that the drug-violence connection has

an uncertain causal relationship. On the other hand, further studies have pointed to a direct causal relationship between drug use and violent crime—although for some it has become a "chicken or the egg" causality dilemma (Menard & Mihalic, 2001a; White, 1990; White & Gorman, 2000). In other words, does drug use cause crime, or does crime perpetuate drug use? Many researchers argue for the latter—that criminal behaviors usually precede illicit substance use (Allen, 2005; Chaiken & Chaiken, 1990; Hall, 1996; Kaye, Darke & Finlay-Jones, 1998; Maher, 1998; Nicholas, 2001). In contrast, other scholars believe that drug use more often precedes crime (Inciardi, Horowitz, & Pottieger, 1993). Finally, a third camp believes that both relationships are accurate—that illegal behaviors might lead to the initiation of substance abuse, but that constant illicit substance abuse can perpetuate illegal behaviors (Elliott et al., 1989; Huizinga et al., Mensard, & Elliott, 1989; Menard, Mihalic, & Huizinga, 2001b).

The Drugs/Violence Relationship: A Tripartite Conceptual Framework

Psychopharmacological Violence

Goldstein (1985, 1989), however, proposed one of the most comprehensive causal models to explain the drug and violent crime relationship. He introduced a tripartite framework that differentiates between psychopharmacological violence, an economic-compulsive model, and systemic violence. The first of the three—the psychopharmacological violence crime model—suggests that some individuals may exhibit violence and criminal behavior as a result of the physical and psychological effects that substances such as alcohol, stimulants, barbiturates, and phencyclidine (PCP) have on the brain.

A number of studies have established a direct correlation between drug use and aggressive reactions, which could lead to psychopharmacological violence. Studies of cocaine users, for example, have shown some acute and chronic effects including irritability, mental

aberrations, and aggressive behaviors (Chermack & Blow, 2002; Elliott, Lubin, Walker & Johns, 2001). Campbell and Stark (1990) documented that individuals who consume opiates, cocaine, or amphetamines have higher than normal levels of pathology, which may result in violent behavior. Their claim has been substantiated by later studies investigating methamphetamines and their association with violence (Anglin, Burke, Perrochet, Stamper & Dawud-Noursi, 2000; Cartier, Farabee & Prendergast, 2006; Sommers & Baskin, 2006; Somers, Baskin & Baskin-Sommers, 2006). The psychopharmacological explanation for the drug-violence association has also received strong support by researchers investigating barbiturates (Miczek, DeBold, Haney, Tidey, Vivian, & Weerts, 1994; Parker & Auerhahn, 1998) and PCP (Boles & Miotto, 2003). Interestingly, there is little evidence of pharmacologically-induced violence among heroin users, except during withdrawal when physical discomfort and agitation has reportedly resulted in violent behavior among addicts (Kuhns & Clodfelter, 2008). In contrast, other researchers have been unable to confirm a psychopharmacological relationship between drug use and violent crime. In fact, the assumed psychopharmacological connection between marijuana and violent crime has not been substantiated in the literature (Zimmer & Morgan, 1997).

The Economic-Compulsive Model

The second element of the tripartite approach is the economic-compulsive model, which refers to violence that is perpetrated to obtain goods or money to "feed" expensive drug habits (Goldstein, 1985). A large proportion of economic-compulsive violent crime is attributed to dependent users of cocaine, heroin and methamphetamines (Goldstein, 1985; Stevens, Trace, & Bewley-Taylor, 2005). While previous studies have revealed that addicts who engage in economic-compulsive violence tend to participate more in theft and property crimes (Goldstein,

1989), recent analyses have shown that drug-related violent crimes involving robbery may have increased (Inciardi, 1992; Miller, 1998).

A number of researchers have investigated this important linkage using anecdotal evidence. For example, Chaiken and Chaiken (1982) surveyed new inmates in Texas, California, and Michigan prisons and jails. They found that the robbery rate was generally higher among daily heroin users than with less frequent users or nonusers. In their study of 118 crack-related homicides, Brownstein and Goldstein (1988) concluded that 8 of the 118 homicides in the study were economically compulsive crimes. Finally, the National Association of Counties' (NACO) (2007) study of local sheriffs revealed that when meth labs were operating in any given county, the robbery and burglary rate in that location would increase to as high as 55 percent more than in "non-meth" counties.

The Systemic Violence Model

The third model proposed by Goldstein (1985) is the systemic violence model, which refers to violence that is committed to protect the essential systems associated with the drug trade (e.g., drug distribution). Since drug dealers and drug users are unable to access the legal system to resolve disputes amicably because of the illegal nature of drug distribution, sales and use, they use threats, intimidation, physical punishment, and even homicide as forms of social control (Boles & Miotto, 2003; Dembo, Hughes, Jackson, & Mieczhowski, 1993; Fagan & Chin, 1990; Goldstein, 1985; McKetin, McLaren & Kelly, 2005; Neale, Bloor, & Weir 2005; Stretsky, 2008). In fact, a number of empirical studies have pointed to homicide as a primary symptom of systemic violence involving drugs (Erickson, 2001; Fagan & Chin, 1990; Stretesky, 2008). A longitudinal study by Zahn (1980) investigating the homicide rate between 1920 and 1974 concluded that "closer attention be paid to the connection between markets for illegal goods and

the overall rates of homicide violence" (p. 128). The report also had this to say about drug use and gun violence:

> The use of guns in illegal markets may also be triggered by the constant fear of being caught either by a rival or by the police. Such fear may increase the perceived need for protection which results in increased violence. For the overall society, this may mean a higher homicide rate. (p. 128)

Goldstein's (1989) study substantiates Zahn's findings that out of 218 drug-related homicides reviewed, 161 (74%) were labeled as resulting from systemic factors.

Four Approaches for Reducing Drug Use and Violent Crime

The escalating personal, societal and monetary costs of substance abuse and addiction—combined with the reported association of drug use and violent crime—accentuate the need for policymakers to do more to reduce the burden of drug-related violent crime on society. The literature, in fact, describes several approaches for reducing the costs associated with the consequences of substance abuse and addiction. Some traditional approaches for reducing drug use and crime have been drug abuse prevention and treatment interventions (Dobkin & Nicosia, 2008). However, the literature suggests that strategies that build on traditional approaches to reduce substance use and addiction—while simultaneously addressing social determinants of health (economic and social conditions that influence the health of people and communities such as economic development and education)—have been proven to be the most effective approaches for mitigating drug use and crime (Alberta Health Services, 2009; Commission on Social Determinants of Health (CSDH), 2008; Loxley, Tourmbourou, & Stockwell, 2004).

Recent studies show that government investments in substance abuse prevention and treatment may be combined with economic development activities and educational attainment

strategies in order to combat this pervasive problem more effectively (Brisman, 2006; CASA, 2001, 2009; CSDH, 2008; Dobkin & Nicosia, 2009; Henry, 2010; Hyra, 2008). In other words, addressing social determinants of health (SDH) in areas such as economic development (unemployment rate) and education (percentage of students who regularly advance from grade to grade, number of high school graduates, and dropout rates) represents a more effective approach for mitigating drug use and violent crime (Galea & Vlahov, 2002; Marmot & Bell, 2009; Telfair & Shelton, 2012).

Substance Abuse Prevention

The first well-known strategy, substance abuse prevention, involves educating both users and non-users about the consequences of drug use. Of all the strategies for mitigating drug use, drug abuse prevention is considered the most effective approach for reducing substance abuse and related crimes (Brunelle, Brochu, & Cousineau, 2000; McIntosh, Bloor, & Robertson, 2007; Stevens et al., 2005). Other researchers and practitioners share this view:

> Prevention is the first line of defense against drug-related crime…Since most addicts begin using drugs while they are teens, efforts to give youngsters the will and skill to not initiate drug use are critical to keeping them out of the criminal justice system. (Belenko, Peugh, Califano, Usdansky, & Foster, 1998, p. 82).

Substance Abuse Treatment

The second is approach for reducing demand among users is substance abuse treatment (Dobkin & Nicosia, 2009). According to many studies, treatment options are essential for reducing drug use, recidivism, and criminal behavior (Anglin & Perrochet, 1998; Holloway, Bennett, & Farrington, 2006; Rettig & Yarmolinsky, 1995). Various treatment options will be addressed later in this study.

Economic Development

The third approach for ameliorating the costs and consequences of substance abuse and addiction is economic development—a strategy that is more nuanced than the former two. Overall, it targets improving material well-being and creating wealth (AEDC, 1984). Specifically, it involves stimulating local employment opportunities to enable people to improve their income circumstances (Blakely & Bradshaw, 2002; Blakely & Leigh, 2010; Todaro & Smith, 2003). Communities across the United States have benefited from both large and small economic development activities, which have enhanced the quality of life in communities. According to Hyra (2008), many cities have been revitalized as a result of economic improvements such as increases in the number of jobs, residents, and available housing. In turn crime tends to go down, and revitalized cities are more likely to be targeted for investment by local, state, and the federal government, as well as by businesses and private developers. These changes have important implications for indicators of community well-being.

Educational Attainment

The fourth tactic for reducing the consequences of substance abuse and addiction is educational attainment. Educators generally have several goals, including to prepare students for citizenship and to help them become culturally literate and critical thinkers. Systems of education must also help to cultivate a skilled workforce so that students can compete in a global economy. Drug use, however, has negative consequences on academic achievement. And indeed, a plethora of studies have examined the harmful impact of substance use and academic achievement (Jeynes, 2002; Perkins & Borden, 2003). For example, researchers have argued that adolescent drug use is related to academic failure, which puts a student at risk for dropping out of school (Engberg & ,l, 2006; King, Meehan, Trim, & Chassin, 2006). However, scholars agree that

schools can play a critical role in preventing drug use amongst adolescents, particularly those who, for a variety of reasons, are at risk for substance use problems (Godley, 2006).

Statement of the Problem

The Economic Cost of Substance Abuse

Although the exact nature of the association between drug use and violent crime is still under investigation, scholars agree that it is a costly one (Ousey, 2000a, 2000b; Ousey & Augustine 2001; Ousey & Lee 2002). In fact, drug use and violent crime have resulted in voluminous and mounting costs to governments, resulting in billions of dollars annually. Principal among these expenditures are costs associated with crime, including justice-related costs. The National Center on Addiction and Substance Abuse (CASA) (CASA, 2001) published a document entitled, *Shoveling Up: The Impact of Substance Abuse on State Budgets*, which attempted to assess the overall cost of substance abuse. The study revealed that in 1998, an estimated $81.3 billion, or 13.1 percent, of state funds were used to pay for substance abuse and addiction. Of this amount, the largest piece of funding for substance abuse and addiction, $30.7 billion, or 77 percent, was related to justice costs: incarceration, probation and parole, criminal, juvenile justice, and family court costs of substance-involved offenders. What's enormously troubling is that justice costs surpassed education, health, child and family assistance, and mental health related expenditures.

Subsequently, CASA (2009) released *Shoveling Up II: The Impact of Substance Abuse on Federal, State and Local Budgets*, which documented national estimates of the cost of substance abuse and addiction to federal, state and local governments. The study concluded that substance abuse and addiction cost federal, state and local governments at least $467.7 billion in 2005. Of that amount, federal governments spent $238.2 billion, state governments spent $135.8 billion,

and local governments spent $93.7 billion on the consequences of substance abuse. With a price tag of $470 billion, justice costs represented the second largest share of the burden of federal and state costs of substance abuse, following health care.

As governments struggle with declining and stagnant revenues and the effects of a recent economic downturn in the economy, policymakers continue to be pressured to invest in substance abuse prevention and substance abuse treatment programs to reduce the economic and social burden of drug use/abuse to their states and localities (CASA 2001, 2009). In fact, it is estimated that for every dollar that federal and state governments expend on substance abuse, the vast majority, 95 cents, goes to paying for the consequences of substance abuse rather than to preventing and treating the disease (CASA 2001, 2009). In other words, governmental spending is overwhelmingly targeted at outcomes of substance abuse and addiction rather than towards investing in cost-effective approaches to stop the problem before it starts.

Regardless of the overwhelming body of research evidence documenting that substance abuse and addiction is a preventable and treatable disease, government policymakers seem more inclined to do damage control than take proactive steps to stop it before it starts—or in the case of current users/abusers—before it is perpetuated. For example, a study on behalf of the Substance Abuse and Mental Health Services Administration, Center for Substance Abuse Prevention, stated that in 2002 the average cost of school-based substance abuse prevention programs was $220 per pupil. This study estimated that these programs could yield savings of $18 per $1 invested if modeled nationally (Miller & Hendrie, 2009). According to data from the Connecticut Department of Corrections and the Connecticut Department of Mental Health and Addiction Services (DMHAS), Connecticut's treatment program achieved significant financial

benefits by reducing the number of men and women in prisons—ranging from 1.8 to 5.7 times the cost of implementing the program (Daley, Love, Shepard, Petersen, White, & Hall, 2004).

Since the completion of the CASA reports, many states, including Virginia, have begun to scrutinize the cost of substance abuse and addiction. In 2007, House Joint Resolution (HJR) 683 and Senate Joint Resolution (SJR) 395 of the Virginia General Assembly directed the Joint Legislative Audit and Review Commission (JLARC) (an agency established to assess the operations and performance of state programs) to determine the consequences of substance abuse. To differentiate, SJR 395 requested a review of social problems associated with substance abuse such as crime, disease, and family violence. In contrast, HJR 683 focused strictly on the likely overall potential cost reductions associated with providing substance abuse treatment to offenders as opposed to incarceration (JLARC, 2008). Overall, the goals were to determine the impact of substance abuse on state and local expenditures, and to make recommendations on how to reduce costs associated with substance abuse for the Commonwealth of Virginia.

JLARC estimated that substance abuse (both drugs and alcohol) cost state and local governments approximately $613 million in FY2006. The largest percentage of expenditures (96 percent) was incurred primarily by public safety agencies at $586 million. However, Virginia and its localities spent an additional $102 million that same year treating and preventing substance abuse in order to mitigate its damaging effects (JLARC, 2008). These results mean that the state and local governments in Virginia continue to spend on the burden of substance abuse and addiction in significant amounts instead of directing funding towards the prevention and treatment of the disease, which could ultimately reduce state expenditures—not to mention improve the health and welfare of its citizens. This “band aid approach” is contrary to the

literature that encourages governments to invest in cost-effective strategies for reducing problems related to drug use.

The Demographics of Substance Abuse in Virginia

Overall, the use and abuse of illicit drugs in the Commonwealth of Virginia is on average lower in comparison to other states (Virginia Department of Behavioral Health and Developmental Services, 2009). However, this comparatively advantageous statistic is offset by certain rural areas within the Commonwealth whose high rates of drug use and abuse in some cases exceed the average state rate. Specifically, Southwest Virginia—which includes the counties of Bland, Bristol City, Buchanan, Carroll, Dickenson, Floyd, Galax City, Grayson, Lee, Norton City, Russell, Scott, Smyth, Tazewell, Washington, Wise, and Wythe—tends to experience higher rates of illicit drug dependence. For example, since 1999 the mortality rates associated with drug use throughout Virginia have escalated 85.7 percent; however, drug abuse-related mortality rates in the western/southwestern part of the state are significantly higher than other regions of the state (Virginia Department of Behavioral Health and Developmental Services, 2009). Further, the drug arrest rate in the Southwest region increased 63.8 percent from 2002 to 2006, driven in part by the mounting number of men and women arrested for marijuana and methamphetamine use (The Council on Virginia's Future, 2010).

One regional exception for the generally higher use of drugs in the southwestern part of the Commonwealth involves cocaine use. A report by the Virginia Department of Behavioral Health and Developmental Services (2012) stated that Region 4, which pertains to Southside Virginia (i.e., the counties of Amelia, Appomattox, Bedford, City of Bedford, Brunswick, Buckingham, Campbell, Charlotte, Cumberland, City of Danville, Dinwiddie, City of Emporia, Franklin, Greensville, Halifax, Henry, Lunenburg, City of Martinsville, Mecklenburg, Nottoway,

Patrick, Pittsylvania, Prince Edward and Sussex) had one of the highest rates of cocaine use in the Commonwealth. The report also indicated that individuals needing treatment for illicit drug use was more prevalent in Region 4 than in any other region in the Commonwealth.

Compounding the problem is that the Southside and Southwest regions are labeled as high-risk communities for a number of social determinants of health (SDH), which include unemployment/underemployment, poverty, health-damaging behaviors, low education levels, family problems, and crime. Moreover, there is a considerable body of research that demonstrates a positive relationship between compromised SDH rates and drug use (Bartley, Ferrie, & Montgomery, 1999; Commission on Social Determinants of Health (CSDH), 2008; Galea & Vlahov, 2002; Jarvis & Wardle, 1999; Shaw, Dorling, & Smith, 1999; Townsend, Lane, Dewa, Brittingham, & Pergamit, 1999). More specifically, both the Southside and Southwest regions suffered substantial job losses due to the decline in tobacco production and the downsizing or closure of local textile industries, which were major sources of employment opportunities and income in these regions. These factors contributed to both regions having an unemployment rate (~8.3 percent) that exceeded the state average (~6.3 percent) as of March 2011, and having the worst economic indicators compared to other regions in Virginia (JLARC, 2011).

Southwest and Southside Virginia also have the highest rates of poverty, with many of their localities exceeding 20 percent; together, the two regions have the lowest median income in Virginia (Cable & Tippett, 2012; The Richmond Times Dispatch, 2010). In 2010, the Southside region had the highest percentage of individuals living below the poverty level of any region in the state (19.9 percent), closely followed by the Southwest region (18.9 percent) (Virginia Performs, 2011b). Further, even though Virginia ranked 8th in 2011 among the states in per

capita personal income with an average of $46,107, the region-wide per capita income averages for Southside and Southwest were $29,318 and $30,754, respectively (Virginia Performs, 2011a).

The Southwest and Southside regions also have the highest percentage of adults without a high school diploma, which has serious implications for social and economic conditions in the regions. In 2000, for example, the percentage of adults without a high school diploma in these areas was above 30 percent. This statistic is particularly significant since a high school drop-out is about 8 times more likely to be in jail or prison in comparison to a high school graduate—and nearly 20 times as likely to be incarcerated compared to a college graduate (Council on Virginia's Future, 2009). In addition, the region's overall low educational attainment promotes economic difficulties and hinders revitalization efforts. These undesirable linkages are important since studies have shown that economic development investments can revitalize communities and reduce crime, thereby improving local social and economic condition (Hyra, 2008).

Indeed, empirical criminology and economic theory research supports the association between economic development and reductions in violent crime—that if unemployment is reduced through economic development activities, the level of crime should decline (Bennett, 1991; Tjaden, 1990; Li, 1995). This linkage was acknowledged by the Virginia Tobacco and Indemnification and Community Revitalization Commission (TICRC), which was created by the Virginia General Assembly in 1999. This 31-member body was tasked to promote economic growth and development and educational attainment in tobacco-dependent communities. It is hoped that investments in Southwest and Southside Virginia regions will create a more stable, diversified, and growing economy that will lead to higher living standards and safer communities—and therefore, to reductions in substance abuse.

Purpose of the Study

The purpose of this study was to examine the relationship between drug-related crimes in high-risk, rural Virginia counties and efforts to reduce drug-related crimes. This was accomplished by: (1) examining the impact of spending on drug-related violent crimse vs. spending on drug abuse prevention, drug abuse treatment, economic development, and education; (2) examining the relationship between drug-related crimes and efforts to reduce drug-related crimes in the areas of drug abuse prevention, drug abuse treatment, economic development, and education; and (3) making policy recommendations.

Research Questions

The following six research questions guided this study:

1. Is there a relationship between drug-related crime expenditures and drug abuse prevention, drug abuse treatment, economic development, and education expenditures?
2. Is there a relationship between expenditures for drug abuse prevention expenditures and drug-related crimes?
3. Is there a relationship between expenditures for drug abuse treatment and drug-related crimes?
4. Is there a relationship between expenditures for drug abuse economic development and drug related crimes?
5. Is there a relationship between expenditures for drug abuse education and drug related crimes?
6. What is the relationship between drug-related crimes, total graduates and completers, dropout rate, unemployment rate, and poverty rate?

Hypotheses

The six hypotheses for this study are listed below:

H_1: There is a statistically significant inverse correlation between drug-related crime expenditures and expenditures for drug abuse prevention, drug abuse treatment, economic development, and education.

H_2: There is a statistically significant inverse relationship between expenditures for drug abuse prevention and drug-related crimes.

H_3: There is a statistically significant inverse relationship between expenditures for drug abuse treatment and drug-related crimes.

H_4: There is a statistically significant inverse correlation between expenditures for economic development and drug-related crimes.

H_5: There is a statistically significant inverse correlation between expenditures for education and drug-related crimes.

H_6: There is a statistically significant relationship between drug-related crimes and total graduates and completers, dropout rate, unemployment rate, and poverty rate.

Significance of the Study

Policymakers in Grayson County (Southwest Virginia) and Brunswick County (Southside Virginia), not to mention surrounding areas, could benefit from research that demonstrates the negative impact of drug-related crimes on local government expenditures. First, documented expenditures that show the high cost of the drug use-crime relationship will provide policymakers with factual evidence about the heavy burden that this nexus imposes on rural counties. This information may be useful for initiating a cost-benefit analysis of spending on substance abuse with the goal of determining whether expenditures designed to tackle the drug

use-crime relationship are achieving the desired outcomes. Second, an analysis of substance abuse expenditures may provide policymakers with reasonable data to justify moving substance abuse and addiction further up on the public policy agenda. Third, an analysis of said expenditures may support the need for alternative policy approaches geared towards reducing the multi-level damage inflicted by substance abuse (Nicosia et al., 2009; Single, 2009).

This study can also be used to determine if investments in substance abuse prevention, substance abuse treatment, economic development, and education are cost-effective interventions for reducing drug-related crimes, while simultaneously improving the social and economic conditions in counties (Brunelle et al., 2000; CASA, 2001, 2009; Henry, 2010; Hyra, 2008; McIntosh et al., 2007; Stevens et al., 2005). Such information will help stakeholders think more strategically about how they might invest in interventions that would yield a better return—especially since the literature suggests the need to go beyond controlling substance abuse on the individual level (prevention and treatment efforts) to include addressing the social determinants of health (SDH) that contribute to the disease (Commission on Social Determinants of Health (CSDH), 2008).

Definition of Terms

Addiction – A chronic relapsing disease, characterized by compulsive drug-seeking and drug use, which is nearly always accompanied by functional and molecular changes in the brain.

Amphetamine – A prescription drug that is used to treat medical conditions to include obesity, attention deficit hyperactivity disorder, Parkinson's disease and narcolepsy.

Barbiturates – A group of medicines known as central nervous system depressants (CNS). Also known as sedative-hypnotic drugs, barbiturates make people very relaxed, calm, and sleepy.

Cocaine – A powerfully addictive central nervous system stimulant that is snorted, injected, or smoked. Crack is cocaine hydrochloride powder that has been processed to form a rock crystal that is then usually smoked.

Drug Abuse Prevention – Prevention takes the form of education and community action to limit new users.

Drug Abuse Treatment – Various in-patient and out-patient methods that are intended to reduce demand among drug users.

Drug Addiction – A chronic, relapsing brain disease that is characterized by compulsive drug seeking and use, despite the fact that the user knows of the harmful consequences.

Drug Related Violent Crime – Violent crime related to drug use that can be categorized in three major areas: psychopharmacological violence (violence based on the physical and psychological effects that substance abuse have on the brain); economic-compulsive violence (violence that is committed for the purpose of obtaining money or goods that can later be sold to buy drugs); and systemic (violence that is committed to protect systems associated with the drug market).

Economic-Compulsive Violence – Violence that is committed to obtain money or drugs to support expensive drug-using habits.

Economic Development – Improving material well-being through business creation, retention and expansion, wealth creation, and employment opportunities.

Heroin – An addictive drug that is processed from morphine and usually appears as a white or brown powder or as a black, sticky substance. It is injected, snorted, or smoked.

Illicit Drugs – Substances that are produced, trafficked and/or consumed illicitly. Examples of illicit drugs are cocaine, marijuana, heroin, amphetamines, methamphetamine, PCP, and ecstasy.

Methadone – A synthetic opiate that blocks the effects of heroin and eliminates withdrawal symptoms.

Methamphetamine – A very addictive stimulant that is closely related to amphetamine. It is a white, odorless, bitter-tasting powder taken orally or by snorting or injecting, or a rock "crystal" that is heated and smoked.

Opiates – The generic name given to a group that includes naturally occurring drugs derived from the opium poppy (*Papaver somniferum*) such as opium, morphine and codeine, semi-synthetic substances such as heroin; and opioids—i.e., "opiate-like" wholly synthetic products such as methadone, pethidine, and fentanyl.

Poverty – The U. S. Census uses a set of income thresholds that vary by family size and composition to determine who is in poverty. If a family's total income is less than a certain income threshold, then that family and every individual in it is considered to be living in poverty.

Phencyclidine (PCP) – A synthetic drug sold as tablets, capsules, or as white or colored powder. It can be snorted, smoked, or eaten.

Psychopharmacologic Violence – Violence that results when individuals, as a result of short or long term ingestion of specific substances, may become excitable, irrational, and exhibit violent behavior.

Schedule II Drug – A drug that has a high potential for abuse, a high possibility of severe psychological and physical dependence, and for which there is accepted medical use in treatment.

Social Determinants of Health – The conditions in which people are born, grow, live, work and age, including the health system.

Stimulants – A class of drugs that elevate mood, increase feelings of well-being, and increase energy and alertness. Examples include cocaine, methamphetamine, amphetamines, methylphenidate, nicotine, and MDMA (3,4-methylenedioxymethamphetamine), better known as "Ecstasy."

Substance Abuse – The harmful or hazardous use of psychoactive substances, including alcohol and illicit drugs.

Systemic Violence – Violence that arises from the need to protect systems of drug distribution and use, and to uphold and regulate cultural norms and values.

Unemployment Rate – The number unemployed as a percent of the labor force.

Summary

To summarize, this study is divided into five interrelated chapters. Chapter I is the introduction of the study and includes the statement of the problem, the purpose of the study, the research questions, the hypotheses, the significance of the study, the conceptual framework, and the definition of terms. Chapter II provides the review of selective relevant literature. Chapter III describes the methodology, the research design, the population, the method of data collection and instrumentation, the method of data analysis, and the limitations of the study. Chapter IV provides an analysis of the data and presents the findings. Chapter V provides the summary, conclusions and implications of the findings.

CHAPTER II:

REVIEW OF THE LITERATURE

The Drug/Violence Relationship: The Tripartite Framework

One need only open any newspaper in any city or town to confirm that the sale, use, and abuse of illicit drugs continue to plague the United States. Apart from the personal toll that drug use exacts, drug-related violent crimes are impacting communities throughout the United States. Important to this study is that the extant literature and relevant news reports continue to suggest a correlation between drug use and violent crime, as exemplified by the following four recent accounts. In New York City, federal law enforcement authorities charged 37 individuals in connection with an international drug-trafficking ring led by ethnic Albanians. According to officials, several defendants were involved in drug-related violent crime, including kidnapping and attempted murder (Dye, 2011). Residents of a Houston, Texas, neighborhood witnessed a drug-related shootout, after which federal investigators reported that the violence created by drug cartels in the Houston area appeared to be increasing (Click2 Houston.com, 2011). Local and federal officials in Baltimore, Maryland, charged 63 suspects with federal and state drug conspiracy counts. The suspects were described as a major source of illicit drugs and related violence in the area (Fenton, 2011). In Chesterfield County, Virginia, police charged two men in a drug-related killing of a local man (Bowes, 2008). These four news reports (among many others) illustrate the growing problem of drug use and violent crime, which researchers are studying in order to gain a greater understanding of this national epidemic.

Over the past several decades a growing body of research has examined the relationship between drug use and violent crime (Goodrum, Wiese, & Leukefeld, 2004; Martin, Maxwell, White & Zhang, 2004; McCoy, Messiah, & Zhinuan, 2001; Parker & Auerhahn, 1998). Although

findings have not been unanimous, many scholars have described a positive correlation between the two—particularly with respect to specific types of drug use and their linkages to violent crime. For example, Sexton, Carlson, Leukefeld & Booth (2009) described a correlation between methamphetamine use and violent behavior. Similarly, Inciardi and Pottieger (1994) suggested a linkage between cocaine use and violent behavior. In a later study, Lavine (1997) confirmed a positive association between heroin and violent behavior.

While research has largely supported a positive relationship between specific types of drugs and violent crime, other studies have been inconsistent or inconclusive (Parker & Auerhahn, 1998; Reiss & Roth, 1993). After reviewing the literature on the effects of heroin, amphetamine, cocaine, and phencyclidine use on violence, Parker and Auerhahn could not conclusively prove that use of these drugs led to increased levels of violence. Instead, the authors concluded that one's social environment tended to be a much more powerful contributor to violent behavior in comparison to the pharmacological factors associated with the substances they reviewed. Despite the fact that linkages between drug use and violent crime have been somewhat inclusive, Goldstein (1985; 1989) developed one of the most comprehensive models to explain this complex relationship. Specifically, he introduced the tripartite framework that distinguishes between psychopharmacological violence, economic-compulsive violence, and systemic violence.

Psychopharmacological Violence

The psychopharmacological crime model suggests that individuals engaged in short- or long-term ingestion of specific substances may become irrational, excitable, and may show a tendency to exhibit violent behavior (Goldstein, 1985). This model stresses the physical and psychological effects that substances can have on the brain, including disinhibition, cognitive-

perceptual distortions, attention-deficits, bad judgment, neurochemical changes, as well as a number of physiological functions that have the potential to either motivate or restrain violence (Casavant & Collins, 2001; Goldstein, 1985; Stevens et al., 2005).

According to this model, some substances such as alcohol, stimulants (amphetamines, methamphetamine, and cocaine), barbiturates, and phencyclidine (PCP) are thought to have a "criminogenic" effect that is believed to provoke violent or criminal behavior in certain users (Alberta Health Services-Addiction and Mental Health, 2009; Boles & Miotto, 2003; Brunelle et al., 2000). Conversely, the psychopharmacological connection between drug use and violent crime has revealed little evidence of violence among other drugs, except during withdrawal when physical discomfort and agitation has reportedly resulted in violent behavior among heroin addicts (Kuhns & Clodfelter, 2009), among marijuana users (Zimmer & Morgan, 1997), or among users of other hallucinogens (e.g., MDMA or "ecstasy") (Kuhn & Clodfelter).

Empirical Findings on Amphetamine/Methamphetamine Use and Psychopharmacological-Driven Violent Crime

The National Institute on Drug Abuse (NIDA) (NIDA, 2010a, 2010b) describes amphetamines and methamphetamines as types of stimulants. Amphetamines and methamphetamines are synthetic drugs, meaning that they are produced from chemical reactions in a laboratory. In the U.S., amphetamines and methamphetamines are classified as Schedule II drugs under the Federal Controlled Substance Act, Title II, of the Comprehensive Drug Abuse Prevention and Control Act passed in 1970, and amended several times since then. To be classified as a Schedule II drug implies that a drug has a high potential for abuse, a high possibility of severe psychological and physical dependence, but also that it is has certain acceptable medical uses in treatment protocols.

An amphetamine is a prescription drug that is available in several pharmaceutical forms such as Dexedrine, Adderall, and Dextrostat. Amphetamines can be used to treat specific medical conditions including obesity, attention deficit hyperactivity disorder (ADHD), Parkinson's disease and narcolepsy. Such compounds, which are typically delivered in capsules containing fine or crystalline powders of various colors, are available only through a non-refillable prescription. The drug is taken orally (by mouth), intravenously (needle injection), intranasally (snorted), or by inhaling (smoking). Some street names for amphetamines are speed, whiz, louee, and goey.

For many of the conditions for which amphetamines are legally prescribed (i.e., Parkinson's disease), habitual use is essential. Consequently, many patients begin to abuse the drug, resulting in potentially devastating effects. Amphetamine abuse has many potential psychological side effects such as paranoia, aggression, euphoria, irritability, anxiety, increased concentration, increased motivation, and panic attacks. Additionally, the physiological effects of amphetamine use include increased heart rate, sweating, high blood pressure, dilated pupils, dry mouth, reduced appetite and headaches. Important to this study is that amphetamines have also been associated with violent behavior (Wright & Klee, 2001).

A methamphetamine, which is similar in chemical structure to an amphetamine, is a white, odorless, bitter-tasting crystalline powder that easily dissolves in water or alcohol and is taken orally, by snorting, by needle injection, or by smoking. Its on-the-street names include meth, speed, chalk, shi-shi, spoosh, and "load the laundry." In its smoked form, it is often referred to as ice, crystal, crank, and glass (NIDA, 2010a). The active ingredient in methamphetamine is either ephedrine or pseudoephedrine, either of which can be found in over-the-counter cold medicines. Ephedrine is a chemical derivative of the ephedra plant that grows in

China, India, Mongolia, and Pakistan; pseudoephedrine is a chemical derivative of ephedrine. The production of pseudoephedrine is more prevalent in China, India, Germany, and the Czech Republic. In 2003, 50 percent of the pseudoephedrine imported into the U.S. came from Germany, and 71 percent of the ephedrine was from the Czech Republic (Hunt, Kuck, & Truitt, 2006). Unfortunately, methamphetamines are also widely produced in so-called "meth labs" across the country.

Economical and easy to produce, cookers or producers of meth use products such as drain cleaner, lithium batteries, and engine-starter fluid to make a powder that can be smoked, snorted, injected, added to a beverage, or even ingested via an enema. Most methamphetamine cooks do not possess any chemistry experience or background. They learn to manufacture methamphetamine by watching other methamphetamine cooks, while doing prison time, or by reading underground publications (McEwan et al., 2003). Guidebooks such as *Secrets of Methamphetamine Manufacture* (Uncle Fester, 2005) are also legally published and distributed by means of the internet; they provide recipes, the pros and cons of certain methods, lists of equipment needs, and how to troubleshoot potential problems.

The method of methamphetamine use often depends on whether it is mixed with or taken in combination with other drugs, such as cocaine or marijuana, which then impacts the speed at which one experiences its effects. Smoking or injecting it intravenously (known as firing or slamming) causes high concentrations of the neurotransmitter, dopamine, to be released, which produces an intense rush or flash that usually lasts only a few minutes—although its effects can persist for several hours. Snorting or oral ingestion produces euphoria, a high, but not an intense rush (Brisman, 2006). Both the rush and the high are believed to result from the release of very high levels of dopamine into areas of the brain that regulate feelings of pleasure (NIDA, 2005).

Methamphetamines have known toxic effects. Long-term methamphetamine abuse or addiction results in many damaging side effects, such as violent behavior, anxiety, confusion, and insomnia. Chronic users can also display a number of psychotic features including paranoia, auditory hallucinations, mood disturbances, and delusions. As reported by NIDA (2005), extreme paranoia can result in homicidal and/or suicidal thoughts. As noted earlier, the physiological effects of methamphetamine include increased heart rate, blood pressure and body temperature. Methamphetamine use also results in dilated pupils, increase alertness, heightened euphoria and a sense of increased energy. Conversely, withdrawal from the drug can produce severe depression. Given the severity of these side effects, methamphetamines are well known to be dangerous and unpredictable drugs, sometimes even causing death (National Geographic, 2006).

Based on patterns and trends of methamphetamine use since the late 1990s, the abuse of these amphetamine-type stimulants has been one of the most significant drug problems worldwide (United Nations Office on Drugs and Crime, 2009). The National Geographic (2006) refers to methamphetamine as the "world's most dangerous drug." The good news, however, is that methamphetamine use in the United States is generally on the decline. Overall, the number and percentage of persons aged 12 or older who were users of methamphetamines in 2010 (353,000 or 1 percent), were similar to those from 2007 through 2009—but were lower than reported users during the period 2002 through 2006. Specifically, the total number of methamphetamine users and relative percentages for the years 2002 through 2010 are as follows (shown graphically in Figure 1): 683,000 (0.3 percent) in 2002; 726,000 (0.3 percent) in 2003; 706,000 (0.3 percent) in 2004; 628,000 (0.3 percent) in 2005; 731,000 (0.3 percent) in 2006;

529,000 (0.2 percent) in 2007; 314,000 (0.1 percent) in 2008; and 502,000 (0.2 percent) in 2009 (Substance Abuse and Mental Health Services Administration, 2010).

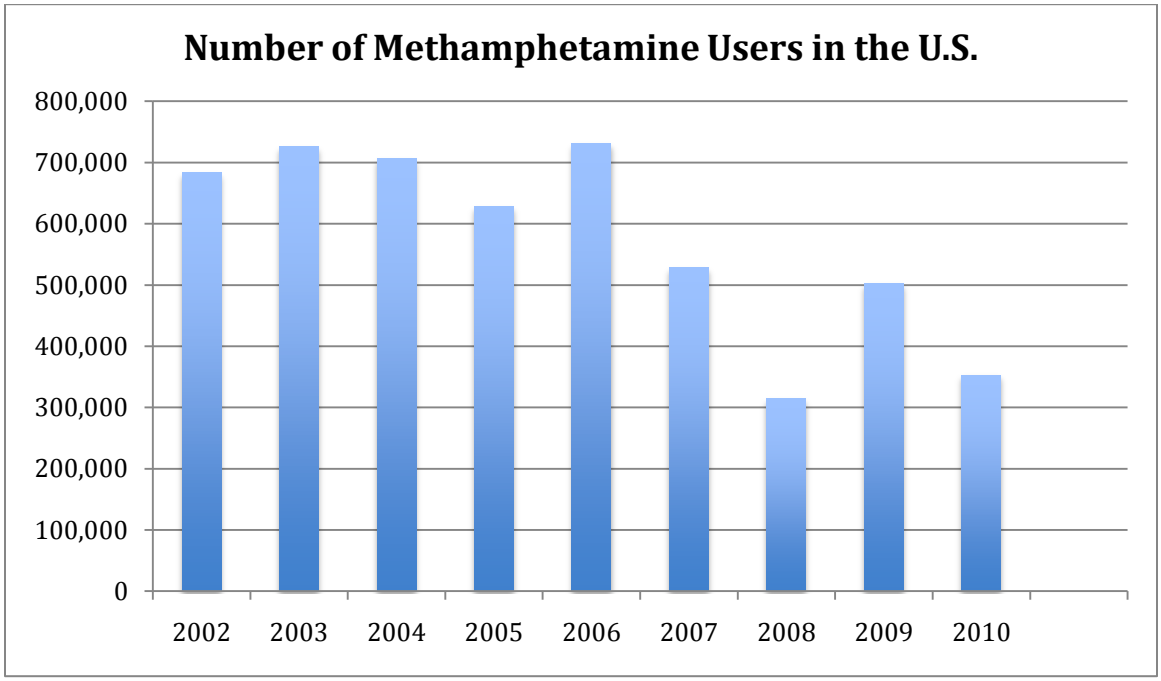

Figure 1. Number of Methamphetamine Users in the U.S., 2002 to 2010

Several efforts have contributed to the decline in methamphetamine use between 2002 and 2009. Anti-methamphetamine legislation was enacted to limit the amount of ephedrine and pseudoephedrine, the primary ingredients used to cook methamphetamine, that an individual may purchase over-the-counter. Additionally, states began to implement anti-methamphetamine laws in 2004, and in the following year Congress passed The Combat Methamphetamine Epidemic Act of 2005 (Title VII of Public Law 109-177). Even with the overall decline in use, however, methamphetamine remains a top law enforcement priority in many states, particularly in rural areas (Hananel, 2008; Wahlberg, 2010).

Demographic data shows that methamphetamine users are more likely to be White and male. According to 2009 data obtained from the Treatment Episode Data Sets (TEDS)

(SAMHSA, 2011), 66.7 percent of amphetamine/methamphetamine users entering treatment that year where Caucasian. This percentage was higher than Caucasians being treated for cocaine smoking (36.2 percent), "other route" cocaine use (48.6 percent), or heroin use (58.5 percent). In total, among those being treated for drug abuse, 60.1 percent were White. In terms of other ethnicities, 10.1 percent of amphetamine/methamphetamine patients were non-White, with methamphetamine abuse least common among African Americans (3.4 percent), but higher among those of Hispanic origin (19.9 percent).

As noted, methamphetamine users entering treatment are also likely to be male, although the gender difference did not vary by much. Of the 66.7 percent of amphetamine/ methamphetamine users entering treatment in 2009, 35 percent were males and 31 percent were females (SAMHSA, 2011). However, recent trends indicate that methamphetamine abuse among females has begun to increase over the past several years. The National Association of Counties (NACo) (2007) conducted a survey of 500 sheriffs and police chiefs from a national database of more than 3,000 law enforcement personnel to determine the impact of methamphetamine abuse on county programs and services. When asked about gender differences in usage, 61 percent of sheriffs reported that they had seen an increase during the prior three years in the number of women abusing methamphetamine.

Despite the near parity in methamphetamine use, males are still more likely to commit violent crimes than their female counterparts. Relying on Goldstein's (1985) three-part drug-violence framework, Oser, Palmer, Tindall and Leukefeld (2009) looked at nearly 800 individuals in rural Kentucky who had committed some type of felony to determine the relationship between drug use and violence. The authors confirmed that the felony probationers who had used either amphetamines or methamphetamines were much more likely to have

engaged in some type of violent crime over their lifespan than female perpetrators of a felony crime. In fact, there is a significant body of research that confirms that male methamphetamine users are on average more violent than their female counterparts and commit the majority of the drug-related violence (Sommers & Sommers, 2006; Sommers & Baskin, 2006a; Sommers & Baskin, 2006b; Sommers, Baskin, & Baskin-Sommers, 2005). It should be noted, however, that other scholars were unable to confirm gender differences in methamphetamine-related violence. In their study of a broad cross-section of 350 males and females in treatment programs for methamphetamine use in Los Angeles County, Brecht and coworkers did not report any gender differences among individuals reported for methamphetamine-related violent behavior (Brecht, O'Brien, von Mayrhauser, & Anglin, 2004).

Demographic differences among meth producers have also been examined. As documented in a 2006 study describing methamphetamine production in rural areas, the drug is typically produced by White, unmarried, and lower/working class individuals (Sexton, Carlson, Leukefeld, & Booth, 2006). Sexton and colleagues also noted that their sample population of meth producers tended to be older, and a very high percentage of them were employed. Additionally, those involved in meth production were less likely to be married or have children living at home. As indicated above, the researchers pointed out that meth cooks are overwhelmingly White, which supports other literature reports wherein only a few study participants had direct knowledge of African-American producers of meth (Sexton et al., 2005; Sexton et al., 2006).

Methamphetamine use and production are more prevalent in rural areas compared to urban areas, a trend that is principally associated with three reasons. First, rural law enforcement departments tend to be understaffed and underfunded. As described by Weisheit (2006), police

departments in rural areas often employ 10 or fewer officers. Additionally, rural law enforcement personnel are responsible with canvassing hundreds of square miles (Butterfield, 2002), which makes it challenging to locate well-hidden meth labs. Second, meth producers prefer rural areas due to their relative isolation. Cooking this drug requires chemicals that give of pungent odors, which are harder to isolate among hundreds of acres of sparsely populated land in comparison to more populated urban areas. Third, many of the ingredients needed to produce methamphetamine can be purchased from local drug stores in both urban and rural areas. As noted by Kraman (2004),

> If the fact that you can buy ingredients in most drug stores does not make production easy enough, rural settings provide access that urban environments cannot. For example, one ingredient, anhydrous ammonia, commonly used as fertilizer, is not available in stores but can easily be stolen from storage tanks on farms. Accessing these tanks is not difficult because they are often left unattended in isolated locations (p. 6).

Accompanying the spread of methamphetamines in rural areas is an increase in violent crime, which is principally associated with the deleterious pharmacological effects of methamphetamine use/abuse (Kramer, 2004; Maxwell, 2004; The National Center of Addiction and Substance Abuse at Columbia University (CASA), 2000). For example, the paranoia associated with methamphetamine use has led some users to perceive threats and respond aggressively in the absence of actual threats. Further, the mood swings, irrational thoughts and feelings of hopelessness associated with coming down from a methamphetamine high could easily spark violent behaviors from those already prone to violent tendencies. Even more troublesome is that coming down from a methamphetamine high is a known trigger for suicidal thoughts among some users (Weisheit, 2009).

Given the seriousness of amphetamine/methamphetamine use and abuse, a significant body of research involving animals and humans (separately) has investigated the causal relationships between use of these drugs and violence—but with inconclusive results. In studies using animals, chronic doses of methamphetamines have been found to increase aggressive behaviors in mice (Sokolov & Cadet, 2005; Sokolov, Schindler, & Cadel, 2004). On the other hand, low to moderate doses of methamphetamine did not elicit aggressive behaviors in some test animals (Machalova, Slais, Vrskova & Sulcova, 2012).

In human studies, a significant body of research has investigated the relationship between amphetamines and/or methamphetamines and aggression in connection with the oral administration of dextro-amphetamine as a drug for narcolepsy (Berman, Kuczenski, McCracken & London, 2009; Littner et al., 2001), obesity (Laties & Weiss, 1981), and ADHD (Berman et al). Study results concluded that low doses of dextro-amphetamine did not increase aggression among study participants. In fact, the participants reported that low doses of the drug "reduced appetite, increased alertness and energy, reduced fatigue and drowsiness, and provided a general sense of well-being" (Logan, 2002, p. 141).

Chronic high amphetamine/methamphetamine use in humans, however, may increase aggressive and violent behavior. For example, in an important study of 641 state prison parolees in California, Cartier, Farabee and Prendergast (2006) determined that methamphetamine use was positively associated with violent behavior. Specifically, the researchers examined the associations between methamphetamine use and three measures of criminal behavior: "(1) self-reported violent criminal behavior, (2) return to prison for a violent offense, and (3) return to prison for any reason during the first 12 months of parole" (p. 435). Results confirmed that methamphetamine use was "significantly predictive of self-reported violent criminal behavior

and general recidivism (i.e., a return to custody for any reason)" (Cartier et al., p. 435). In an earlier survey of prison inmates in five western cities (Los Angeles, Phoenix, Portland, San Diego, and San Jose), researchers found that one-third of arrestees believed their use of methamphetamines increased their tendencies toward violence (Pennell, Ellett, Rienick, & Grimes, 1999).

Studies of amphetamine/methamphetamine users in treatment programs have also pointed to violent behavior resulting from drug use. Research involving methamphetamine users admitted to treatment in Los Angeles indicated that nearly two-thirds of the participants cited violent behavior as a consequence of their drug use (von Mayrhauser, Brecht, & Anglin, 2002). Similarly, Wright and Klee (2001) presented findings from a study on the effectiveness of treatment services for 86 amphetamine users, which included information about any violent or aggressive behavior perpetrated by the respondents. The researchers found that "47% of the sample reported having committed a violent crime, and half of them associated the violence with their amphetamine use. In addition, 62% repeated ongoing problems with aggression which were related to their amphetamine use" (p. 73).

The extant literature further includes many other documented reports of the relationship between methamphetamine use and violent crime. For example, NACO (2007) reported that robberies and burglaries have increased by 55 percent as a result of methamphetamine use. Simple assaults have also soared as a result of methamphetamine use, increasing by as much as 42 percent in certain counties (NACO). Additionally, NACO also reported that 87 percent of U.S. counties reported an increase in violence (e.g., domestic violence) resulting from methamphetamine use. The violent cases were principally in rural locations with less than 50,000 inhabitants.

Amphetamine/methamphetamine use has been strongly linked to an increase in violent assaults such as domestic violence (Brown, 2004; Cohen et al., 2003; Fussell, Haaken, & Lewy, 2009; NACo, 2007; Sommers & Baskin, 2006; Sommers, Baskin, & Baskin-Sommers, 2006a; Sommers, Baskin, & Baskin-Sommers, 2006b; Weisheit, 2009; Weisheit , Falcone, & Wells, 2006; Wermuth, 2000). In Iowa, methamphetamine was recently cited as a contributing factor in an estimated 80 percent of domestic violence cases, and as a major reason behind violent crime (U.S. Department of Justice, 2010). In a similar report, the Wood County Sheriff's Department in West Virginia documented a strong correlation between methamphetamine use and violent crime; in fact, nearly 90 percent of domestic violence cases in that county was methamphetamine related (Office of National Drug Control Policy, 2004C).

Domestic violence is also more common methamphetamine users. The Washington/ Baltimore High Intensity Drug Trafficking Area Program (HIDTA) (Office of National Drug Control Policy, 2004) conducted a study of 53 local, state and federal narcotics officers and intelligence analysts in Maryland, Virginia, the District of Columbia, West Virginia, Pennsylvania, Kentucky, Tennessee and North Carolina. The goal of the study was to inform law enforcement, prevention and treatment communities, and the public at large about methamphetamine, how it is identified, and what it does to users and their families. The report concluded that violence is common among users—especially after repeated usage—and can be directed at any family member.

Empirical Findings on Crack/Powder Cocaine and Psychopharmacologically-Driven Violent Crime

Cocaine is a powerfully addictive stimulant that is extracted from the leaves of coca plant. During the 19th century, cocaine had a variety of legitimate medical uses—primarily in

association with its anesthetic properties (e.g., as a nerve block)—but also in connection with ophthalmic usages, respiratory system disorders, and even as a treatment for morphine addiction. Cocaine could also be purchased over the counter, including in the original version of Coca-Cola (Bayer, 2000). Today it has very few medical uses.

In the 1970s, intranasally-used cocaine emerged as a popular recreational drug that was readily available on the street—mainly as a fine, white, somewhat bitter-tasting crystalline power. Technically, the powder is called cocaine hydrochloride and is made from the leaves of the coca plant found in South America. Street dealers generally dilute it with substances such as cornstarch, talcum powder, or sugar, or with active drugs such as procaine, a chemically-related local anesthetic. Cocaine has a variety of nicknames, including coke, "c," snow, flake, Charlie, nose candy, toot or blow. Like other stimulants, cocaine is classified as a Schedule II drug.

Two chemical forms of cocaine are abused: the water-soluble hydrochloride salt form and the water-insoluble cocaine base form (or freebase). When abused, the hydrochloride salt (the powdered form of cocaine) can be injected or snorted. The base form of cocaine is processed with ammonia or baking soda (sodium bicarbonate) and water; this concoction is then heated to remove the hydrochloride to produce a substance that can be smoked. The term "crack," which is the street name given the freebase form of cocaine, refers to the crackling sound heard when the substance is smoked (NIDA, 2010c)

Cocaine can be snorted, injected, and smoked. An individual who snorts the drug inhales the powder through the nose, where it is absorbed into the bloodstream through the nasal tissues. A second method involves injecting the drug directly into a vein via a needle. Third, a cocaine smoker inhales the vapor or smoke into the lungs, where absorption into the bloodstream is as rapid as it is by injection. All three methods of cocaine abuse can lead to addiction and other

severe health problems, including an increased risk for contracting HIV/AIDS, hepatitis B or C, and other infectious diseases (NIDA, 2010c).

The intensity and duration of cocaine's effects is impacted by how a user ingests the drug. The faster cocaine is absorbed into the bloodstream and delivered to the brain, the more intense is the high. Injecting or smoking cocaine produces a quicker and stronger high than snorting. However, faster absorption usually translates to a shorter high—15 to 30 minutes from snorting cocaine compared to 5 to 10 minutes from smoking. Thus, in order to sustain the high a cocaine abuser has to administer the drug again. For this reason, cocaine is sometimes ingested repeatedly within a relatively short period of time at increasingly higher doses (NIDA, 2010d).

The use and abuse of cocaine/crack has many physiological effects. The short-term physiological effects of cocaine/crack ingestion include constricted blood vessels, dilated pupils, and increased temperature, heart rate, and blood pressure; some of the psychological effects including mental alertness, feelings of euphoria, increased energy, and talkativeness. In the extreme, sudden death has been known to occur among cocaine users, usually due to a heart attack or stroke. In contrast, the long-term effects of cocaine use include bizarre, erratic and/or violent behavior, paranoid psychosis, restlessness, auditory hallucinations, irritability, mood disturbance and prolonged euphoric effects. (NIDA, 2010c).

A dramatic growth in the use of cocaine occurred in the U.S. in the 1980s when crack became the drug of choice in inner cities (Fagan, 1996; Fagan & Chin, 1990; Klein & Maxson, 1994). For instance, Chitwood, Rivers and Inciardi (1996) described how the use, abuse, and trafficking of cocaine exploded in and around Los Angeles beginning in the mid 1980s, after which the drug's popularity spread throughout other major cities in the United States, particularly in Black and Hispanic communities. As a result, the number of Americans who

became addicted to cocaine at that time increased dramatically. According to data from the U.S. Department of Health and Human Service's National Household Survey, the number of people who had tried cocaine at least once increased from 5.4 million in 1974 to 21.6 million in 1982 (NIDA, 1983). By 1985, more than 22 million people had reported at least trying cocaine. In contrast, the number of people who admitted using cocaine on a routine basis increased from 1.6 million in 1977, to 4.2 million in 1982, and to 5.8 million in 1985. As a measure of this increase, cocaine-related hospital emergency episodes continued to increase nationwide in the late 1980s. The Drug Abuse Warning Network (DAWN) reported that in 1985, cocaine-related hospital emergencies rose by 12 percent over the prior year (from 23,500 to 26,300), but increased from 26,300 to 55,200 in 1986, reflecting a 110 percent increase in just one year.

Crack-related violence also experienced a rapid increase (Blumstein, Rivara, & Rosenfeld, 2000; Schober & Schada, 1991) and communities across America were witnessing an increase in cocaine/crack-related homicides, particularly amongst African American and Latino males (Tardiff et al., 1994; Tardiff, Wallace, Tracy, Piper, Vlahov, & Galea, 2005). During the period between 1984 and 1994, the homicide rate for Black males aged 14 to 17 more than doubled, and the homicide rate for Black males aged 18 to 24 increased nearly as much (Fryer, Heaton & Levitt, 2005). In addition, African American communities were experiencing alarming social declines during this same period, as evidenced by increases in low birth-weight babies, the number of children in foster care, an increase in fetal deaths, and the number of individuals arrested for the possession of weapons (Levitt & Murphy, 2006). Many scholars have linked the social decline in African American communities and the alarming increase in Black youth homicides to what is called the "crack epidemic" (Cook & Laub, 1998; Grogger & Willis, 2000).

In response to these troublesome trends, researchers continue to examine the relationship between cocaine use and violence—although with mixed results. At one end of the spectrum is a sizable body of research suggesting a positive correlation between the pharmacologic effects of cocaine/crack use and violent behavior—some of which defy popular perceptions. For example, although studies do link cocaine/crack use to violent crimes committed by men (Brownstein & Goldstein, 1990; Goldstein, 1990), many studies associate cocaine as a major contributor of violent crime amongst women as well (Inciardi & Pottieger, 1986; Spunt, Goldstein, Bellucci & Miller, 1990). Similarly, two related studies examined the cocaine-violence relationship among samples of male and female drug users in New York. Both studies concluded that drug-related violence was more prevalent amongst the female population (Goldstein, Bellucci, Spunt, & Miller, (1991a; 1991b).

Brody (1990) conducted a study of 223 patients who were admitted to the emergency department of Grady Memorial Hospital (an Atlanta, Georgia, facility frequented by low-income patients) with cocaine-related problems over a 6-month period between August 1986 and February 1987. This same study also included a cohort of 29 patients with cocaine-related medical problems who sought emergency treatment during a subsequent six-month period. Brody found that violent or aggressive behavior had occurred just prior to the emergency room visit, what was "often the reason the patient was brought to the hospital by police or family" (p. 47). Overall, Brody documented that "violent behavior was described by police in 20 patients (54 percent), by paramedics in 6 patients (2 percent), by friends or family members in 11 patients (30 percent), and was directly observed by the [emergency room personnel] in 30 patients (81 percent)" (p. 47).

Although the research has indicated a positive correlation between cocaine/crack and violent behavior (see, for example, Macdonald, Erickson, Wells, Hathaway and Pakula, 2008), many have pointed to a declining rate of psychopharmacological violence. Using data from the Office of the Chief Medical Examiner in York, Tardiff et al. (2005) investigated the relationship between changes in alcohol and drug use among homicide victims (12,573 for all homicides and 6,351for accidental death victims), as well as reductions in homicide rates between 1990 and 1998. The study indicated that the number of murders and accident deaths that were cocaine-related dropped during the study period (13 percent and 9 percent, respectively).

Using a cohort of over 600 teenage drug users, Inciardi (1990) investigated various types of violence associated with crack use and crack distribution in Dade County (Miami), Florida, The researcher indicated that only 5.4 percent of the adolescents demonstrated any sign of psychopharmacologic violence during the 12-month period prior to the survey. An even lower percentage (4.6%) reported being a victim of a drug-related violent act.

Other studies have found no credible evidence linking cocaine use to violent behavior (Parker & Auerhahn, 1998). Interestingly, Collins, Powers & Craddock (1988) concluded that newly-jailed cocaine users were, in fact, less likely to have been arrested for perpetrating violent crimes in comparison to non-drug users. In contrast, Goldstein, Brownstein and Ryan's (1992) study of drug-related homicides in New York City between 1984 and 1988 indicated that alcohol abuse was linked to about three-quarters of the psychopharmacological homicides. This contrasts markedly with the percentage of marijuana use-related murders (just 3 percent) and homicides driven by cocaine use (0 percent)

Empirical Findings on Heroin and Psychopharmacological Driven Violent Crime

Heroin is an addictive opiate drug that is synthesized from morphine, a naturally occurring extract from the seed pod of the Asian opium poppy plant. Typically found as a white or brown powder or as a black, sticky substance, heroin is the most rapidly acting and abused of the opiates. The street names for heroin are smack, "H," black tar heroin, ska, or junk. It is classified as a Schedule II drug (NIDA, 2010e; NIDA 2010f). Street heroin can be found in "pure" forms, but it is also commonly cut with other drugs or with benign white substances (e.g., sugar, powdered milk, or starch). Like cocaine, heroin is usually smoked, snorted, or injected. In the case of needle user, a heroin abuser can inject the drug up to four times a day. Intravenous injection provides the highest degree of intensity and euphoria (e.g., results are felt within 7 to 8 seconds); in contrast, users who inject into muscles have to wait 5 to 8 minutes to feel any euphoric effects. When heroin is sniffed or smoked, desired effects are usually obtained within 10 to 15 minutes. Regardless of the delivery method, all forms of heroin administration are confirmed to be addictive (NIDA, 2010f).

Heroin use has varying effects on users. Intermittent use of the drug can produce analgesia, euphoria, decreased anxiety, and respiratory depression (Jaffe & Jaffe, 1999); in contrast, regular users experience more complex changes in mood and behavior. Equally troublesome are the effects of withdrawal. An abrupt cessation of drug use puts the abuser at risk for a number of risky consequences. Heroin withdrawal, which typically begins after about 8 hours after the last dose, has been linked to heightened aggression and defensive responses in rats and mice (Hoaken & Stewart, 2003).

Like all drug addiction, heroin dependence can be treated with therapeutic interventions. However, they tend to be more effective when the addiction is caught early. The course of

treatment varies depending on the individual, but usually includes both behavioral therapy and drug treatment. One pharmacological-based therapy with a record of success for people addicted to heroin or other opiates is methadone, which is a synthetic opiate that helps to mitigate the effects of heroin and reduces or even eliminates withdrawal symptoms. Recently, clinicians have been using buprenorphine to treat opiate addiction. Its main advantages are that it less addictive for the patient and can be prescribed by a physician (NIDA, 2010f).

There is ongoing debate about the extent to which heroin use causes violent behavior, and inconsistent animal and human experimental research results make it difficult to unequivocally link the two. In fact, a significant body of animal-based research suggests that heroin actually reduces aggressive behavior (Hoaken & Stewart, 2003; Miczek, Weerts, & Debold 1993; Wright & Klee, 2001). In human studies, evidence does not support any strong linkages between heroin and violent behavior (Parker & Auerhahn, 1998)—except in instances when an addict may use aggressive behavior to obtain the drugs needed to reduce withdrawal symptoms (Boles & Miotto, 2003; Gerra et al., 2001; Hoaken & Stewart, 2003; Lavine 1997). In this case, a sizable body of literature dating back over 20 years does describe an association between heroin use and increased hostility (Gerra, Zaimovic, Ampollini, Giusti, Delsignore, Raggi, Laviola, Macchia & Brambilla, 2001; Roth, 1994; Tidey & Miczek, 1992). In contrast, research does point to a positive correlation between violent behavior and heroin when the opiate is combined with other drugs. A 2005 Australia-based study conducted by Jones, Weatherburn, Freeman and Matthews used interview data from 200 intravenous drug users and 96 prisoners with a history of drug injection. Their results indicated that injecting heroin users who also took psycho-stimulants committed more violent crimes in comparison to heroin-only users.

Although human studies do point to a positive correlation between heroin use and violence, the literature does not support a prevalence of psychopharmacologically-induced violence. For example, Morentin, Callado and Meana (1998) reviewed case files for 578 recently-arrested individuals and assessed them for drug-related violence. The authors concluded that among those arrestees who were heroin abusers, "instances of aggression or resistance to police authorities and nonfatal offenses against persons were more frequent among controls (12% and 13.7%, respectively) than among heroin abusers (3.7% and 3%, respectively)" (p. 993).

Economic-Compulsive Violence

The economic-compulsive model refers to violence that is committed for the purpose of obtaining money or goods that can later be sold, or drugs to support expensive drug-use habits (Boles & Miotto 2003; Goldstein, 1985). The economic-compulsive model is considered the most viable link between drug use and violent crime, with higher numbers of violent crimes attributed to dependent users of cocaine, heroin and methamphetamines (Goldstein; Stevens et al., 2005). This is not surprising since heroin and cocaine tend to be the most expensive drugs; hence, they put the most pressure on addicts to engage in criminal acts in order to feed their drug habits. Nonetheless, the research on economic-compulsive violence among drug users has also produced mixed results. The main quandary in research of this type is conclusively linking the violent economic-compulsive act with the need for drugs. At one end of the spectrum are studies that argue that some criminals who commit violent crimes for economic gain do use drugs (Resignato, 2000). Such a linkage was borne out by a study conducted by the National Center on Addiction and Substance Abuse at Columbia University in 1998. Those involved in the research reported that a significant percentage of individuals incarcerated for economic-compulsive

violent crimes were substance users. In fact, among the violent offenders, the majority—73 percent in state prisons and 65 percent in federal prisons/jails—indicated that they had regularly used drugs or had an ongoing battle with substance abuse. Many, in fact, perpetrated their crimes to obtain the money to purchase drugs or were under the influence of drugs at the time of their crime. If there is a silver lining in these studies, Goldstein (1989a) noted that most substance abusers who do take part in economic-compulsive crimes tend to avoid personal acts of violence; instead, they engage in property crimes such as home break-ins or auto theft. Nonetheless, a substantial body of research indicates an increasing prevalence of robbery (often with a gun) accompanied by violence (Bureau of Justice Statistics, 1991a, 1991b; Roth, 1994).

At the other end of the spectrum are studies that deny evidence of substance users committing economic-compulsive violent crimes. One investigation into the involvement of adolescents in economic-compulsive crimes, for example, did not support the notion that teen drug users engaged in criminal acts to earn money for drugs (Johnson et al., 1986). Instead, the young perpetrators reported committing crimes to have fun, to obtain valued goods, or to get money for other purposes. A later study supported that finding, indicating that teen drug-users who commit crime for money use the profits to buy other commodities (Altschuler & Brounstein, 1991). The involvement of many teens in the crack market, for instance, provides sufficent income to reduce their need to perpetrate economically motivated crime (White & Gorman, 2000).

Menard and Mihalic (2001) used a tripartite conceptual framework in attempting to explain the complex relationship between substance use and crime. Utilizing a national probability sample of adolescents and young adults, the researchers reported that the economic-compulsive relationship between substance use and crime appeared to be applicable to only a

small minority of adolescent users, offenders, and offenses. Similarly, Goldstein (1989) used a tripartite framework for understanding the relationship between drugs and violence and found that only 8 out of the 218 drug-related homicides he investigated (3.6 percent) fit into the economic-compulsive category.

Goldstein, Brownstein, Ryan and Bellucci (1989) reviewed the police records of over 400 homicides in New York during 1988 to determine whether illegal drugs may have played a role in the murders. Although they did conclude that over half of the homicides were connected with drugs in some way, in only 2 percent of the cases did the homicides result from a direct effort to obtain money for drugs. Goldstein et al (1992) subsequently reported findings from two other studies New York City-based studies: Drug Related Crime Analysis 1 (1984), and Drug Related Crime Analysis 2 (1988). The researchers systematically assessed both datasets about the drug-relatedness of homicides utilizing the tripartite conceptualization of the drugs/homicide nexus and found very few economic-compulsive drug-related homicides—specifically, 3 percent in the 1984 sample and 4 percent in the 1988 sample.

Empirical Findings on Amphetamine/Methamphetamine and Economic-Compulsive Violent Crime

Although a review of the literature does suggest a link between amphetamine/ methamphetamine use and economic-compulsive violence (Dobkin & Nicosia, 2008), these users typically employ non-violent methods to obtain their drugs (Klee & Morris, 1994; Weisheit, 2009). Recall that producing methamphetamines can be easily accomplished with commonly available precursor materials. Thus, those desiring such drugs are more likely to steal the ingredients for making them rather than committing violent crime to obtain them (Cretzmeyer, Sarrizin, Hubber, Block & Hall, 2003; Weisheit, 2009). However, instances of violence have

been reported—for example, when amphetamine users became violent when faced with a threat while committing property theft. Wright and Klee (2001) found that within their sample of 86 amphetamine users, committing violent crime was not significantly associated with "acquisitive crime." Nonetheless, the researchers found evidence of contact crime motivated by economic concerns (e.g., street theft), as well as reports of meth users becoming violent (i.e., biting store detectives, resisting police arrest, and pulling a knife on pursuers) when committing a crime.

Methamphetamine users also engage in identity theft when they assume multiple identities to help them purchase more precursor chemicals for drug production (Alcoholism and Substance Abuse Weekly, 2004; 2005; Leland, 2006). In fact, identify theft has become the economic crime of choice for methamphetamine users as evidenced by a 28 percent increase in this crime among this group (NACO, 2007). This finding is supported by Brisman (2006):

> Increasingly, ID theft has become the economic crime of choice for meth users users, who stay awake for days at a time and are capable of fixating on small details—such as check and credit card numbers—necessary to steal identities—and who may face greater challenges in holding down jobs than other addicts as a result of their long awake and sleep cycles. 'The drugs and the crime fit neatly together; addicts strung out on meth can stay awake and focused for days at a time, making them expert hackers and mailbox thieves. And ID theft is easy money, the perfect income for drug addicts who have no other way to fund their habit.' (p. 1336)

Empirical Findings on Crack/Powder Cocaine and Economic-Compulsive Crime

Studies have confirmed an intersection between cocaine use and economic-compulsive violence. For example, Inciardi's (1990) study of 361 juvenile perpetrators of various types of violence associated with crack use/distribution in Dade County (Miami) Florida confirmed a

linkage crack use and economic crime. Specifically, 59% of them committed robberies during the year-long period before they were interviewed. The majority of these crimes were perpetrated to purchase drugs. Inciardi (1991) then investigated crack use among juvenile drug users in Miami and concluded that 55 percent of respondents obtained their crack by robbing their dealer, and an additional 18.6 percent of respondents obtained crack by robbing others for money.

Goldstein et al. (1991a) investigated whether cocaine played a role in the violent acts (mainly robberies) committed by the male and female subjects who took part in their study. Their results showed a generally weak connection between cocaine and economic-compulsive violence. A later study by Goldstein, Brownstein and Ryan (1992), who investigated cases involving drug use/trafficking and homicide, similarly reported that very few drug-related homicides were economic-compulsive. Another relevant report revealed that for both males and females, cocaine was the drug most likely to be associated with the small number of events that had an economic-compulsive dimension of violence (Goldstein, Bellucci, Spunt & Miller, 1991).

Empirical Findings on Heroin and Economic-Compulsive Crime

As any heroin substance abuser will attest, the desire for the drug can be extremely strong. However, research shows that many heavy users of heroin and other expensive drugs have no legitimate means of raising the money to support their habit, making economic-compulsive crime the only feasible method for generating purchasing power (Boyum, Caulkins & Kleiman, 2010; Johnson, Anderson & Nurco, 1987; Wish, 1988). Unlike meth users who turn to identify theft for illegal income, heroin users seem to rely on robbery. Johnson et al. (1985) studied heroin users in New York City and concluded that of the 183 robberies reported during the study period, nearly half of the robberies (45%) were committed by only ten individuals

Incarcerated heroin offenders are known perpetrators of robbery to obtain money to purchase the drug. Chaiken and Chaiken (1982) interviewed inmates in Texas, California, and Michigan prisons and jails. They found that the robbery rate was generally higher among daily heroin users as compared to less frequent users or nonusers. In a recent study of whether drug use impacted the criminal activities of 41 drug-using offenders in three prisons, Bennett and Holloway (2009) indicated that the majority of the prisoners who committed robbery did so to obtain money for drugs.

Systemic Violence

The systemic violence model refers to violence that arises from the need to protect systems of drug distribution and use, as well as maintain and regulate related cultural norms and values. In short, systemic violence refers to antagonistic interaction patterns within drug distribution and use systems (Goldstein, 1985). Examples of systemic violence include territorial disputes between rival drug dealers, assaults and murders that those in control commit to maintain control, robberies of drug dealers and the often expected and violent retaliation by the dealer or his/her bosses, the removal of informers, punishment for selling fake drugs, punishment for failing to pay one's debts, violence against law enforcement personnel, and disputes over drugs and related paraphernalia, and even price gouging wars (Goldstein, 1985; Miczek et al., 1994; Reiss & Roth, 1993; White & Gorman, 2000).

Since business arrangements involving the illegal drug trade cannot be enforced in any legitimate way, other forms of social control are imposed to control drug markets and drug distributors. These include punitive threats, intimidation, and physical punishment (Boles & Miotto, 2003; Boyum & Kleiman, 2001; Goldstein, 1985; Neale et al., 2005; Stretsky, 2008; Torok et al., 2008). Consequently, if conflicts cannot be resolved harmoniously, they are likely

to be settled by the threat or use of force. Understandably, those at the receiving end are highly unlikely to call in the police for protection. Dealers, therefore, have good reason to establish and uphold a reputation for being "bad," armed to the teeth, and ready and willing to take on competitors and any wayward customers (Boyum, Caulkins, & Kleiman, 2010; Sheley, 1994).

Drug-related systemic violence is insidious and negatively impacts the social and economic fabric of communities and the norms and behaviors of local residents (Ousey & Lee, 2002; White & Gorman, 2000). Drug-related systemic violence can undermine the unity and stability of families—especially in areas where they are already vulnerable (e.g., low income and/or dangerous communities) (Barnard, 2005; Jackson, Usher & O'Brien, 2006). In fact, this type of activity exacerbates existing problems of poverty, perpetuates low educational attainment, criminal activity, and unemployment, isolates people within their own neighborhoods (Buxton, 2006), and can result in the closure of businesses and public spaces. In short, drug distribution systems and related violence has the potential to separate neighbor from neighbor by impeding community interaction and common resolution of problems (Brisman, 2006).

The nature of drug-related systemic violence has been well documented in the literature (McKetin et al., 2005; Torok et al., 2008). As involvement in drug distribution increases, it intensifies a dealer's risk of becoming a victim or a perpetrator of systemic violence—or both (Goldstein, 1985; Nurco, Kinlock, & Hanlon, 2004). As an example, Butters (1997) reported that 63 percent of drug sellers on probation reported being victimized and 56 percent admitted hurting others in the course of their activities.

There is far more compelling evidence that homicides are linked to drug-related systemic violence. Zahn (1980) described the increasing rate of homicides between 1920 to 1974, leading the researcher to conclude that "closer attention be paid to the connection between markets for

illegal goods and the overall rates of homicide violence" (p. 128). In addition, the report concluded the following:

> The use of guns in illegal markets may also be triggered by the constant fear of being caught either by a rival or by the police. Such fear may increase the perceived need for protection which results in increased violence. For the overall society, this may mean a higher homicide rate. (Zahn, p. 128)

The literature is full of other compelling reports about drug dealing and violence. Reuter, MacCoun and Murphy (1990) estimated that for one year of regular dealing, the chance of serious injury was 1 in 14, and the probability of dying as a result of dealing was 1 in 50. Dembo et al. (1993) found that two-thirds of young crack dealers admitted hurting or killing someone due to their involvement in the drug trade. Goldstein et al.'s (1989) homicide study found that in 1988, 161 out of 218 drug-related murders (74 percent) were attributed to systemic factors. Similarly, after investigating homicides and drug trafficking crimes perpetrated by youth gangs, Maxson (1998) concluded that this type of homicide is increasing nationwide and are can be linked to "turf" disputes between warring gangs.

Empirical Findings on Amphetamine/Methamphetamine and Systemic Violent Crime

In contrast, the research does not generally indicate that methamphetamine production and systemic violence are linked. This is due in part to the fact that since family and friends typically produce methamphetamines locally, victimization is uncommon in comparison to other drug operations. Additionally, methamphetamine transactions often involve bartering rather than cash sales. For example, instead of shelling out money, someone who wishes to acquire the drug may simply provide the raw materials in exchange for a finished product (Weisheit, 2009). This

is not to say, however, that systemic violence does not exist among meth users and producers; it is, however, less common in comparison to, say, crack cocaine.

When systemic violence does occur with the methamphetamine trade, it is typically targeted against law enforcement personnel (Erickson, 2001; Scott & Dedel, 2006; Wright & Klee, 2001). Goldstein (1998) and Cartier, Farabee, & Pendergast (2006) both described meth-related systemic violence in terms of needing to protect methamphetamine manufacturing sites, distribution operations, and black-market trafficking territories. According to Weisheit (2008), violence can also be linked to efforts to protect the enormous profits associated with meth use and distribution.

As noted, systemic violence linked to meth production is often directed against law enforcement officials by methamphetamine dealers who may plant explosives around clandestine methamphetamine labs to protect the production unit—or destroy the evidence should it be found (Scott & Dedel, 2006). Incidences of gun threats against police officers are known (Office of National Drug Control Policy, 2004), and one dealer even built himself a contraption that enabled him to barricade himself—complete with a machete under the sofa cushion (Wright & Klee, 2001).

In an effort to further protect law enforcement personnel from acts of systemic violence, counties throughout the United States with high levels of methamphetamine production have established task forces with trained personnel to slow the production and distribution of the drug and cope with any associated violence (Blankstein & Haynes, 2001; National Drug Intelligence Center, 2001). Law enforcement officials in Kentucky, for example, routinely wear flak jackets when raiding methamphetamine labs (Washington/Baltimore High Intensity Drug Trafficking Area, 2004).

Empirical Findings on Cocaine/Crack and Systemic Violent Crime

Compared to all other types of illicit drugs, cocaine/crack is the drug primarily associated with systemic violence. According to Goldstein et al. (1992), a majority of the drug-related murders (26 percent) in New York City in 1984 were linked to cocaine use. An additional 15 percent involved cocaine mixed with other substances. In fact, if the category of "unknown drug-related homicides" were to be eliminated from the 1984 total, trafficking in cocaine alone or in combination with other substances was linked to 67 percent of the systemic murders. Four years later in 1988, crack use was associated with 60 percent of systemic homicides, and another 27 percent resulted from trafficking in powdered cocaine. In summary, cocaine in powdered or crack form was linked to the vast majority of the 1988 systemic homicides that were included in this study.

Inciardi and Pottieger (1994) reported that a relatively small number of men were engaged in fairly high numbers of systemic violence. However, since a growing body of research suggests that women are assuming an increasingly greater role in the illicit drug market (Erickson & Watson, 1990), it is likely that females will also become involved in drug-related systemic violence (Fagan, 1994; Goldstein, 1989; Mieczkowski, 1994), as well as become victims themselves of cocaine-related violence (Goldstein, 1998).

Goldstein, Bellucci, Spunt and Miller (1991a) reported an alarming increase in the rate of cocaine/crack-related systemic violence. Their study of the drug/violence nexus among both females and males confirmed that cocaine use was resulting in incidents of systemic violence; in fact, the proportion of violence linked to a systemic component increased markedly between moderate users and regular users for both males (a threefold increase) and females (a fourfold increase).

Researchers have also looked at the increase in systemic violence among certain ethnic minorities. For example, Tardiff et al. (1994; 1995) argued that the escalating murder rate among young Blacks and Latinos may be due to their increased involvement with both cocaine use and weapons. This finding is not surprising given the prevalence of drug distribution networks in low-income inner city neighborhoods.

Systemic violence, however, has not been reported to be a significant factor among most adolescent drug users because few are seriously involved in drug distribution (White, 1990). Dru-related violence among adolescents is typically associated with fights over from territorial matters, the sale of poor quality drugs, and financial screw-ups. According to Inciardi (1990), only nine percent of his sample study of young adults reported being victims of systemic violence, while a slightly lower percentage (8.3 percent) indicated that they had perpetrated such violence.

Studies have confirmed that crack cocaine related-systemic violence is mainly associated with maintaining and enforcing control. During the U.S. Sentencing Commission hearing on crack cocaine and its relationship to violent crime, the panel consistently agreed that "the primary association between crack cocaine and violence is systemic" (U.S. Sentencing Commission, 1995, p. 96). Dr. Steven Belenko, Deputy Director, New York Criminal Justice Agency, who further elaborated on the crack cocaine and violent crime relationship, noted that those involved in the crack cocaine trade were prone to "use…violence to maintain disciple, resolve disputes, and enforce control" (p. 96). Similarly, Fagan and Chin (1990) examined violence and aggression among 350 crack and other drug sellers in New York City (specifically, in Washington Heights and West Harlem—two northern Manhattan neighborhoods with high

concentrations of crack use and sales) and found evidence that drug-related violence tends to be associated with maintaining "control and territory" in the cocaine marketplace.

Mieczowski (1990) applied management and organizational principals to his study of typical crack-house operations in Detroit in order to describe how violence is manifested in this subculture. Distributors use violence to control the organization—most commonly to maintain security where drugs are sold, to resolve conflicts with rivals, and to discipline employees when necessary. In several Detroit communities, gangs such as Young Boys Incorporated have been formed to enforce control and maintain the organizational structure—oftentimes with deadly consequences. Similarly, Indianapolis officials have struggled to combat the retail drug trade in that city, which has been dominated by the Black Gansta Disciples (AKA, The Ghetto Boys) and other drug gangs. Researchers indicate a positive correlation between the increased competitiveness of the crack cocaine trade and the upsurge in homicides (Lattimore, Trudeau, Riley, Leiter, & Edwards, 1997).

Empirical Finding on Heroin and Systemic Crime

The literature points to a low occurrence of systemic violence amongst heroin users, principally because this drug is believed to reduce violent behavior in humans. According to Goldstein, Brownstein and Ryan (1992), only 1 percent of heroin-related homicides in New York City in 1988 were systemic-related. Similarly, Fagan and Chin (1990) reported that among all types of drug sellers, those who engaged in heroin sales engaged in the lowest levels of violence. When systemic violence has been reported, however, it is usually the result of retaliation by drug dealers for counterfeit operations. Goldstein (1985) described the process as follows. A user will purchase a known brand/quality of heroin and then remix it with another substance (e.g., powdered sugar) in order to increase the overall quantity and then resell it. This practice gives

the original dealer a bad street reputation, resulting in a loss of sales. As a result, the dealer seeks out the perpetrator of the counterfeit sales, often relying on systemic violence (e.g., threats, assaults, and even homicide) to remedy the problem.

According to the literature, direct retaliation appears to be the preferred response because it serves three important goals: reputation maintenance, loss recovery and vengeance (Topalli, Wright, & Fornango, 2002). Using interviews with 20 active drug dealers in St. Louis who had been robbed, Topalli and coworkers explored how these "victims" perceived the "crime" and responded to the assault. The researchers provided an interesting exchange with "Stub," a heroin dealer, who was robbed and shot on the street corner by one of his regular customers who refused to accept disrespect without retaliation.

> I said "Damn man, what the fuck are you doing man?" He said, "I'm robbing you." I said, "No you ain't." Cause I was real strong and bold even with a gun in my face. I said "No you ain't…robbing me." He immediately shot me twice after I said that…So when he shot me twice I just dropped all the shit 'cause I said, he's trying to kill my ass, you know, I ain't crazy…See you got to stab me or shoot me, I'm not gonna just let you take my shit because if you just take it the word on the street gonna get out that you can't take Stub's shit, you know what I'm saying?... And whoever he told about the robbery attempt, he told them that Stub's a strong little guy. Stub said no you ain't robbing me, even though I had a gun on him. (p. 351).

A friend later rushed Stub to the hospital. After four days of hospital treatment, followed by a short time "laying low" at his girlfriend's house, Stub put the word out on the street to track down his assailant. Stub reported that the robber is no longer in existence (p. 351).

The Burden of Drug Abuse

Substance abuse and its consequences impose an incalculable burden on the individual, his or her family, and on society at large. The financial impact of substance abuse is enormous and has been increasing with every passing decade. One of the first estimates of the cost of substance abuse was reported by Cruze et al. (1981) for the year 1977. At that time, the total estimated costs were $18.4 billion. Since then many other studies have calculated annual substance abuse costs, which are largely based on work productivity losses, crime response and prevention, medical expenses (including loss of life costs), as well as social/human services, treatment, prevention, and other related expenses (CASA, 2001, 2009; Nicosia, 2009; Office of National Drug Control Policy, 2004; Whelan, 2008). Some of the more recent approximations include the estimated costs of alcohol abuse and mental health treatment as well. In 1980, for example, Harwood, Napolitano, Kristiansen and Collins (1984) estimated the combined costs of alcohol and substance abuse and treatment for mental illness to be $190.7 billion (Cruze et al., 1981)—with substance abuse representing $46.9 billion of those total costs. Rice et al. (1990, 1991a; 1991b) provided subsequent cost analyses for alcohol, substance abuse and mental illness for 1985 and 1988. The total losses to the economy related to alcohol, substance abuse and mental illness for 1985 were $218.1 billion, of which $44.1 billion was attributed to substance abuse. The analogous figures for 1998 were $273.3 billion, with a $58.3 billion price tag for substance abuse.

Over the last several decades, one of the most harmful consequences of substance abuse on society and on the local/state/federal government has been associated with crime. In fact, a sizable number of studies indicate that crime-related costs account for a significant share of the total cost of substance abuse (Cruze, Harwood, Kristiansen, Collins, & Jones, 1981; Harwood,

Fountain, & Livermore, 1998; Harwood, Napolitano, Kristiansen, & Collins, 1984; Office of National Drug Control Policy, 2001; Rice, Kelman, & Miller, 1991; Rice, Kelman, Miller, & Dunmeyer, 1990). These crime-related costs are exceedingly high, amounting to $32.5 billion—almost three-fourths of the total costs of substance abuse. Included in crime costs are expenditures for police protection, private legal defense, property destruction, as well as the value of productivity losses for drug users (principally heroin or cocaine addicts) who engage in crime as a career and for people incarcerated in prison as a result of a drug-related crime (Rice et al., 1990, 1991a, 1991b).

A study by the Lewin Group for the National Institute on Substance Abuse (NIDA) and the National Institute on Alcohol Abuse and Alcoholism (NIAAA)—both institutes of the National Institute of Health (NIH)—estimated the costs of alcohol and substance abuse at $245.7 billion in 1992 (Harwood, 1998). The study indicated that substance abuse and dependence accounted for 40 percent ($97.7 billion) of the estimated costs—principally in the following areas: substance abuse treatment and prevention, healthcare, costs associated with reduced job productivity or lost earnings, and other costs to society such as crime prevention and social welfare. The 1992 drug cost estimate had increased 50 percent over analogous 1985 data (Rice et al., 1990, 1991a, 1991b). The upsurge in expenditures was associated with the cocaine use epidemic, the spread of the HIV, increases in drug related crimes, and increases in the number of drug offenders incarcerated.

The Lewin Group also provided estimates for the Office of National Drug Control Policy (ONDCP) (2004) of the societal cost of substance abuse. Specific cost areas include health care costs (federally-provided specialty treatment, community-based specialty treatment, health infrastructure and support, and medical consequences), productivity losses (premature death,

substance abuse-related illness, institutionalization and hospitalization, productivity losses for victims of crime, incarceration, and crime careers), and other costs (criminal justice system and other public costs, private costs, and social welfare). The report estimated that the total cost of illegal substance abuse in the U.S. probably exceeded $180.9 billion in 2002—which represents an average increase of 5.3 percent per year between 1992 through 2002. Increased rates of incarceration for drug (and drug-related) offenses and increased spending on law enforcement and adjudication represented the significant shares of the cost of substance abuse. Of that $180.9 billion, almost 60% ($107.8 billion) was related to crime, which rose by an average of 5.7 percent annually between 1992 and 2002.

This crisis is not unique to the U.S. International cost estimates of the burden of substance abuse have also produced alarming data. A Canadian study estimated the total cost of substance abuse (including alcohol, tobacco, and drugs) to be more than $18.45 billion in 1992 ($18.62 billion U.S.) (Single, Robson, Xie, & Rehm, 1996). This represents $649 per capita ($655 per capita U.S.). Drug abuse was estimated to account for $1.37 billion, or 7.4 percent of total costs ($1.38 billion U.S.). Of that sum, approximately $823 million ($831 million U.S.) was associated with lost productivity due to illness and premature death, $400 million ($404 million U.S.) went to law enforcement, followed by $88 million ($89 million U.S.) in direct health care costs.

A decade later, Rehm et al. (2006) conducted a comparative study of the cost of substance abuse in Canada for the year 2002. Their estimates included economic impacts in terms of death, illness and costs associated with the abuse of tobacco, alcohol and illegal drugs. In 2002, the social cost of substance abuse in Canada was estimated to be $39.8 billion ($40.2 billion U.S.), reflecting an over 50 percent increase in substance abuse costs compared to 1992

figures. Of the total social cost of substance abuse, productivity losses amounted to $24.3 billion (61%) of the total, while health care costs were $8.8 billion (22.1%). The third highest contributor to total substance-related costs was law enforcement with a cost of $5.4 billion (13.6%) of the total, followed by other direct costs $1.3 billion (3%).

Similar studies have been conducted in several European countries. Fenoglio, Parel and Kopp (2003) estimated the cost of alcohol, tobacco and illicit drugs at more than 200 billion francs in France in 1997 ($41.32 billion U.S.) of which 13,350.28 million francs ($2,758.36 million U.S.) was connected to illegal drug use. Expenditures associated with productivity losses were 6,099.19 million francs ($1,260.18 million U.S.), with 5,246.92 million francs ($1,084.09 million U.S.) connected to imprisonment and 852.27 million francs ($176.09 million U.S.) to premature death. Law enforcement costs came in second, with 3,911.46 million francs ($808.17 million U.S.), followed by health care costs of 1,525.51 million francs ($315.19 U.S.).

Garcia-Altes, Ollie, Antonanzas and Colom (2002) estimated the overall cost of illegal drug use in Spain in 1977 at 88,800 million pesetas ($729 million U.S.). Of the overall cost of drug use, health care represented the most significant share of the cost of substance abuse (50%), while crime-related costs represent 18 percent of the costs.

Collins and Lapsley (1991, 1996, 2002, 2008) published a series of substance abuse cost estimates in Australia. However, in 2004/05, the researchers estimated the total social cost of substance abuse at $55.2 billion ($55.9 billion U.S.). Of the total cost, illicit drugs accounted for $8.2 billion (14.6 percent) ($8.3 billion U.S.). Drug-related crime costs (e.g., violence, policing, criminal courts, prisons) were estimated at $4.0 billion ($4.1 billion U.S.), representing nearly one-half of the total illicit drug-related costs.

In addition to inclusive substance abuse estimates, other studies have narrowed their focus to a specific drug. One study documented the costs of heroin addiction in the United States in 1996, both to the addict and to society at large (Mark, Woody, Juday and Kebler, 2006). The researchers estimated costs in four broad areas (medical care, lost productivity, crime, and social welfare) and came up with total expenditures figure of $21.9 billion. Of these costs, productivity losses accounted for approximately $11.5 billion (52.6%), crime activities, representing the second highest cost of the burden of heroin addiction, accounted for $5.2 billion (23.9%), medical care accounted for $5.0 billion (23%) and social welfare accounted for $0.1 billion (0.5%).

The RAND Drug Policy Research Center (Nicosia, Pacula, Kilmer, Lundberg, & Chiesa, 2009) conducted the first (and only) national estimate of the myriad costs associated with methamphetamine use in the U.S. for the year 2005. When expenditures associated with premature death, crime and criminal justice costs, child maltreatment and foster care, lost productivity, and treatment/health care expenditures, the reported total cost of methamphetamine use came to $23.4 billion. According to the RAND study, crime and criminal justice costs represent the second-largest expense category, ranging from $2.5 to $15.8 billion—with a "best estimate" of $4.2 billion.

The aforementioned substance abuse cost studies have delivered compelling information about the incredible financial burden of drug abuse and addiction to society. However, limited research is available that estimate the financial burden of substance abuse to governments. For example, the National Center on Addiction and Substance Abuse at Columbia University (CASA) has conducted cost estimate studies about government health care expenditures (CASA, 1993, 1994), prisons and jails (CASA, 1998), and child welfare (CASA, 1999). Later, CASA

conducted studies to estimate the economic burden of substance abuse to federal, state and local governments among the various categories. These studies illustrate that the burden of substance abuse is enormous to governments, costing billions of dollars annually for programs such as social services, education, crime, productivity—all of which ultimately rely on taxpayer dollars. CASA's *Shoveling Up: The Impact of Substance Abuse on State Budgets* (2001) estimated that in 1998, $81.3 billion, or 13.1 percent, of state funds were used to deal with substance abuse and addiction.

Expenditures related to substance abuse represent one of the largest cost categories in a state's budget, although its impact is hard to pinpoint since many of the substance abuse costs are buried in departments and activities not directly linked to substance abuse. Of the $81.3 billion states spent on substance abuse and addiction in 1998, $30.7 billion, or 77 percent, was related to justice costs: incarceration, probation and parole, criminal, juvenile justice, and family court costs of substance-involved offenders. In fact, crime-related costs represent the largest state spending category associated with substance abuse and addiction, surpassing education, health, child and family assistance, and mental health.

Subsequently, CASA (2009) released *Shoveling Up II: The Impact of Substance Abuse on Federal, State and Local Budgets* (2009), which documented national estimates of the cost of substance abuse and addiction to federal, state and local governments. The study indicated that substance abuse/addiction cost federal, state and local governments at least $467.7 billion in 2005. Of $467.7 billion expended, federal governments spent $238.2 billion, state governments spent $135.8 billion, and local governments spent $93.7 billion on the consequences of substance abuse. With a price tag of $470 billion, justice costs represented the second largest share of the burden of federal and state costs of substance abuse, following health care.

Since the completion of the CASA studies, many states have begun to scrutinize the cost of substance abuse and addiction to state and local budgets. For example, in 2007, House Joint Resolution (HJR) 683 and Senate Joint Resolution (SJR) 395 of the Virginia General Assembly directed the Joint Legislative Audit and Review Commission (JLARC) (an agency established to assess the operations and performance of state programs) to determine the consequences of substance abuse. JLARC calculated the financial cost of substance abuse on Virginia's state and local budget at $613 in FY2006. Public safety agencies represented the largest expenditure, $586 million (96 percent). Incarceration expenditures were 47 percent, or nearly one-half, of the public safety costs associated to substance abuse, followed by law enforcement (31 percent), adjudication (13 percent), community corrections (9 percent), and motor vehicle crashes (over 1 percent) (JLARC, 2008).

The state of Maine estimated its annual cost of substance abuse in 2005 at $898.4 million, with crime-related costs comprising the largest proportion at $214.4 million or 23.9%. Other 2005 expenditures in order of funding totals were as follows: mortality ($204.2 million), medical care ($186.8 million), morbidity ($155.6 million), and "other costs" related to child welfare, administration of other social welfare programs, fire protection and the destruction caused by fire, and the non-medical costs of motor vehicle accidents ($112.2 million). Interestingly, substance abuse treatment comprised the smallest proportion of total costs at $25.2 million (2.8%) (Maine Office of Substance Abuse, 2007).

The Division of Alcohol and Substance Abuse in Washington State estimated their total 2005 drug and alcohol abuse-related expenditures at $5.21 billion. According to the report, this figure represents a 105 percent increase over the 1996 cost estimate ($2.54 billion). Of the total cost of drugs and alcohol abuse, premature mortality accounted for the largest costs ($2 billion);

followed by crime, which includes costs for police protection, legal and court costs, and expenditures for incarceration ($1.09 billion) (Wickizer, 2007).

The state of Oregon estimated its total direct costs for substance abuse at $5.93 billion in 2006, broken down as follows: (1) $813 million for health care costs; (2) $4.15 billion in lost earnings due to productivity losses; and (3) $967 million in other costs (e.g., violent crimes, destruction of property, motor vehicle crashes, fires, law enforcement, criminal justice, and social welfare programs) (Whelan, 2008).

The aforementioned studies reinforce the fact that the financial burden of substance abuse represents a major resource drain for both states and the federal government—especially given the fact that about 46 percent of the cost of alcohol and drugs to society is borne primarily by state and local governments (Harwood, 1998). The fact that these costs are overwhelmingly "reactive" rather than proactive continues to frustrate stakeholders at every level of government (CASA, 2009). In light of these escalating substance abuse costs, policymakers are encouraged to direct more attention to investing in efforts to reduce the financial burden of substance abuse to governments. According to Joseph A. Califano, Jr., CASA's founder and chairman:

> Of every dollar federal and state governments spent on substance abuse and addiction in 2005, 95.6 percent went to shoveling up the wreckage and only 1.9 percent on prevention and treatment. Under any circumstances spending more than 95 percent of taxpayer dollars on the consequences of tobacco, alcohol and other substance abuse and addiction and less than two percent to relieve individuals and taxpayers of this burden would be considered a reckless misallocation of public funds. In these economic times, such upside-down-cake public policy in unconscionable… In the face of evidence that prevention programs aimed at substance abuse can be effective, and that many treatment

> programs have outcomes more favorable than many cancer treatments, our current spending patterns are misguided. It is past time for this fiscal and human waste to end (CASA, 2009, p. i.).

As evidenced in a number of recent reports by a variety of investigators, the literature confirms that the most significant strategies for reducing the burden of substance abuse on public programs is through targeted and effective substance abuse treatment programs, substance abuse prevention programs, economic development activities, and educational interventions (Brisman, 2006; Cartwright, 2008; CASA, 2001, 2009; Dobkin & Nicosia, 2009; Henry, 2010; Hyra, 2008; Mark, Woody, Juday, & Kebler, 2006).

Methods for Reducing the Burden of Drug-Related Violent Crime

Substance Abuse Treatment

Substance abuse treatment is a collaborative process between health professionals and clients that involves assessment, diagnosis, treatment planning, intervention, and evaluation to help addicted individuals stop compulsive drug use (Rasmussen, 2010). Unfortunately for both the abuser and society, a substantial number of substance abuse victims do not enter treatment programs. According to Substance Abuse and Mental Health Services Administration's (SAMHSA) National Survey on Drug Use and Health (NSDUH) (2011), in 2010 an estimated 23.1 million persons aged 12 or older needed treatment for an illicit drug or alcohol use problem. Of that total, only a little over 1.0 percent of them (2.6 million) actually received treatment at a specialty facility. Therefore, over 20 million people who needed drug and/or alcohol treatment in 2010 did not receive it.

Substance abuse and addiction are major public health problems that are color-blind, indifferent to socioeconomic status, and prey on men and women of all ages. Thus, the economic

response to such addictions is multifaceted, expensive, and involves local, state, and federal government funding. Private and employer-sponsored health plans also may provide coverage for treatment of addiction and its medical consequences (e.g., HIV and other infectious diseases, cardiovascular effects, kidney damage, and so forth). Unfortunately, managed care responses usually mean shorter average stays or insufficient coverage for substance abuse treatment programs—both of which have curtailed the number of operational programs in the U.S. (NIDA, 2009).

Treatment for substance abuse and addiction is delivered in many different settings—typically using a mix of medical, pharmacological, and behavioral approaches. According to the National Institute on Substance Abuse (2009), there are over 13,000 specialized U.S. drug treatment facilities providing a range of services to persons addicted to drugs or alcohol. These facilities deliver counseling, behavioral therapy, medication interventions, and follow-up case management services. In addition to specialized drug treatment facilities, substance abusers are also treated in physicians' offices and mental health clinics by a variety of providers, including counselors, physicians, psychiatrists, psychologists, nurses, and social workers.

Treatment can be provided in outpatient, inpatient, and residential settings. Although specific treatment approaches often are associated with particular treatment settings, a variety of therapeutic interventions or services can be delivered in any given setting (NIDA, 2009). Substance abuse and addiction treatment programs are also classified according to two important distinctions—whether the patient is incarcerated or not. Thus, such programs are both community-based and prison-based.

Community-based Substance Abuse Treatment Programs

Community-based treatment programs use multiple modalities to treat users and addicts, and these typically include detoxification, inpatient/outpatient treatment, and therapeutic communities of recovering drug/alcohol users. The primary treatment approaches of these programs use counseling and social skills training in order to tackle issues that encourage drug use. Other methods emphasize monitoring, drug-testing, and case-management of chemically-dependent offenders (Chanhatasilpa, MacKenzie, & Hickman, 2000).

Although the term "detox" can be applied to several substance dependency programs, detoxification programs are principally designed for persons addicted to heroin. Outpatient detoxification using methadone is one type of treatment intervention that can help a user's physiological addiction. The goal of this treatment type is to provide support and therapy so that the addict can return to society in a drug-free state. In contrast, inpatient detoxification incorporates traditional short-term detoxification strategies but requires hospital admission; this is intended to provide the stabilization needed for patients who need direct supervision or longer-term methadone treatment. The goals of inpatient treatment are to eliminate the patient's dependence on drugs.

Methadone, which has long been the drug of choice for detoxification, is a synthetic opiate that produces similar effects to heroin and other opium-based products and helps to prevent or even eliminate withdrawal symptoms (Bennett & Holloway, 2005). Methadone-maintenance programs enable addicts to receive a daily dose of methadone. Since it is taken orally, it make intravenous use unnecessary. Further, it is longer acting than heroin, with one oral dose lasting up to 24 hours. This makes methadone effective in managing chronic heroin addiction (Inciardi & McElrath, 1995).

Inpatient drug treatment, which can last four to six weeks, takes place in the drug unit of a hospital or in dedicated treatment center. In addition to very specific treatment protocols, inpatient drug treatment programs rely on a fairly regimented behavioral privilege system. Patients cannot have physical or telephone contact with family and friends during the early stages of treatment. “Self-governing” patient groups are important for these individuals since they build in a sense of responsibility and accountability—not to mention develop confidence and improve self-esteem. Group leaders (recovering addicts themselves) are in charge of unit meetings and can serve as positive role models; others record meeting minutes and post a duty-list that can include making coffee, cleaning lounges, and mentoring and assisting new patients (Milhorn, 1994).

As an alternative to detoxification and inpatient drug treatment programs, a third choice to treat drug addiction is a drug-free outpatient treatment option. Treatment occurs in a community-based, outpatient facility where patients participate in a variety of therapeutic activities within a shared environment. This type of treatment emphasizes a drug-free approach to eliminating addiction. When new patients require detoxification, it is accomplished without the use of chemicals. Treatment typically lasts about a year and may be a part of a continuum of treatments offered by the agency. In terms of goals, outpatient drug-free treatment is designed to help patients confront themselves and their life circumstances and cope positively with both. Another important objective of this treatment is to create and foster a sense of personal worth within the individual, which is intended to reduce self-destructive behaviors. Program staff members also work with patients to increase their self-awareness and sense of self-sufficiency by helping them understand how to cope with problems in healthy ways. These accomplishments

are considered essential for the client to develop life skills and eliminate his or her drug dependency.

This type of approach—which is representative of a drug-free "therapeutic community" (TC)—relies on group therapy and individual counseling as its major therapeutic tools. TCs were first established in 1958 by Chuck Dederick as a comprehensive treatment model to address substance abuse, particularly for heroin addicts (Neme, Wish, & Messina, 1999). They now represent one of the most common residential treatment paradigms for substance abusers (although some non-residential TCs exist as well). Therapeutic communities, which utilize peer support and group processes, inspire members to adhere to group norms and to assimilate effective social skills to overcome their drug-use problems. The programs are also based on self-help principles in that the individual is seen as an essential contributor to the change process (Bennett & Holloway, 2005).

The distinction between a TC and other treatment modalities is a TC's intentional use of community members as a strategy for facilitating individual progress (De Leon, 1994; Tims, Jainchill, & DeLeon, 1994). There are four dimensions of behavior change. Two of them—community members and socialization—are concerned with the individual's social development; the other two dimensions—developmental and psychological—refer to the evolution of the individual in terms of maturity, emotional skills, and identify (Tims et al., 1994). There are five subjective aspects related to an individual's behavioral change: (1) his or her personal circumstances or the external pressures for change, (2) motivation or a person's inner reasons for personal change, (3) readiness for treatment, (4) the suitability or the self-perceived match between the person and the treatment modality, and (5) critical perceptions of self-change (e.g., self-efficacy and self-esteem). "Essential experiences include healing experiences (nurturance,

physical and psychological safety); subjective learning experiences (self-evaluative perceptions, thoughts, and feelings necessary for achieving internalized learning); and critical therapeutic experiences (e.g., distinctive therapeutic events)" (Tims et al., 1994, p. 4).

The change process in a TC incorporates behavioral and social learning philosophies. In terms of the former, the behavior orientation of a TC (which views the community as the trainer) includes efficacy training, social role training, and indirect learning. The stages of change are assessed according to three perspectives: the program, treatment, and recovery. The final stage of treatment is integration, which occurs mainly after separation from the program. Integration stresses the interconnectedness between TC influences and life experiences. "A distinctive marker of the integration stage is a change in identity that is perceived by the individual and others" (Tims et al., 1994, p. 4).

Effectiveness of Community-Based Substance Abuse Treatment Programs

A growing body of research provides persuasive evidence that community-based drug-treatment programs can reduce substance use, recidivism rates, and even criminal behavior (Holloway et al., 2006; Jofre-Bonet & Sindelar, 2002; Sinha, Easton, & Kemp, 2003). In contrast, while detoxification has been documented to reduce drug use and criminality on a shorter-term basis, is has not been linked to reducing persistent drug use and criminal behavior. However, outpatient treatment programs have been validated to reduce substance use and criminal recidivism (Chanhatasilpa et al., 2000), as well as inpatient treatment programs, which researchers have reported to significantly reduce illegal drug use, criminal activities, and arrests (Hser et al., 2001; Morral, McCaffrey, & Ridegway, 2004). Similarly, therapeutic communities are linked to reduced substance use, criminal behavior, and recidivism (Aos, Milller & Drake, 2006; Holloway et al., 2006).

A number of studies have evaluated community-based treatment models, such as the Treatment Alternative to Street Crime (TASC), which is considered one of the original models for community-based drug treatment programs for criminal offenders (Chanhatasilpa et al., 2000). In general, most studies of the TASC program have repeatedly shown reductions in criminal behavior and recidivism. However, reports of other drug-treatment programs are inconclusive about their effectiveness in reducing the recidivism rate (Anglin, Longshore & Turner, 1999; Anglin, Longshore, Turner, McBride, Inciardi & Prendergast, 1996). Rhodes and Gross (1997) looked at programs in Washington, DC, and Portland, Oregon, utilizing a case-management approach that incorporates the drug counseling and referral elements of TASC programs—minus the supervisory and coercive elements. The researchers found that participants—many of whom were under the supervision of the criminal justice system for some part of the six-month follow-up period (although not by staff at the study site)—reported dramatic reductions in illegal activity compared to the pre-arrest period.

Stelle, Mauser and Moberg (1994) reviewed Wisconsin's Treatment Alternative Programs (TAP), based on the TASC model. TAP provides therapeutic alternatives to drug-abusing offenders to want to avoid imprisonment. Stelle and colleagues asserted that TAP "graduates" were significantly less likely to fall back into crime than offenders who had not completing the program. Similarly, researchers studied the Kentucky Substance Abuse Program in Jefferson County and reported lower recidivism rates for offenders who completed the KSAP-based treatment (Vito, Wilson, & Holmes, 1993).

In fact, the effectiveness of community-based treatment programs have been widely reported, as documented in the following list: (a) Treatment Outcome Prospective Study (TOPS) (Harwood, Collins, Hubbard, Marsden & Rachal, 1988; Hubbard, Marsden, Rachal, Harwood,

Cavanaugh & Ginsburg, 1989); (b) the Substance Abuse Reporting Program (DARP) (Simpson, 1993); and (c) the Substance Abuse Treatment Outcome Study, (DATOS) (Hubbard, Craddock, Flynn, Anderson & Etheridge, 1997; Simpson, Joe & Brown, 1997). Results of these studies validate lower rates of substance use, decreased recidivism, and declines in criminal acts.

Important to note is that the effectiveness of community-based treatment programs is largely predicated on the client's retention or length of stay in treatment (Anglin & Hser, 1990b; Gerstein & Harwood, 1990; Gerstein, Johnson, Harwood, Fountain & Malloy, 1994; Inciardi & Martin, 1993). Condelli and Hubbard (1994) also summarized outcome research on TC clients and other types of residential treatment programs. The investigators concluded that clients who remained in programs for longer periods of time were less likely to use drugs and engage in criminal behavior; higher rates of school attendance (for adolescents) and employment in contrast to program "short timers."

Pompi (1994) reviewed several studies to determine whether therapeutic communities were effective with adolescent drug users. He found that of the nine studies he evaluated, the retention statistics ranged between 35 to 181 days. The researcher also concluded that TCs are effective in reducing drug use and crime and increasing productive behavior among adolescent clients.

Gender-based studies in this area also provide useful outcomes. For example, Stevens and Glider (1994) looked at women enrolled in a TC for substance abuse treatment. Interestingly, the researchers found that the presence of women in the therapeutic community—both as program participants and as role models—enhanced treatment outcomes for men and women, as evidenced by length-of-stay statistics and behaviors. The length of programs ranged from 6 to 30 months, with the average being 12 to18 months.

As noted above, the clients who remained in TCs for longer periods of time experienced better outcomes. Studies differ, however, in the duration of time needed to produce these positive outcomes. Bale et al. (1980) observed decreases in the use of heroin and other illegal drugs, the number of arrests or convictions, and unemployment rates among program participants who remained in treatment for as little as 50 days. De Leon, Wexler and Jainchill (1982) indicated that clients needed 4 to 6 months of treatment to produce a decline in opiate use and criminal behavior, but more than 9 months to increase employment rates. At the high end of the scale, Hubbard et al. (1988, 1989) indicated that 6 to 12 months of treatment were needed reduce predatory crimes—and a year or more of treatment to increase employment levels and to decrease use of heroin, marijuana, and other drugs.

The length of stay in treatment remains one of the most significant factors affecting treatment outcomes. However, the research is mixed regarding the role that client characteristics play in client retention (i.e., length of stay) in community-based substance abuse treatment programs. Condelli's (1994) compared three large studies of retention in TCs and other types of residential programs (i.e., DARP, Therapeutic Communities of America (TCA), and TOPS) and asserted that a person's level of education was the sole variable in all three studies that could predict retention. In contrast, several smaller multivariate studies (Condelli, 1986, 1989) have been conducted on retention in traditional TCs for substance abusers. Some of the fixed predictors of retention include age, race/ethnicity, family socioeconomic status, drug use involvement and patterns, employment history, local versus out-of-town residence, and marital status. It should be noted, however, that the findings of these studies concurred that these fixed client variables alone did not serve as reliable predictors of retention in TCs.

Prison-Based Substance Abuse Treatment Programs

Drug treatment programs are also based in prisons and correctional facilities. Despite their location, such programs still retain many of characteristics of community-based therapeutic models (De Leon, 2000). The prison-based TC is an intensive, longer-term, and highly structured treatment option for chronic drug users convicted of a criminal offense. These programs encourage members to take greater responsibility for their behaviors before, during, and after treatment. Inmates who take part in prison-based TCs receive intensive treatment designed to change their attitudes, as well as learn relapse-prevention skills necessary to function successfully outside prison walls.

Inmates typically engage in a three-phase treatment program (usually lasting about a year). The first phase includes an orientation, diagnosis, and assimilation process. During the second phase (lasting 5 to 6 months) inmates are encouraged to take on increased responsibility and involvement in the program. "Senior" program members are expected to share their insights by teaching new members and assisting in the day-to-day operations of the TC. Group counseling sessions focus on self-discipline, self-worth, self-awareness, and respect for authority. The third and final phase lasts 1 to 3 months and is designed to prepare the inmate for community re-entry. This is a critical phase during which participants strengthen planning and decision-making skills and design their individual aftercare plans.

Of all the treatment modalities, prison-based TCs are considered the most complex to implement and operate—principally because they require a high level of commitment from the prison administration and staff (Wexler & Williams, 1986). Additionally, the literature indicates six other common barriers to developing effective correctional drug treatment programs: (1) client identification, assessment, and referral; (2) recruitment and training of treatment staff; (3)

redeployment of correctional staff; (4) over-reliance on institutional versus therapeutic sanctions; (5) aftercare, and (6) coercion (Farabee, Prendergast, Cartier, Wexler, Knight, & Anglin, 1999). However, the literature also describes specific characteristics of effective prison-based treatment programs.

One study proposed three psychological principals for delivering appropriate prison-based treatment services: include higher risk cases, target the needs of offenders, and use of styles and modes of treatment (e.g., cognitive and behavioral) that dovetail with client needs and learning styles (Andrews, Zinger, Hoge, Bonta, Gendreau, & Cullen, 1990). Wexler (1994) recommended ten specific strategies for a successful prison-based TC: (1) designing a treatment approach based on a clear and consistent treatment philosophy; (2) establishing an atmosphere of empathy and physical safety; (3) recruiting and retaining qualified and committed treatment staff; (4) specifying clear and unambiguous rules of conduct; (5) employing ex-offenders and ex-addicts as role models, staff, and volunteers; (6) using peer role models and peer pressure; (7) including a relapse prevention component; (8) establishing continuity of care from treatment to community aftercare; (9) integrating treatment evaluations into the design of the program; and (10) maintaining treatment program integrity, autonomy flexibility, and openness. Similarly, Antonowicz and Ross (1994) argued that six factors were significantly associated with the success of offender treatment programs: (1) sound conceptual model, (2) multifaceted programming, (3) targeting "criminogenic needs," (4) responsivity principle, (5) role-playing/modeling, and (6) social cognitive skills training.

Since the 1980s, several major evaluations have examined the efficacy of prison-based TCs, as follows: Cornerstone in Oregon (Field, 1985, 1989), Stay'n Out in New York (Wexler, Falkin & Lipton, 1990), KEY/CREST in Delaware (Inciardi, Martin, Butzin, Hooper, &

Harrison, 1997; Lockwood & Inciardi, 1993; Martin, Butzin, Saum, & Inciardi, 1999), New Vision in Texas (Knight, Simpson, Chatham, & Camacho, 1997; Knight Simpson, & Hiller, 1999); Amity in California (Wexler, De Leon, Thomas, Kressler, & Peters, 1999; Wexler, Melnick, Lowe, & Peters, 1999), Forever Free in California (Prendergast, Hall, & Wellisch, 2002; Prendergast, Wellisch, & Wong, 1996), and the Federal Bureau of Prison Programs (Pellissier et al., 1998; Pellissier, Camp, & Motivans, 2003). Overall, these studies support that in-prison treatment is effective in reducing drug use, crime, and recidivism, and generally point to better parole outcomes—particularly when combined with community-based treatment following release from prison.

Other evaluations also support the combination of prison-based TC treatment and subsequent community-based aftercare as being effective in reducing the drug-use/crime cycle among offenders, reducing recidivism and relapse rates, and improving parole outcomes (De Leon, Melnick, Thomas, Kressel, & Wexler, 2000; Porpino, Robinson, Millson, & Weekes, 2002).

The three-stage substance abuse treatment approach has also been proven to be an effective treatment model for prisoners. For example, Inciardi et al. (1997) examined Delaware's multistage TC treatment system (prison-based TC only, work release, and TC followed by work release TC and aftercare). The researchers compared treatment groups to a non-treatment group and found that those receiving treatment in the two-stage (work release and aftercare) and three-stage (prison, work release, and aftercare) models had significantly lower rates of drug relapse and criminal recidivism, even after adjusting for other risk factors. These findings reinforce the effectiveness of a three-stage TC model for drug-dependent offenders, as well as the importance of a work release transitional therapeutic community.

In a related study, Butzin, Martin and Inciardi (2002) examined the impact of each of the individual treatment components on subsequent outcomes using data from the Delaware correctional system. Specifically, the Delaware Initiative for Criminal Offenders is a three-stage TC treatment program that includes prison-based treatment (Stage 1), work release tailored as a transitional, residential TC program (Stage 2), and aftercare services delivered on an outpatient basis (Stage 3). Their results supported the benefit of participating in each component, even discounting for differences in demographics and history of criminal behavior and illicit substance use.

Consistent with studies of community-based drug treatment programs, comparable reports on the effectiveness of prison-based programs have demonstrated that longer treatment time is associated with better outcomes (Burdon, Messina & Prendergast, 2004; De Leon, Kressel & Peters, 1999; Knight, Simpson & Hiller, 1999; Martin, Butzin, Saum & Inciardi, 1999; Wexler et al., 1999). Overall, studies have confirmed that TC participants who remained in treatment longer—up to nine months—had lower recidivism rates; moreover, including an aftercare component dramatically improved participants' post-release behavior and increased the likelihood of successful longer-term outcomes.

Another type of prison-based substance abuse treatment program utilizes a cognitive behavior approach, and is considered easier to implement and more cost-effective in comparison to the TC model. The cognitive behavior program assumes that people commit crimes due to deficient reasoning skills, inadequate social and interpersonal skills, and/or developmental deficiencies. Thus, the overall goal of a cognitive behavior program is to enhance the offenders' self-worth and self-perceptions. The program includes exercises that strengthen reasoning and

decision-making skills, typically involving role-playing and modeling, skills training, and negotiations (Prendergast & Wexler, 2004).

A number of meta-analysis reports have assessed the effectiveness of prison-based cognitive behavior programs, concluding that they are effective in reducing recidivism and preventing relapse. For example, Izzo and Ross (1990) conducted a meta-analysis of 46 studies of intervention programs for juvenile delinquents whereby the authors revealed a significant difference between programs that included a cognitive component and those that did not. Specifically, cognitive programs were more than twice as effective as non-cognitive programs. Similarly, Antonowicz and Ross (1994) confirmed that programs that were based on a cognitive-behavioral theoretical model were the most beneficial, with 75 percent of "successful" programs grounded in a cognitive-behavioral approach. A subsequent meta-analysis report evaluated 26 studies assessing the overall effectiveness of the relapse-prevention approach (a form of cognitive-behavior treatment) and the extent to which certain variables can be linked to treatment outcome. Results showed that relapse prevention was effective for various types of substance users in both inpatient and outpatient settings (Irvin, Bowers, Dunn, & Wang, 1999).

Lipsey, Chapman and Landenberger (2001) conducted a meta-analysis evaluation of 14 studies investigating the effectiveness of cognitive-behavioral programs for reducing recidivism of criminal offenders. The results confirmed the effectiveness of cognitive-behavioral programs, with the best of them capable of producing sizable reductions in recidivism. In even larger meta-analyses of 69 studies on the effectiveness of behavioral and cognitive-behavioral treatment in reducing recidivism for offenders, researchers corroborated the importance of treatment in helping to keep former inmates out of jail. This effect is mainly due to cognitive-behavioral

interventions rather than to standard behavior modification approaches (Pearson, Lipton, Cleland, & Yee, 2002).

Fiscal Impact of Substance Abuse Treatment

The literature provides substantial evidence that substance abuse treatment significantly reduces the probability of crime, recidivism, and drug use, and ultimately improves parole results. However, at a time of stressed government budgets, it is imperative that the cost of substance abuse treatment programs demonstrates clear economic benefits (French, Fang, & Fretz, 2010). The overall costs, cost-effectiveness, and cost-benefit analyses associated with treatment interventions provide important information for allocating scarce resources, thereby enabling policymakers, taxpayers, and treatment providers to be more informed about the economic trade-offs of delivering care (Beaston-Blaakman, 2005; French, 2001; Salome & French, 2001).

Several researchers have analyzed the economic costs of substance abuse treatment and its impact. Mark et al. (2007) investigated national spending on treatment and found that in 2003, an estimated $21 billion was devoted to substance abuse treatment (about 17 percent of total mental health and substance abuse expenditures). This amount represented 1.3 percent of all health care spending, which totaled 41.6 trillion in that year.

A CASA (2009) study designed to approximate the cost of treatment to governments indicated negligible spending levels. Of the estimated $81.3 billion that states spent on substance abuse in 1998, only $2.5 billion was spent on treatment (CASA, 2001). In 2005, of the $238.2 billion the federal government spent on substance abuse and addiction, only $5.5 billion (2.3 percent) was spent on prevention, treatment and research. Forty-four percent of this amount ($2.4 billion) was spent on treatment. Moreover, in 2005 states spent just $3.2 billion (2.4 percent) of

their total $135.8 billion on substance-related spending on prevention, treatment and research—which reflects a reduction over 1998 figures (accounting for inflation). Approximately 65 percent of this amount ($2.1 billion) was spent on treatment and 21 percent ($664 million) was tied to unspecified prevention and treatment.

Similar cost-benefit analyses have been conducted in treatment spending to determine the return on investment to society. McCollister and French (2002) performed economic cost-benefit analyses of four in-prison treatment programs located California, Delaware, Colorado, and Kentucky. Treatment costs varied significantly among the four programs due to geographical location, program size, and the variety of services offered. The average weekly cost of these in-prison programs ranged from $37 to $68. Furthermore, the average weekly cost of an aftercare program for offenders in California was estimated to be $181; this figure represents a consideration reduction over community-based modified TC for mentally ill substance abusers, which runs about $554 a week ($79 per day).

Cost-effective analysis (CEA) studies of substance abuse treatment validate the economic benefit of treatment programs, which as discussed have been shown to reduce post-treatment drug use, crime rates and recidivism. Researchers examined three-year outcome data from 394 parolees (291 of those treated; 103 untreated) to ascertain the relative cost-effectiveness of prison-based treatment and aftercare. Findings showed that intensive services were cost-effective when the entire treatment program was completed; the greatest economic savings was linked to higher-risk cases (Griffith, Hiller, Knight, & Simpson, 1999).

Other researchers conducted a CEA of Delaware's CREST Outreach Center, a work release TC and aftercare program for criminal offenders. When the study was conducted, the six-month CREST program cost $1,937 for the average participant, and led to 30 fewer days of

incarceration (29 percent less) in comparison to the average participant in a standard work-release program. This finding indicates that CREST decreased incarceration rates for criminal offenders at an average cost of $65 per day. An added outlay of $935 per client for providing aftercare services resulted in 49 fewer in-prison days (43 percent less) than the CREST work release program. This data suggests that by adding an aftercare component to the CREST work-release program, additional incarceration days are avoided at an average cost of $19 per day (McCollister, French, Inciardi, Butzin, Martin, & Hooper, 2003a).

Similarly, McCollister et al. (2003b) performed a CEA of the Amity prison-based TC and Vista aftercare programs for criminal offenders in California. The authors found that participants who received any in-prison treatment—at an average total cost of $4,122 per prisoner—had 51 fewer incarceration days (a 36 percent reduction); this reflects that treatment reduced recidivism at a cost of $80 per incarceration day. McCollister, French, Prendergast, Hall and Sacks (2004) then extended that study and found that the average cost of addiction treatment and 5-year follow-up period was $7,041for the Amity group and $1,731 for the control group. However, the additional investment of $5,311 in treatment yielded 81 fewer incarceration days (13 percent) among Amity participants relative to control participants, which represents a cost-effectiveness ratio of $65. When considering that a day in prison in California runs about $72 per offender, this study suggests that providing in-prison treatment services, followed by community-based aftercare treatment, is a cost-effective policy tool.

Daley et al. (2004) used data from the Connecticut Department of Corrections and the Connecticut Department of Mental Health and Addiction Services (DMHAS) to compare the cost-effectiveness of four tiers (levels) of substance abuse treatment programs for a sample of 831 offenders who were released during FY1996-1997. They found that offenders who availed

themselves of any of the advanced treatment options (tiers 2, 3 and 4) had significantly lower rates of re-arrest when compared to offenders who attended only the first level of the program or who had no treatment whatsoever—even after controlling for background characteristics that may have differentiated the two groups. The benefits to the State of Connecticut correctional system, measured in terms of the costs of avoided re-incarceration, averaged 1.8 to 5.7 times the cost of implementing the program, ranging from $20,098 (Tier 4) to $37,605 (Tier 2).

Belenko, Patappis and French (2005) conducted a comprehensive CEA of prison-based substance abuse treatment programs and reported that treatment significantly reduces drug use and criminal activities and improves a client's health and post-release prospects. The study also confirmed substantial net economic benefits associated with drug treatment—primarily from reduced crime costs (avoided incarceration and victimization costs) and a post-treatment reduction in health care costs.

Cost-benefit analyses of community-based and prison-based treatment also corroborate that the economic benefits of treatment to society match or exceed the cost of treatment (Farrington, Petrosino, & Welsh, 2001; Flynn, Kristiansen, Porto, & Hubbard, 1999; French et al., 2000). One of the most important economic and social benefits that results from treatment is that clients are less likely to re-engage in criminal activity (Koenig, et al., 2005). Mauser, Van Stelle and Moberg (1994) estimated the costs and benefits—measured in improved criminal justice outcomes, lower medical care expenses and higher employment earnings data—associated with the Treatment Alternative Program (TAP) for criminal offenders in Wisconsin. A comparison of pre- and post-TAP outcomes verified that lower criminal justice costs generated positive economic benefits. Specifically, the economic benefits of decreased criminal activity

were $18-$38 per day, per client, while the average annual benefit per client from reduced criminal activity was $10,687.

French et al. (2000, 2002) also support the economic advantages of treatment programs based on data from the state of Washington. They reported that reductions in crime-related costs associated with clients receiving a full continuum of care (i.e., residential care followed by outpatient services) yielded average benefits of about $14,000 per person, which far exceeds average treatment costs of $2,500.

French (2002) also reviewed the Drug Abuse Treatment Cost Analysis Program and Addiction Severity Index instruments in his cost-benefit analysis of three out-patient drug-free programs in Philadelphia. French assessed benefits over a seven-month period in terms of increased employment earnings, and reduced health services utilization, criminal activity and illicit drug/alcohol expenditures. The average treatment client generated a total annual economic benefit of $9,166. Reduced health services utilization comprised the largest component of economic benefit ($3223 or 35 percent), followed by lower criminal activity ($3,024 or 33 percent).

Koenig et al. (2005) investigated the treatment costs and the long-term economic benefits of treatment using interview data from a sample of substance abusers in Cuyahoga County, Ohio. Data were obtained at 6, 12, 24, and 30 months after the study's onset. According to the researchers:

> We find positive benefits from substance abuse treatment, almost of all of which were derived from reduced criminal activity and increased real earnings, with overall benefit-to-cost ratios ranging from 2.8 to 4.1. The reductions in costs to society were found to be persistent over the long-term…On average, treatment was found to be cost beneficial

> regardless of the number of times a client entered treatment in the baseline or follow-up periods. Clients who entered residential treatment and then step down to less intensive care showed greater treatment benefits than clients who only received residential treatment. (p. S41)

Another study compared the costs and benefits of juvenile and adult offender programs in terms of reductions in criminal behaviors. The authors examined 16 adult in-prison TCs, 11 of which included aftercare programs. On average, the economic return from the 11 programs with aftercare components ranged from $1.91 to $2.69 per dollar invested (Aos, Phipps, Barnoski, & Lieb, 2001).

Substance Abuse Prevention

A systematic concept of substance abuse prevention is now more than 50 years old and emerged from a public health model (Commission on Chronic Illness, 1957). Within that public health framework, prevention is divided into three categories: primary, secondary, and tertiary. Simply put, primary prevention refers to interventions that will avert new cases of a disease or disorder. Secondary prevention seeks to reduce the rate of identified cases of a disease or disorder in a population. Tertiary prevention focuses on treating those already dealing with the consequences of a disease or disorder, as well as preventing further harm and consequences.

As new information about the etiology of diseases and disorders came to light, the Commission on Chronic Illness' definition of prevention began to evolve. Gordon (1987) developed a preventive model that encompasses universal, selective and indicated prevention efforts. The first is universal measures, meaning that the preventive course of action is appropriate for everyone. The second level of prevention involves selective measures, which corresponds to preventive interventions that are targeted for a specific population of people—the

author used the examples of flu vaccines for the elderly and pregnant women avoiding drugs and alcohol. The third prevention level corresponds to indicated measures, which focuses on individuals who are at risk for a particular condition.

In 1992, the Substance Abuse and Mental Health Services Administration (SAMHSA) established the Center for Substance Abuse Prevention (CSAP) (formerly the Office of Substance Abuse Prevention), whose goal is to "empower individuals to meet the challenges of life by creating and reinforcing healthy behaviors and lifestyles and by reducing the risks that contribute to alcohol, tobacco, and other drug misuse and abuse" (www.SAMHSA.gov). CSAP also developed a comprehensive approach to prevention encompassing six prevention strategies: information dissemination, prevention education, alternative activities, community-based processes, environmental approaches, problem identification, and referral (Hogan, Gabrielsen, Luna, & Grothaus, 2003; VanderWaal, Powell, Terry-McElrath, Bao, & Flay, 2005).

The term "prevention science" was first used in the 1990s by Coie et al. (1993), whose stated goal is to:

> Prevent or moderate major human dysfunctions. An important corollary of this goal is to eliminate or mitigate the causes of disorder. Preventive efforts occur before illness is fully manifested, so, prevention research is focused primarily on the systematic study of potential precursors of dysfunction or health, called risk factors and protective factors. (p. 1013)

Prevention science is a holistic approach that includes a number of disciplines (e.g., mental health, criminology, education, etc.) and is designed to minimize the social and environmental factors that contribute to disease and disorder by minimizing risk factors and maximizing protective factors (Ammerman, Ott & Tarter, 1999; Stormont, Reinke, & Herman, 2010).

Hawkins, Catalano, & Miller (1992) classified risk factors into two categories: contextual factors and individual/interpersonal. Contextual factors "provide the legal and normative expectations for behavior" (p. 65); while individual and interpersonal factors include family attitudes and behaviors about drug use, poor and varying family discipline, family disorganization, lack of family bonding, behavior problems, low academic achievement, association with drug-using peers. As the term implies, protective factors defend individuals from the effects of risk factors. They also have a cumulative effect—the more numerous the protective factors, the lower the risk. Examples of protective factors include the following: positive relationships with family members, peers, and community members, clear and unwavering expectations by family members, peers, and community members, positive attitudes and behaviors (Hogan, et al., 2003), community organization, and social engagement (Battistich, Solomon, Kim, Watson, & Schaps, 1996).

Other perspectives have also been proposed with respect to substance abuse prevention. These prevention models are based on components of various prevention approaches and theories such as the persuasive communications theory (McGuire, 1968), psychosocial development concept (Erickson, 1968), social influence theory (Evans, 1976; Evans et al., 1978), social learning theory (Bandura, 1977), problem behavior theory (Jessor & Jessor, 1977), and peer cluster theory (Oetting & Beauvais, 1987). For example, the psychosocial development concept as described by Erik Erickson (1968) asserts that individual development takes place in a social context, that it is a lifelong process, and that at every stage a person confronts new challenges. Erickson's eight stages of development unfold as an individual progresses through the lifespan, as follows: (1) trust vs. mistrust (infancy, first year); (2) autonomy vs. shame and doubt (infancy, ages 1 to-3); (3) initiative vs. guilt (early childhood, ages 3 to 5); (4) industry vs.

inferiority (middle and late childhood, 6 years to puberty); (5) identity vs. identity confusion (adolescence, ages 10 to 20); (6) intimacy vs. isolation (early adulthood, 20s to 30s); (7) generativity vs. stagnation (middle adulthood, 40s, 50s); (8) integrity vs. despair (late adulthood, 60s and older). Each stage consists of both expected and unexpected developmental challenges that a person must face. According to Erickson, these challenges inherently encompass both increased vulnerability and enhanced potential. The more successfully an individual addresses these stages, the healthier his or her development will be.

Evans and coworkers are noted for proposing the social influence prevention model that focuses on the significance of social and psychological factors in promoting the onset of cigarette smoking; this model has since been expanded to include substance abuse. Simply stated, adolescents turn to drugs as a result of peer and media pressures (Evans, 1976; Evans et al., 1978). These social influences take the form of the modeling of drug use by peers and media personalities, persuasive advertising appeals, and/or direct offers by peers to use drugs (Botvin, 2000).

The three major components of the social influence model are psychological inoculation, normative education, and resistance skills training. Psychological inoculation, based on McGuire's (1964, 1968) persuasive communications theory, systematically desensitizes a person to negative peer pressure while gradually enhancing his or her powers to resist. Normative education proposes that students inculcate behaviors based on the acceptance of peers and society. Resistance skills training implies that students do not on their own have the knowledge or confidence needed to overcome social pressures to use drugs. This training instills the skills needed to recognize and overcome media and peer pressure to engage in risky behaviors (Botvin, 2000).

Bandura's Social Cognitive Theory (1977), formerly known as Social Learning Theory, is linked to four major principles: differential reinforcement, vicarious learning, cognitive processes, and reciprocal determining. According to this theory, people develop expectations and learn behaviors at the cognitive level through modeling and reinforcement (Ewen, 1980; Feldman, 1993). In other words, people develop behaviors by observing others with the expectation that similar outcomes will occur (Ewen). However, once the behavior is learned, it may generate either positive reinforcement (rewards) or negative reinforcement (punishment) (Blackburn, 1993; Feldman, 1993).

Substance Abuse Prevention Domains

As discussed above, drug prevention interventions are designed to minimize risk factors and maximize protective factors. Risk and protective factors exist in five principal domain areas: schools, community, individual, family, and peers.

1. The School-Based Prevention Domain

The major domain for substance use prevention among youth has been the school (Botvin & Griffin, 2003; Botvin & Griffin, 2007). Since drugs have known negative effects on the brain, learning, and academic achievement, schools are natural settings for conducting prevention interventions (Bryant & Zimmerman, 2002; Jeynes, 2002). "The majority of school-based drug prevention programmes are universal interventions designed to reach all students in a particular school or classroom before they have begun using tobacco, alcohol, or other drugs" (Botvin & Griffin, 2007, p. 610)—mainly because they are widely used by both teens and adults (CASA, 2011b).

Over the past three decades, a wide range of prevention approaches has been conducted in school settings—some grounded in theory…some not. These intervention approaches can be

divided into four general prevention strategies: (1) cognitive/information dissemination approaches, (2) affective education, (3) social influences approach, and (4) personal and social skills training (Botvin, 1995; Botvin, 1999; Botvin & Griffin, 2003).

School-based prevention has typically focused on conveying information about the consequences of drug use and abuse. Many of these approaches provide general health information and dramatize the dangers associated with substance—principally by scaring young adults into not using drugs. The underlying assumption is that evoking fear is more effective than simply explaining facts. These approaches go beyond an objective presentation of information and provide graphic messages that using drugs is dangerous (Botvin & Griffin, 2003). However, school-based prevention research has merely delivering information—with or without the fear component—is ineffective and does not markedly change tobacco, alcohol, or drug use behavior among current users; not does it routinely dissuade the uninitiated from starting substance use/abuse (Botvin & Botvin, 1992b).

The affective education strategy is based on the belief people can be dissuaded from using drugs by taking part in programs designed to promote affective development. Affective education approaches, which stress a student's personal and social development, focus on increasing self-awareness and self-acceptance, improving interpersonal relations through enhanced communication skills, peer counseling, encouraging students to seek answers through existing social institutions (Botvin, 1995, 1999).

The social influences approach, as described earlier, teaches teens how to identify and overcome peer and media pressures that promote drug use. Personal and social skills training are based on social learning theory (Bandura, 1977) and problem behavior theory (Jessor & Jessor, 1977). Substance abuse is conceptualized as a socially learned and functional behavior, resulting

from the interplay of social and personal factors. Substance use behavior is learned through modeling and reinforcement and is influenced by cognition, attitudes, and beliefs (Botvin, 1995, 1999).

Personal and social skills training prevention approaches typically teach two or more of the following skills: (1) general problem-solving and decision-making skills, (2) general cognitive skills for resisting interpersonal or media influences, (3) skills for increasing self-control and self-esteem, (4) adaptive coping strategies for relieving stress and anxiety through the use of cognitive coping skills or behavioral relaxation techniques, (5) general social skills, and (6) general assertive skills. These skills are taught using a combination of instruction, demonstration, feedback, reinforcement, behavioral rehearsal, and extended practice through behavioral homework assignments (Botvin, 1995, 1999).

Several wide-ranging school-based prevention models have been somewhat effective in preventing and reducing drug use—for example, the Drug Abuse Resistance Education program (DARE) and the School Program to Educate and Control Substance Abuse (SPECDA). Other prevention models and approaches such as Life Skills Training (LST) and Here's Looking at You interventions are also effective school-based prevention programs.

The DARE curriculum, the most popular and visible school-based drug education program, was developed in 1983 as a joint effort between the Los Angeles Police Department and the Los Angeles Unified School District. The DARE program is delivered primarily to fifth and sixth graders, although there are K-3 and junior high/middle school components as well. The program contains both information dissemination and affective education components, as well as social influence approaches to substance abuse prevention (Botvin, 2000). DARE relies on 17 core areas: personal safety, the harmful effects of drugs and misuse, consequences of drug use,

resisting pressure to use drugs, resistance techniques-refusal strategies, building self-esteem building, assertiveness, managing stress, media influences on drug use, decision making and risk taking, alternatives to drug use, role modeling, support system, consequences of gang activity, summary of the DARE project, stand up for self when pressured to use drugs, and a culminating activity.

The DARE curriculum is taught by uniformed police officers. Officers receive an intensive 80-hour, structured training course that teaches both curriculum content and effective pedagogical techniques. Officers are taught in all their training to "go by the book," and this mandate—coupled with the paramilitary character of police training in general—enhances the probability that officers follow established DARE protocols. Implementing the DARE program requires a good collaborative relationship between the school system and the police department to enhance effectiveness (National Research Council, 1993).

Project SPECDA, which emerged in 1984 shortly after the DARE Program, is a collaborative drug prevention project between the New York City Board of Education and the New York Police Department. Like DARE, Project SPECDA is based on the social influence model. SPECDA's curriculum has 16 lessons, divided equally between its target divided audience of fifth and sixth grade students. Similar to DARE, SPECDA was designed to prevent substance abuse by building students' self-esteem, teaching decision-making skills, and guiding them to resist peer pressure (Delong, 1987).

Another prominent substance-abuse prevention program is Life Skills Training (LST), a universal, school-based prevention approach for adolescent substance abuse prevention. Originally conceptualized by Gilbert J. Botvin to deter adolescents from taking up cigarette smoking (Botvin & Eng, 1980, 1982; Botvin, Resnick, & Baker, 1983; Botvin & Wills, 1985;

Botvin & Griffin, 2005), the model has since been expanded to prevent other forms of substance use/abuse (Botvin & Griffin, 2005). Based on the cognitive-behavior approach, LST is a middle-school curriculum that emphasizes the development of general life and coping skills, including skills and knowledge related to resisting peer influences to use substances (Botvin & Eng; Botvin, Eng, & Williams, 1980). The program, which can be taught by community members, teachers, or peer leaders, consists of three components: (1) substance-specific information and refusal skills training; (2) a personal skills component to improve critical thinking and responsible decision making, help cope with anxiety, and learn principles of self-improvement; and (3) improvement of nonverbal and verbal communication skills for social encounters including dating, conversation, and assertiveness (Botvin, 1996).

The Here's Looking at You program was designed to help young people find responsible ways of dealing with alcohol in their environment through enhanced decision-making skills. The goals of the curriculum are to enhance knowledge about the dangers of excessive drinking, and help them develop self-esteem, coping skills, and better decision-making capabilities (National Research Council, 1993). After the original curriculum was introduced, a modification of the program—Here's Looking at You Two—was integrated into a variety of different subjects. Its objectives were expanded toward helping high school students make responsible decisions regarding the use of alcohol and drugs. The curriculum, which consists of 20 lessons, imparts basic information about alcohol and drug use, as well as helps students express their feelings and understand their values and behavior in relation to alcohol and other drugs. This intervention was adopted in schools throughout the U.S. (National Research Council, 1993).

An additional modification to the program—the Here's Looking at You 2000 intervention—is comprised of 150 lessons to be spread out over grades K-12. The goals are to

provide information on substances, to develop social skills, and to encourage bonding to school, family, and community. The drug education component focuses on the gateway drugs (tobacco, alcohol, and marijuana). Building social skills targets how to make friends and stay out of trouble, and warns students to the risk of having drug-using friends (National Research Council, 1993).

2. The Community-based Prevention Domain

Community-based prevention approaches have emerged as the most viable way of reducing the risk of drug use (Chambliss, 1994; Cheon, 2008). Interestingly, community-based interventions emerged from public health efforts to prevent cardiovascular disease. These programs tend to be grounded in social learning theories, as well as on principles and models of community action for social change (Brown, 1991) and community empowerment (Serrano-Garcia & Bond, 1994).

The concept of community in public health and sociology terms has several divergent meanings. Holder and Giesbreck (1989) defined community as an area with geographic and/or political boundaries that are demarcated as a county, a metropolitan area, a city, a township, a neighborhood, or a block. In a broader definition, Israel (1985) described a community as a place where members have a sense of identity and belonging, and are able to share values, norms, communication, and helping patterns. A community can also be defined in terms of the relationships among organizations and groups within a defined area (Mancini, Martin, & Bowen, 2003).

A comprehensive community-based prevention intervention targets multiple systems and employs multiple strategies in order to reduce a community's risk factors. Further, targeting multiple systems implies the importance of different constituencies (e.g., residents, government

officials, educational institutions, religious community, and business leaders) in addressing substance abuse problems (Anguirre-Molina & Gorman, 1996). Some of the notable components of comprehensive community-based drug prevention programs include the following: (a) community/organizations (Minkler, 1991); (b) parent interventions (Biglan, Ary, Smolkowski, Duncan, & Black, 2000; Stevens, Mott & Youells, 1996); (c) media campaigns/advocacy (Flynn et al., 1994; Vartianen, Paavola, McAlister, & Puska, 1998); (d) involvement of youth in drug-free activities (Gottfredson, Gottfredson, & Weisman, 2001; Jenkins, 1996; YMCA of USA, 2001); (e) coalition building (Butterfoss, Goodman, & Wandersman, 1993); (f) involvement of government and law enforcement (Aguirre-Molina & Gorman, 1996); and (g) advocacy for public policies that influence the availability and marketing of drugs (Aguirre-Molina & Gorman, 1996).

The empirical evidence also suggests that incorporating comprehensive community-based strategies to existing classroom-based school programs can enhance overall reductions in substance use (Donaldson, et al., 1996; Ellickson, 1999; Flay, 2000), with significant secondary benefits to communities. According to Penz (1999), combining a school-based prevention program with community prevention activities has several practical advantages. First, a community will typically have more programmatic and monetary resources to draw on in comparison to a school (or even a school district). Second, involving the community in school-based programs has important spinoff effects. In other words, the greater the community's understanding of what and why prevention programs are taught in schools, and how effective programs may decrease the prevalence of drug use, violence, and delinquency in the community, the more likely the community will increase its support of such programs in the form of volunteer time, monitoring public places, and money. Third, efforts that include the community

could potentially reach a larger audience than just school-attending youth. Fourth, involving the community capitalizes on expertise and influences that enable youth to practice substance use avoidance behavior and value activities not involving substance use.

To enhance effectiveness, the implementation of a community-based prevention program should feature several important components. *First*, community must be ready for a community-based prevention program (Allen, 2005; Cann & Markie-Dadds, 2003; Edwards, Jumper-Thurman, Plested, Oetting, & Swanson, 2001; Engstrom, Jason, Townsend, Pokorny, & Curie, 2002; Greenberg & Osgood, 2004; Mancini, Nelson, Bowen, & Martin, 2006; Mihalic, Irwin, Elliott, Fagan, & Hansen, 2001; Miller & Shinn, 2005; Plested, Oetting, & Swanson, 2000; Sanders, Feinberg, Elliott, & Mihalic, 2004; Sandler et al., 2005; Shull & Berkowitz, 2005). *Second*, effective community coalitions must be developed (Allen, 2005; Collins, Murphy, & Bierman, 2004; Feinberg, Greenberg, & Osgood, 2004; Galano, et al., 2001; Sanders, Turner, & Markie-Dabbs, 2002; Shull & Berkowitz, 2005). *Third*, the programming must fit the community (Nation, et al., 2003). *Fourth*, program fidelity must be maintained (Dusenbury & Hansen, 2004; Elliott & Mihalic, 2004; Mihalic et al., 2001; Nation et al., 2003; Pentz, 2004; Sanders et al., 2002). *Fifth*, adequate resources, training, technical assistance, and attention to follow-up evaluation efforts must be ensured (Backer, 2000; Biglan, Mrazek, Carnine, & Flay, 2003; Chinman et al., 2005; Elliott & Mihalic, 2004; Galano, et al., 2001; Kellam & Langevin, 2003; Mihalic et al., 2001; Penz, 2004; Rhatigan, Moore, & Street, 2005; Sanders et al., 2002; Sandler et al., 2005; Stith et al., 2006).

3. <u>The Individual Domain</u>

Drug prevention programs that focus on the individual believe that substance abuse arises out of six risk factors. The first risk factor, biological vulnerabilities, is a concept based on the

belief that some individuals are biologically more susceptible to becoming addicted than others, and that biological markers will eventually be found to identify these individuals so that they can be targeted for specific prevention efforts. Decades of research have implicated the role of genetic factors in the etiology of substance abuse disorder (Milhorn, 1994). To date, most of the studies targeting family patterns, adoption, and twins have specifically examined biological/ genetic risk factors. Majority of these studies involve alcoholism; however, evidence suggests that "inheritance patterns" of other forms of substance abuse may be similar to that of alcoholism (Pickens & Svikis, 1988).

Others studies have sought to determine if substance abuse runs in families. Dick and Agrawal (2008) found that genetic factors influence the risk of alcohol and drug dependence. Moreover, additional studies suggest a genetic predisposition toward one of two typical patterns of alcoholism (Cloninger, Bohman, & Sigvardsson, 1981). Specifically, children born to a biological parent with clinical alcoholism are four to ten times more likely to abuse alcohol in comparison to children whose biological parents have no history of clinical alcoholism—even in cases when the parent had no role whatsoever in that child's upbringing (e.g., children adopted at birth), (National Research Council, 1993).

Adoption and twin studies provide compelling evidence for a genetic risk for alcoholism in both men and women. Studies of male twin pairs identified from birth records (Hrubec & Omenn, 1981) have consistently shown a higher rate of alcoholism in monozygotic twin pairs born to male alcoholics than in dizygotic twins. There is also a significant body of adoption research confirming higher rates of alcoholism among adopted sons born to alcoholic parents compared to control adoptees (Cadoret, 1994; Cadoret, Cain, Troughton, & Heywood, 1995; Heath, Slutske, Bucholz, Madden, & Martin, 1997).

Evidence of a genetic link for alcoholism in women has been comparatively weaker, as evidenced by samples of birth and adoption records. Investigators have reported a significantly elevated risk of alcoholism in the adopted-away daughters of alcoholic parents unrelated to gender (Cadoret, Cain, Troughton, & Heywood, 1985). Findings from twin studies have been similarly inconclusive (Heath, Slutske, Bucholz, Madden, & Martin, 1997).

The second risk factor for an individual is affective regulation, which is grounded in the psychological model (Milhorn, 1994). This concept is based on the belief that individuals use drugs (1) to self-medicate to deal with a variety of problems including depression, anxiety, boredom, loneliness, or (2) as a reflection that substance abuse is a symptom of a primary psychological disorder. Prevention efforts are directed at identifying individuals at risk and providing non-pharmacological treatment for their underlying problems.

The self-medication hypothesis represents the psychoanalytic perspective developed by Khantzian, Mack & Schatzberg (1974), which arose from the main author's clinical experience evaluating and treating heroin addicts. He noted that his addict patients tended to present a history of aggression and derivative problems of rage and depression that long preceded their use of any illegal drugs. He described how many of them reported that using heroin provided relief from dysphoric feelings of restlessness, anger, and rage. Khantzian concluded that a predisposition for heroin use/abuse resulted from problems with aggression, specifically from inadequate ego mechanisms for controlling and directing aggression.

Khantzian (2003) later revisited his self-medication hypothesis and described growing clinical support for the significant relationship between substance use disorders and psychiatric disorders, as opposed to a personality disposition to aggression. The self-medication hypothesis holds that abused substances relieve human psychological suffering in susceptible individuals

and that there is a considerable degree of psychopharmacologic specificity in an individual's preferred drug. Khantzian categorized the various drugs according to their popularity and appeal. Opiates have the ability to calm intense rage, combating it not only internally, but also in external relationships. Central nervous system depressants are short-lived and create the illusion of relief because they temporarily soften the rigid defenses and ameliorate states of isolation and emptiness that predispose to depression. Conversely, stimulants appeal to those who are bored or in need of a boost of energy; however, stimulants are also use for their rebound effect in calming hyperactivity. Marijuana also works as both a stimulant and a calming agent.

The third individual risk factor relates to knowledge deficits. Simply, an individual will use drugs because they do not know about their detrimental effects. This model suggests that if people were aware of the various negative consequences associated with drug use, they would rationally decide to avoid them (Milhorn, 1994). Accordingly, providing students with factual information about drugs and drug use is the most common approach to prevention. Typically, students are taught about the dangers and consequences of tobacco, alcohol, or drug use in terms of the adverse health, social, and legal outcomes. Information programs also define various patterns of drug use, the pharmacology of drugs, and the typical process of becoming a substance abuser. Many of these programs include law enforcement personnel and health professional to describe the pros and cons of drug use. Recently there has been an emphasis on using same-age or older peers to discuss substance abuse. In addition, some informational approaches use moral grounds to dissuade people from drug use because of the demeaning nature of substance abuse. In summary, education programs not only provide factual information about the risks of smoking, drinking, or using drugs, but also exhort them to avoid such behaviors on religious or moral grounds (Botvin & Griffin, 2003; Hogan, Gabrielsen, Luna, & Grothaus, 2003).

The fourth individual risk factor is social/life-skills deficit. Programs based on this model believe that young people use drugs because they have specific social/life-skills problems such as low self-esteem, poor decision-making skills, or poor communication skills, and thus work to correct those deficits (Milhorn, 1994). Social skills play an important role in one's mental, emotional and social development. Basic interpersonal skills are essential for confident, responsive, and mutually beneficial relationships. In fact, they are among the most important skills that an individual must learn since a lack of social competence may lead to rejection and social isolation, which may in turn result in poor psychological adjustment (Botvin & Wills, 1985).

People generally start to develop basic social skills during childhood and then build on them as they mature. By adolescence most will have developed a range of social skills that include being able to engage in conversations, communicating effectively, giving and receiving compliments, refusing unreasonable requests, and expressing feelings. Social skills are learned through a combination of modeling and reinforcement, which highlights the importance of young people having the opportunity to observe and practice them. In addition to acquiring general social skills, it is important that adolescents learn refusal skills that will enable them to resist peer pressure to engage in risky behaviors (Botvin & Wills, 1985).

The fifth individual risk factor is invulnerability. This concept is based on the belief that, although young people recognize the adverse consequences of drug use, they do not believe the risks apply to them (Milhorn, 1994). One approach argues that invulnerability is a result of deficiencies in cognitive development. Accordingly, an feels a sense of immortality, thereby putting them at risk for believing the myth that harmful outcomes are more likely to happen to others (Greene, Kremar, Walters, Rubin & Hale, 2000; Lapsley & Hill, 2010).

The sixth individual risk factor relating to substance abuse is sensation seeking, which is characterized by a drive for intense and stimulating experiences and the willingness to take unnecessary risks to obtain those experiences (Milhorn, 1994). Many high sensation seekers underestimate the risks associated with drug use compared to their low sensation-seeking counterparts; therefore, they are less likely to see drug use as risky (Hoyle, Stephenson, Palmgreen, Pugzles Lorch & Donohew, 2002; Milhorn, 1994; Yanovitzky, 2005). Therefore, drug education/treatment programs with this focus seek to provide alternative "highs" (Hawkins et al., 1992; Milhorn, 1994; Scheier & Newcomb, 1991). Research on adolescents' motivation to use drugs have given rise to theories emphasizing personality traits—in particular sensation seeking—as major factors affecting drug use (Newcomb & Earleywine, 1996). Germane to this factor is the fact that sensation-seeking tendencies typically intensify during adolescence, but then level off in the late 20s, which may in part account for the increased risk for drug use during these years (Hornik et al., 2001).

4. Family Domain

Prevention programs that focus on the family domain view substance abuse in terms of one or more of the following four factors. First, family dynamics consider the risk of substance abuse to be associated with factors such as parental permissiveness or inconsistency, loose family structure, harsh physical punishment, and poor family communication. Therefore, programs with this focus seek to improve parenting skills as a way to avert drug use among adolescents. Second, socialization deficit theorists assert that since the family is the major socialization agent for a child, parents and other older family members are responsible for teaching values such as self-control, self-motivation, and self-discipline. Programs with this focus teach parents ways to structure the home environment to increase the likelihood that children will develop these skills.

Third is the parental modeling factor, which is based on the belief that a child's early notions about drug use are learned by observing how parents behave with tobacco, alcohol, over-the-counter medications, prescription medications, and illicit drugs. The goal of programs based on this concept is to change and improve parental behavior. Fourth is the social control factor, which is grounded in the assumption that parents with substance-using children have abdicated essential parenting responsibilities. Program with this focus seek to get parents to reinstate social control (Milhorn, 1994).

Family relationships are the primary predictors of children's behavior (Kumpfer, Olds, Alexander, Zucker, & Gary, 1998). Interventions that focus on family risk and protective factors are essential for averting substance abuse. Such interventions typically look at family dynamics as they impact the child (Etz, Robertson, & Ashery, 1998). According to researchers, family-related protective factors may be categorized into five broad characteristics that occur in both the home and outside the home (Bry, Catalano, Kumpfer, Lochman, & Szapocznik, 1998). Protective factors within the home include close and supportive parent-child relationships (Brook, 1993; Catalano et al., 1993). Parents that exert positive discipline methods have proven to help children avoid substance use/abuse (Catalano et al., 1993). Protective factors outside the home include monitoring and supervising children's activities and relationships (Catalano et al., 1993; Chilcoat, Dishion & Anthony, 1995; Fletcher, Darling, & Steinberg, 1995). Family involvement in church and school activities is also highly correlated with children who are able to avoid substance abuse (Kandel & Davies, 1992; Krohn & Thornberry, 1993). Finally, parents who are proactive in seeking information for the benefit of their children tend to be more successful in helping their children avoid substance abuse in comparison to those who do not (Nye, Zucker, & Fitzgerald, 1995; Rhodes, Contreras, & Mangelsdorf, 1992, 1994).

On the flip side, negative family dynamics can also increase the risk factors for substance abuse among youth. They include parental rejection and neglect (Shedler & Block, 1990); physical/sexual abuse and exposure to violence (Clayton, 1992; Dembo et al., 1992; Polusny & Follette, 1995); and substance abuse by parents and siblings (Andrews, Hops, Ary, Tidlesley, & Harris, 1993; Merikangas, Rounsaville, & Prusoff, 1992). Other risk factors include positive family attitudes toward substance use (Bahr, Hoffman, & Yang, 2005); lack of attachment to parents at any developmental stage (Bahr, Hoffman, & Yang, 2005); lack of maternal involvement in activities with children (CASA, 2005); and poor supervision or severe disciplinary practices (Chilcoat & Anthony, 1996; Hawkins et al., 1992).

Family prevention interventions have successfully used behavioral, affective, and cognitive approaches to target family behaviors (Ashberry, Robertson, & Kumpfer, 1998). Interventions include the development of healthy parent-child interaction strategies, communication skills, child-management practices, and family management skills (Bry, Catalano, Kumpfer, Lochman, & Szapocznik, 1998). A major factor that distinguishes family-based prevention interventions with positive outcomes from other parenting programs is that they concentrate on skill development rather than on simply educating parents about appropriate parenting practices. Effective programs use interactive approaches for imparting skills to parents and their children, include feedback opportunities, assign homework, and then help family members refine skills that work and modify those that do not (Ashberry, Robertson, & Kumpfer).

Also important is that family members actively participate in substance abuse intervention strategies—both by focusing on the family as a whole and by honing parenting skills. Among the most innovative and effective are those that include parents and children in

individual and group training sessions. In these interventions, work is conducted individually with the parents and the children and then the entire family is brought together to practice the skills and strategies learned in the individual sessions (Ashberry, Robertson & Kumpfer, 1998).

5. Peer Domain

Prevention programs that focus on the influence of peers consider substance abuse to be the result of several factors. The first is conformity—namely, a kid wants to fit in with the crowd (Milhorn, 1994). A number of studies have focused on the negative personal and social consequences of low self-esteem (e.g., self-rejection or loathing), which tend to put an adolescent at greater risk for drug/alcohol dependence (Kaplan & Johnson, 2001). One recent study confirmed that self-derogation and peer approval of substance use independently predicted drug dependence even when early substance use was controlled (Taylor, Lloyd, & Warheit, 2005). Other researchers have hypothesized links between self-derogation, peer relationship and deviant behaviors (Kaplan, 1995; Kaplan & Johnson, 2001). Specifically, they argued that when a young person is rejected by a membership group—and/or when he or she is excluded from a desired group—feelings of rejection are likely to ensue. In an effort to restore a positive sense of self, these individuals may align themselves with alternative groups, including some that may predispose him or her to engage in delinquent behaviors (Taylor, Lloyd, & Warheit, 2005).

A second perspective focuses on peer modeling, which is based on the assumption that drug use is learned from peers (Milhorn, 1994). Theoretically, peer groups represent an important cohort for imparting attitudes and behaviors regarding substance use (Bahr, Hoffmann, & Yang, 2005). In fact, social learning theory suggests that an individual develops attitudes that are either favorable or unfavorable towards drug use in small informal group—principally through imitation and reinforcement (Akers & Sellers, 2004; Bahr, Maughan, Marcos, & Li,

1998). These findings have prompted many to conclude that adolescents who affiliate with substance-using friends are more likely to use substances themselves (Wilson & Donnermeyer, 2006).

Other studies have explored family and peer interactions to determine which has the strongest direct association with adolescent drug use (Hoffman, 1993). Newcomb (1992) referred to this dynamic as a tug-of-war between pro- and anti-drug forces, with the winner having the greater influence on an adolescent's choice to use drugs. Researchers have found consistently that peers have stronger associations with adolescent drug use than family members (Bahr, Maughan, Marcos, & Li, 1998; Brook, Brook, & Richter, 2001; Wills, Mariani, & Filer, 1996).

A well-established body of social learning theory research has confirmed that when adolescents associate with peers who use drugs, they are much more likely to initiate drug use themselves (Andrews, Tildesley, Hops, & Li, 2002; Brook, Brook & Richter, 2001; Crosnoe, Erikson, & Dornbusch, 2002; Hoffman & Cerbone, 2002; Kaplan & Johnson, 2001; Windle, 2000). In fact, related studies confirm that adolescents rarely use drugs if none of their friends use drugs (Khavari, 1993; Moon, Hecht, Jackson, & Spellers, 1999). However, there are selection effects that must be considered (Bahr, Hoffmann & Yang, 2005). In other words, adolescents who use drugs tend to choose friends who use drugs (Bahr, Hoffman, & Yang, 2005).

Effectiveness of Substance Abuse Prevention Programs

Research-based prevention principles have been instrumental in crafting effective prevention programs. A series of literature reviews and meta-analyses have provided key components and characteristics regarding the efficacy of drug prevention programs (Cuijpers, 2002; Gottfredson & Wilson, 2003; McBride, 2003; Midford, 2002; Springer et al., 2004). The

National Institute on Drug and Alcohol Abuse (NIDA, 1997) published a summary of recommendations for key elements of successful prevention programs for children and adolescents, which emphasizes four core principles: (1) using a developmental approach; (2) conducting interventions at the individual, peer, family, and community levels; (3) diminishing the impact of risk factors and enhancing the positive influences of protective factors; and (4) stressing the importance of adapting prevention programs to the unique needs of groups of individuals who are at greater risk. In sum, these ideologies feature programmatic activities involving children and adolescents—but they can also apply to preventing drug use in adults.

One study used a "review-of reviews" approach across four areas and identified specific characteristics that were consistently associated with effective prevention programs: they were comprehensive, included varied teaching methods, they met often and at convenient times for participants, were theory driven, encouraged the development of positive relationships, were socio-culturally relevant, included programmatic evaluations, and involved well-trained staff (Nation et al., 2003). Similarly, Gottfredson and Wilson (2003) investigated the characteristics of school-based substance abuse prevention programs; they argued that targeting middle school-aged children and designing programs that can be delivered primarily by peer leaders will increase the effectiveness of school-based substance use prevention programs. Results also indicate that such program need not be lengthy.

Cuijpers (2003) conducted a systematic literature review examining the characteristics of effective drug prevention programs and identified seven evidence-based quality criteria: (1) the effects of programs should have been proven before wider implementation, (2) interactive delivery methods are exceptional, (3) the social influence model is preferred, (4) the focus should be on committing not to use drugs, (5) adding community interventions increases effects, (6)

peer leaders must be included, and (7) adding life skills to programs is likely to strengthen effects.

Springer et al. (2004) looked at specific characteristics that help explain reductions in 30-day substance use program. The researchers found that the most effective programs for reducing drug use were those that stressed strong behavior life skills development content, emphasized team-building and interpersonal delivery methods, emphasized introspective learning approaches focusing on self-reflection, were based upon a clearly articulated and coherent program theory, and provided intense contact with youth.

Botvin and Griffin (2003, 2007) listed nine components of an effective drug prevention program. It should (1) be guided by a comprehensive theoretical framework that addresses multiple risk and protective factors; (2) provide developmentally appropriate information relevant to the target age group and the important life transitions they face; (3) include material to help young people recognize and resist pressures to engage in drug use; (4) include comprehensive personal and social skills training to build resilience and help participants navigate developmental tasks; (5) provide accurate information regarding rates of drug use to reduce the perception that it is common and normative; (6) be delivered using interactive methods (e.g., facilitate discussion, structured small group activities, role-playing scenarios) to stimulate participation and promote the acquisition of skills; (7) be culturally sensitive and include relevant language and audiovisual content familiar to the target audience, (8) include relevant materials to introduce and reinforce the material; and (9) provide comprehensive interactive training sessions for providers to generate enthusiasm, increase implementation fidelity, and give providers a chance to learn and practice new instructional techniques.

Drug prevention models and science-based approaches have also been analyzed to determine the effectiveness of drug prevention programs. A significant body of research has examined the effectiveness of social influence approaches to reduce or prevent drug use behavior (Luepker, Johnson, Murray, & Pechacek, 1983; Perry, Killen, Slinkard, & McAlister, 1983; Telch, Killen, McAlister, Perry, & Maccoby, 1982). One such programmatic example is DARE, which has been a widely used program for preventing tobacco, alcohol, and other illicit drug use behavior in schools. However, the DARE Program has been the subject of considerable debate. Even though studies have reported the program's positive impact on drug-related knowledge, attitudes, social skills, these outcomes did not have any significant impact on drug use behavior.

In a study of fifth and sixth grade DARE students in North Carolina, researchers observed a significant positive impact on student attitudes towards avoiding drugs, their assertiveness, their knowledge of the costs associated with drugs and media pressures, and their understanding of peer influences (Ringwalt, Ennett, & Holt, 1991). Similarly, Harmon's (1993) study of the DARE program in Charleston County, South Carolina, found positive effect on reduced alcohol use, beliefs in prosocial norms, reduced association with drug using peers, desirable attitudes towards substance use, and increased assertiveness.

Conversely, the research has also shown that the DARE program has produced disappointing results (Clayton, Cattarello, & Johnston, 1996; Dukes, Ullman, & Stein, 1996; Rosenbaum & Hanson, 1998). For example, West & O'Neal (2006) evaluated the effectiveness of Project DARE in preventing alcohol, tobacco, and illicit drug use among school aged children and found that the DARE program was ineffective. Similarly, Faine's (1989) assessed the attitudes of 400 inner-city youth in Nashville (TN) and found no support for the effectiveness of the DARE curriculum in changing peer resistance or positive attitudes toward drugs. Moreover,

the DARE students had significantly more negative attitudes toward the police than the non-DARE students at post-test

Overall, studies of the effectiveness of the cognitive-behavioral approach to substance abuse prevention have proven to reduce drug use. Botvin et al. (2000) examined longitudinal follow-up data from a large-scale randomized prevention trial to determine the extent to which participation in a cognitive-behavior skills-training prevention program resulted in drug-use reductions in comparison to untreated controls. Results indicated that students who took part in the prevention program during junior high school reported less use of illicit drugs than the control students.

Studies also support the long-term effectiveness of the Life Skills Training (LTS) program, a cognitive-behavioral approach developed by Dr. Gilbert J. Botvin. Specifically, Botvin and his colleagues examined data from a large-scale randomized prevention trial to determine whether participation in a cognitive-behavioral skills-training prevention program led to less illicit drug use. Their findings showed that students who received the Life Skills Training during junior high school reported less use of illicit drugs in comparison to untreated controls (Botvin, Griffin, & Diaz et al.; 2000). Their data also indicated that illicit drug use can be prevented by targeting the use of gateway drugs such as tobacco and alcohol.

Botvin, Griffin, Diaz and Ifill-Williams (2001) investigated polydrug outcome measures also found that LST prevention approach can significantly decrease polydrug use. Similarly, studies testing the effectiveness of the competency enhancement approach have repeatedly demonstrated prevention effects on polydrug use on the order of 30 to 80 percent (Botvin, Baker et al., 1995; Botvin, Epstein, Baker, Diaz & Ifill-Williams, 1997).

Fiscal Impact of Substance Abuse Prevention Programs

A number of cost-benefit studies that target the potential benefits of school-based prevention programs confirm that their advantages far surpass their costs. An investigation of the cost-effectiveness of school-based prevention programs whose goal is to reduce cocaine consumption produced persuasive results (Caulkins, Rydell, Everingham, Chiesa, & Bushway, 1999). Even though the researchers acknowledged some ambiguity about the extent of the programs' effects, they concluded that model school-based prevention programs could reduce cocaine use more cost effectively than ensuing enforcement programs. Additionally, those cost-benefit analyses confirmed that the many advantages of reduced cocaine usage would very likely surpass the financial costs of implementing those programs.

The Washington State Institute for Public Policy (2004) conducted out a systematic study to ascertain the actual value for each 2003 taxpayer dollar allocated for drug abuse prevention or early intervention programs for youth. The study concluded that some prevention and early intervention programs for youth were cost effective—that is, credible data confirmed that well-implemented programs based on viable research could achieve significantly more benefits in comparison to their costs. As an example, the state's investments in programs for juvenile offenders returned the highest net benefit with programs yielding from $1,900 to $31,200 per youth. Additionally, home visitation programs designed to assist high-risk and/or low-income mothers and children returned from $6,000 to $17,200 per youth.

Researchers have looked at school-based drug prevention programs in the United States from an economic and social policy perspective (Caulkins, Pacula, Paddock, & Chiesa, 2002, 2004). The authors stated that the social benefits per student that result from reduced tobacco, alcohol, cocaine, and marijuana use (approximately $840) appeared to outweigh the economic

costs of running the programs, which averaged $150 per participant. Furthermore, even though the benefits tied to reduced cocaine use alone exceeded costs by about $300, results were less dramatic with marijuana use—specifically, only about $20. The researchers also calculated the distribution of benefits associated with school-based drug prevention programs across four drugs (alcohol, cocaine, marijuana, and tobacco). The largest segment of social cost savings associated with prevention was linked to reductions in alcohol (31 percent) and tobacco use (43 percent), followed by reductions in cocaine use (22 percent) and at a much lower level—marijuana use at 4 percent. (Other drugs (e.g., methamphetamines) were not examined. In sum, the authors estimated the benefit of drug-use prevention would range from 26 to 33 percent. It should be noted that two-thirds of the benefit of prevention would still be accrued by reductions in alcohol and tobacco use. To conclude, the authors argued that even though prevention is cost-effective for reducing alcohol, marijuana, tobacco and cocaine use combined, it would still be cost-effective if methamphetamine use were added to the list.

Miller and Hendrie's (2009) study on behalf of the Substance Abuse and Mental Health Services Administration (SAMHS), Center for Substance Abuse Prevention, reported that the average cost of effective school-based programs in 2002 averaged about $220 per pupil, which represented the cost of materials and teacher training. However, it is estimated that these programs could result in a savings of $18 per $1 invested if implemented nationwide. In fact, the wider implementation of effective substance abuse programs in schools would have saved state and local governments $1.3 billion (in 2002 dollars), including $1.05 billion in educational costs in just two years. Moreover, had they been instituted nationwide, such programs would have reduced the social costs of substance abuse-related medical care, other resources, and lost

productivity over a lifetime by an estimated $33.7 billion, as well as resulted in lifetime "quality of life savings" valued at $65 billion.

Despite the growing body of scholarly evidence confirming the value of substance abuse prevention programs and their enormous cost-savings potential, governments have invested comparatively limited resources in this area. CASA (2001) estimated that in 1998 states spent $81.3 billion on substance abuse and addiction—of which only $513.3 million (17 percent) was allocated to substance abuse prevention. In a subsequent study, CASA (2009) revealed that of the $238.2 billion in federal dollars spent on substance abuse and addiction in 2005, $1.6 billion (28.1 percent) was spent on prevention. During this same period, states spent only $418 billion (13 percent) nationwide on substance abuse prevention. As a result, Joseph A. Califano, Jr., Founder and Chairman of CASA, urged governments to make key investments in prevention, suggesting that America's failure to do so has contributed to the current economic crisis governments now face.

Economic Development

In addition to traditional approaches for reducing reduce drug abuse and related crime through drug abuse prevention and drug abuse treatment strategies, the recent literature suggests that a combination of approaches may be more effective in minimizing the drug use and violent crime relationship. In particular, strategies that collectively build on traditional approaches (e.g., substance abuse prevention and substance abuse treatment) to reduce substance abuse and addiction and simultaneously address social determinants of health (SDH), are proven to be the most effective approaches to mitigating the drug use and crime relationship (Alberta Health Services, 2009; Loxley, Tourmbourou, & Stockwell, 2004).

Social determinants of health are defined by the World Health Organization's (WHO) Commission on Social Determinants of Health (CSDH) (CSDH, 2008) as, "The conditions in which people are born, grow, live, work and age, including the health systems that support them." According to the Commission, these determinants are inherently unequal:

> The poor health of the poor, the social gradient in health within countries, and the marked health inequities between countries are caused by the unequal distribution of power, income, goods, and services, globally and nationally, the consequent unfairness in the immediate, visible circumstances of people's lives – their access to health care, schools, and education, their conditions of work and leisure, their homes, communities, towns, or cities – and their chances of leading a flourishing life. This unequal distribution of health-damaging experiences is not in any sense a "natural" phenomenon but is the result of a toxic combination of poor social policies, unfair economic arrangements, where the already well-off and healthy become even richer and the poor who are already more likely to be ill become even poorer, and bad politics. Together, the structural determinants and conditions of daily life constitute the social determinants of health. (CSDH, 2008, p.1)

The concept of addressing SDH focuses on improving economic and social deficits that impact the health of people in neighborhoods or communities. Two important components of this approach involve mechanisms for advancing economic development/growth and educational attainment factors, both of which have important implications for the following outcomes: reduced income/poverty levels, improved graduation rates, increased employment rates, and improvements in the physical/built environment. When these factors are addressed in

cooperation with traditional drug abuse prevention and treatment strategies, they play a crucial role in reducing drug use and crime (CSDH, 2008; Tarlov, 1999).

Local and state governments, private sector firms, local nonprofit organizations, and community members are all important contributors to economic development/growth in communities, whose main goal is to create new opportunities for investment in high risk areas. Porter (1997) stressed how governments have a continuing vital role for economic development—a role focused not only on direct intervention (for example, by providing financial incentives to attract companies), but also on creating a favorable environment for new and existing business (e.g., creating safe communities free from illicit drugs and violence, improving the public school system, developing workforce, upgrading infrastructure, etc.). A recent illustration of this was documented by Hyra (2008), who reported how public/private partnerships have contributed to the revitalization and transformation of Harlem in New York City and Bronzeville in Chicago, both of which were once plagued by crime, drugs, dismal poverty and other economic and social ills. Specifically, as a result of both public and private economic investment, these neighborhood have been transformed into increasingly safe and desirable neighborhoods, characterized by new business/employment opportunities, improved infrastructures, and reductions in crime and drugs in areas that were once all but lost.

What is Economic Development/Growth?

There is no single definition that incorporates all of the diverse components of economic development; nor do different constituencies define it in the same way. A public official may view economic development in terms of expanded tax revenues and employment opportunities for its citizens, while a business leader may think of it in relation to workforce development and increased competitiveness (Fitzgerald & Leigh, 2002; Malizia & Feser, 1999). In yet another

interpretation, a chamber of commerce official may define economic development as the number of new businesses opened or existing businesses expanded (Fulknier, 1992).

The American Economic Development Council (AEDC), a professional organization originally dedicating to revitalizing communities as vibrant places to live and to conduct business, defined economic development as "The process of creating wealth through the mobilization of human, financial, capital, physical and natural resources to generate marketable goods and services" (AEDC, 1984, p. 18). Now called the International Economic Development Council (IEDC), which is a non-profit membership organization dedicated to preparing economic development professional to perform effectively in their jobs, it typically defines economic development in terms of objectives.

IEDC noted that economic development comprises three critical areas: (1) policy development and implementation to meet comprehensive economic goals including inflation control, increased employment, and sustainable growth; (2) policy development and programs implementation to provide public services (e.g., providing access to health care to the economically disadvantaged population); and (3) policy development and program implementation to improve the business climate through a variety of approaches (e.g., neighborhood development, business retention and expansion, technology transfer, real estate development, etc.).

Similarly, other researchers define economic development as the process whereby local governments, local businesses, and/or community-based organizations foster and maintain business activity and/or employment (Blakely & Bradshaw, 2002; Fitzgerald & Leigh, 2002; Markley, 2004). The principal goal of local economic development is to promote local employment opportunities in areas that enhance the community using existing human, natural,

and other resources (Blakely & Bradshaw; Blakely & Leigh, 2010; Todaro & Smith, 2003). Although nuanced in terms of specifics, these definitions all point to business creation, retention and expansion, wealth creation, and employment/job opportunities.

Role of Government in Economic Development/Growth

The research suggests diverse opinions regarding a government's role in economic development (Koven, 2003). In fact, there is no agreement on when or how governments should intervene in the private sector—or if governments should intervene at all. Therefore, varying perceptions of the role of government in economic development have led to contrasting reports. For example, Bradshaw and Blakeley (1999) and Bartik (2004) argued that economic development programs differ by state, which is not unexpected since the political and economic environment of a place can have consequential impacts. Indeed, state governments play a critical role in local economic development, mostly because a state's fiscal, regulatory, and other policies have traditionally guided local economies. Tabellini (2005) reviewed a large body of empirical research on the role of the state in economic development and concluded that good governmental policies are essential to economic attainment. Similarly, a Georgia statewide poll regarding economic development practices found that 82 percent of respondents either agreed or strongly agreed that promoting quality economic development was a vital role of state governments (Fiscal Research Program, 1998).

Interest is increasing about the impact of state policies on local economic growth—particularly in urban settings. Aronson and Shapiro (1980) from Public Technology, Inc. investigated the effects of increased state involvement in the economic development of large cities; their primary goal was to determine how large cities are impacted as a result of the increased state involvement in local economies. Specifically, PTI survey of economic

development professionals in 23 large cities and urban counties found that 80 percent of the urban government officials stated they would support an increased state role in the urban economic development

With increased global competition, state governments have found themselves playing a new role in economic development. As such, many states are increasingly focused on the new "knowledge economy" that targets collaborative partnerships between higher education institutions and state governments to enhance economic development. Shaffer and Wright (2010) suggested that, "A new paradigm may be emerging that will help state governments attract and retain new industries, create jobs, and grow their economies. During the 20th century, economic development at the state level tended to focus on incentives, financial packages, cost comparisons, labor policy, infrastructure systems, and so on. In contrast, the 21st century paradigm is shifting toward putting knowledge first. For states, this means that officials are enlisting academic expertise to help them craft and drive economic development strategies."

At the local level, city and county officials are turning to state and federally-funded programs to aid in their efforts to increase local employment/job opportunities, decrease the unemployment rate, and to enhance the tax base. Examples of such economic development programs include (a) revitalizing a downtown or industrial area to attract business development; (b) marketing an area as a premier location for industrial facilities and corporate offices; (c) assisting with existing business expansions; (d) providing tax incentives to businesses; (e) providing government loans or grants to attract new businesses; (f) creating workforce development training tailored to specific business needs; (g) encouraging and supporting small businesses start up or expansion (Bartik, 1995).

As noted, although the varying nature of local governments inevitably impacts their goals and economic development outreach, these efforts are largely directed at increasing local jobs. A survey of elected officials in cities of over 100,000 in population conducted by the National League of Cities (NLC) concluded that the top priority for local economic development is increasing jobs (48 percent) (Furdell, 1994). Similarly, a National Council for Urban Economic Development (1993) survey also found that jobs creation was the essential criteria for economic development. Related to jobs creation is increasing the local tax base, which was identified as the second most important goal of most local economic development efforts (Furdell, 1994).

Others view the role of local governments in economic development in terms of enhancing infrastructure development and providing quality services and amenities. For example, in a study of local economic development goals and policies in cities across Canada and the U.S., Reese and Rosenfeld (2004) found that policymakers in U. S. cities of greater than 10,000 tended to stress the importance of investing in infrastructure (roads, sewer, water, parking, etc.), which is crucial to attract new economic development investments. The second most desirable economic development activity in U.S. cities relates to investments in downtown streetscapes and beautification projects, which are important elements to stimulate downtown development, and to improve its appearance and perception to attract new business investments.

Loboa and Kraybill (2005) examined the role of counties in economic development and public service activities. Their national survey of county governments in both metropolitan and rural areas reinforced their importance in promoting local economic activities. They also found, however, that non-metro counties are faced with significant challenges that limits their ability to provide public services—which of course, has implications for how effective rural areas can be in stemming/treating substance abuse and controlling drug-related violence.

It should be noted, however, that the research also suggests that counties play an important collaborating role with respect to economic development for county-wide and adjoining towns and municipalities (Cigler, 1993; Morgan, 2009; Reese, 1994). Similarly, Kane (2004) argued that government economic development initiatives with a regional approach are more effective in improving economic growth over time.

Economic Development/Growth and Its Relationship to Crime, Poverty, Income Inequality and Unemployment

Numerous studies have been conducted to examine the complex relationships between economic development/growth and crime, poverty, income inequality and unemployment. Interestingly, the empirical research supports a contradictory relationship between economic development/growth and crime. Many studies have shown that economic development plays a critical role in reducing crime (Levitt, 1999; Sala-i-Martin, 1997). Specifically, as development increases, violent crimes such as homicides decrease, while theft-related crimes have shown to increase (Bennett, 1991). Li's (1995) investigation of the relationship between unemployment and homicide rates supports this finding; he suggests that economic development will offset the potential for violent behavior and thus reduce murders. This association is not universally supported, however. Other studies (e.g., Messner (1982a) have shown no relationship between development activities and violent crime (including homicide).

The relationship between economic development/growth and poverty has also produced conflicting empirical results. In order to measure poverty, the U.S. Census Bureau "uses a set of money income thresholds that vary by family size and composition to determine who is in poverty. If a family's total income is less than the family's threshold, then that family and every

individual in it is considered in poverty" (obtained from: http://www.census.gov/hhes/www/ poverty /about/overview/measure.html).

Based on that generic indicator, several studies have reported an inverse relationship between economic development/growth and poverty (Allen & Stone, 1999; Haines, 2001; Triest, 1998). In fact, many have noted that as economic development/growth increases in a given region, the number of families living in poverty decreases (Cashin et al., 2001; 2000; Khan, 2000; Pfeffermann, 2001). In contrast, other studies have failed to show a significant relationship between economic development and poverty (Deaton, 2001; Ravallion, 2001).

There is substantial body of literature that, for the most part, indicates a positive relationship between poverty and certain types of crime, such as property crimes and robberies (Allen, 1996; Glaeser & Sacerdote, 1999; Levitt, 1999) and violent crimes such as assaults (Crutchfield et al., 1982). Conversely, the poverty-crime association, has not proven to be true with homicide rates (Crutchfield et al., 1982; Messner, 1983). The connection between income inequality (e.g., the unequal distribution of income), and crime also provide conflicting results. While several investigators have argued in favor of a positive association between inequality and crime (Arvanites & Asher, 1998; Fowles & Merva, 1996), another study of inequality found a strong link to violent crime, but no effect on property crime (Kelly, 2000). Other reports have shown insignificant results between inequality and crime (Allen, 1996; Doyle et al., 1999; Ehrlich, 1996; Patterson, 1991).

Studies of the relationship between unemployment (i.e., the number unemployed as a percentage of the labor force) and crime have also produced some skepticism about causal linkages between the two (Chisholm & Choe, 2005). Some reports have shown a positive, and sometimes moderate, relationship between unemployment and crime (Agell & Nilsson, 2003;

Fougere, Kramarz, & Pouget, 2006; Hale & Sabbagh, 1991), while others did not show a significant association between the two (Box, 1987).

Svirdoff and Thompson (1983) interviewed offenders during and after incarceration from prison and showed correlation between unemployment and crime. That is, the preponderance of interviewees was unemployed during the time of their incarceration. In terms of specific types of crime, some studies have described a positive relationship with unemployment and property crime, but a negative relationship with violent crime. Long and Witte (1981) studied the impact of crime and variables such as employment and unemployment and reported a positive, but insignificant, relationship between the level of unemployment and criminal activity—with the exception of property crime.

Other crime-specific studies are also worth noting. After reviewing the findings of 63 unemployment-crime studies, Chiricos (1987) argued in favor of a positive (in fact, frequently significant) unemployment-crime relationship with property crime. However, unemployment had a weak relationship to violent crime. Raphael and Winter-Ebmer (2001) analyzed the effects of unemployment on the rates of seven felony offenses and identified a significant positive effect of unemployment on property crime rates; however, the linkage between joblessness and violent crime was considerably weaker.

Conversely, other researchers have been unable to significantly correlate unemployment rates with crime. While Wilson & Cook (1985) acknowledge some truth to the unemployment rate and crime relationship, their overall findings is that unemployment rates have resulted in insignificant rates of crime. In a third "camp," Cantor and Land (1985) indicated both a negative and positive effect of economic activity related to unemployment and crime.

Education

Substance use amongst adolescents remains a devastating and persistent concern for parents, educators, and lawmakers—not only for its personal toll, but also for its association with reduced educational outcomes and compromised professional prospects (Day & Newburger, 2002; Maggs, Schulenberg, & Hurrelmann, 1997; Odgers et al., 2008). Substance use inevitably leads to academic underachievement and therefore lasting negative consequences for individuals, families, and society at large (Henry, Knight, & Thornberry, 2012). The failure to achieve academically also contributes to reduced health prospects (Muennig, 2005; Woolf, 2007), dependence on public aid (Waldfogel, Garfinkel & Kelly, 2005), substantially lower earnings over one's lifetime (Rouse, 2005), and an increase in the probability of involvement in criminal activities and subsequent incarceration (Moretti, 2005).

Cigarettes, marijuana, and alcohol represent the substances most widely used and abused by adolescents (CASA, 2011b). Although other "harder" substances—e.g., cocaine, inhalants, and narcotic—are less likely to be used (especially during early adolescence), young adults are not immune to their ready availability (Bachman, O'Malley, Schulenberg, Johnston, Freedman-Doan & Messersmith, 2008). The National Youth Risk Behavior Survey indicated that, nationwide, 6.4 percent of students had used some form of cocaine (e.g., powder, crack, or freebase) at least once, 2.5 percent of students had used heroin one or more times, and 4.1 percent of students had used methamphetamines at least once (Centers for Disease Control and Prevention, 2010). It should be noted that the average age at which teens begin using one or more of these substances is between 13 and 14 years of age (CASA, 2011a). While any substance use is hazardous during adolescence, early use ratchets up the likelihood of using other drugs, as well as increases the risk of addiction (CASA).

Fortunately, quantitative data concerning substance use among adolescents indicate that since 1999 there has been a drop in the percentage of high school students who have ever used illicit drugs, (CASA, 2011a)—except in the case of heroin use. *Monitoring the Future* (Johnson, O'Malley, Bachman, & Schulenberg, 2010), a long-term study of American adolescents, college students, and adults up to age 50, reported the following changes in cocaine, crack, amphetamine and methamphetamine use among students in grades 8, 10, and 12 (combined) between the years 2008 and 2009: (a) the lifetime prevalence of cocaine use fell by 0.6 percent, from 4.8 percent to 4.2 percent; (b) crack use fell by 0.2 percent, from 2.2 percent to 2.0 percent; (c) amphetamine use fell by 0.2 percent, from 8.6 percent to 8.6 percent; and (d) methamphetamine use fell by 0.5 percent, from 2.5 percent to 2.2 percent. In contrast, the lifetime prevalence of heroin use increased by 0.1 percent between 2008 and 2009, from 1.3 percent to 1.4 percent. (Note: any apparent inconsistency between the change estimate and the prevalence estimates for two years is due to rounding).

Despite overall declines in most forms of substance use among young adults as a whole (Johnston et al., 2012), rates for smoking, drinking and other illicit drug use among students remain unacceptably high (Centers for Disease Control and Prevention, 2000b). According to the Substance Abuse and Mental Health Services Administration (SAMHSA, 2000), about 13.2 million 12 to 17-year olds annually try tobacco, alcohol, marijuana, or other illicit drugs. This figure represents over 4.9 million new smokers; 3.3 million new drinkers; 1.6 million new users of marijuana use; and 3.3 million new users of other illicit drug use such as cocaine or heroin, prescription medications, and inhalants (CASA, 2001a). The National Household Survey on Drug Abuse (NHSDA) (SAMHSA, 2010) reported that among youth aged 12 to 17, illicit drug

use increased from 9.3 percent in 2008 to 10.0 percent in 2009. Among youth aged 16 and 17, the rate increased from 15.2 percent to 16.7 percent.

Disturbingly, adolescents' substance use is not limited to a single drug. In fact, the majority of high school students (75.6 percent, 10.0 million) have tried one or more addictive substances, and by the 12th grade that figure escalates to 82.3 percent (CASA, 2011b). Moreover, a substantial proportion of adolescents report that they have encountered drugs or their use while at school. Recent studies indicate that 9.5 million high school students and nearly 5 million middle school students attend schools where drugs are used, kept and sold (CASA, 2001a; CASA, 2001b).

Studies on adolescent drug use have also investigated differences based on type of institution. For example, it is more likely for public school students to report illicit drug use in their schools than students attending either private secular schools or private religious schools (CASA, 1999). Figlio and Ludwig (2000) examined the effects of private religious education on adolescent non-market outcomes using micro-data from the National Education Longitudinal Survey of 1988; the researchers found that these institutions were successful in reducing use of hard drugs (cocaine) among teens. Moreover, CASA (2001b) found that two-thirds (65 percent) of Catholic and other religious-based school students were drug free compared to 42 percent of public school students. Finally, the National Center for Education Statistics (1996b) found that secondary school teachers in public schools cited alcohol use as a serious problem in larger percentages compared to private school teachers (19.6 percent vs. 12.4 percent). Even more striking, more than three times as many public school teachers cited drug abuse as a serious problem compared to private school teachers (17.1 percent vs. 5.1 percent).

A significant body of research has looked at locational differences as well, with rural youth tending to engage in substance use at rates greater numbers than their urban counterparts (Lambert, Gale, & Hartley, 2008; National Center on Addiction and Substance Abuse, 2000; SAMHSA, 2004; Scheer, Borden, & Donnermeyer, 2000). This finding may be counterintuitive, since a rural setting tends to be linked to peaceful simplicity and picturesque landscapes where children play safely and are protected from urban crime and problems (Pruitt, 2009). This portrait, however, lacks legitimacy. Rural areas are faced with mounting social ills that have devastating impacts on children and families. For example, poverty rates in rural places have historically surpassed urban locales (Economic Research Service, 2006; Edelman, 2002; Skerratt, Chapman, & Shucksmith, 1996); rural youth tend to have lower educational attainment than urban or suburban youth (Haller & Vickler, 1993; Rojewski, 1996); and rural children and families tend to have fewer resources (e.g., police protection) against drug gangs, substance abuse, vice and organized crime, violence and hate crimes (Pruitt, 2009; Weisheit, Falcone, & Wells, 1994).

The problems of youth drug use in both rural and urban areas have been extensively investigated. In terms of comparative data, rural youth are not only more likely to abuse tobacco and alcohol (SAMHSA, 2000, 2002; U. S. Department of Health and Human Services, 2000), they also use illicit drugs such as cocaine and methamphetamines at higher rates than urban youth (Lambert et al., 2008; Mink, Moore, Johnson, Probst & Martin, 2005). CASA's *No Place to Hide: Substance Abuse in Mid-Size Cities and Rural America* (2000a), a study commissioned by the U. S. Conference of Mayors, reported that rural eighth graders were 104 percent more likely to engage in amphetamine use (including methamphetamines) and 50 percent more likely to use cocaine in comparison to urban eighth graders. Marijuana and alcohol were also more

prevalent in rural communities. The same rural-urban differences appeared for tenth graders as well in that rural students used cocaine, amphetamines, barbiturates, inhalants, hallucinogens, LSD, heroin, steroids, tranquilizers and tobacco more frequently than students in large metropolitan areas. The only two substances used with greater regularity by urban tenth graders were MDMA (Ecstasy) and marijuana. Among twelfth graders, substance use rates in rural areas exceeded those in large metropolitan areas for cocaine, amphetamines, barbiturates, inhalants, crack, tranquilizers and tobacco; in contrast, use of marijuana, hallucinogens, LSD, MDMA, and steroids was higher in large metropolitan areas.

The health effects of illicit substance use among adolescents can be catastrophic. During adolescence the reward pathways in the brain are continuing to develop; thus, an adolescent's brain is more easily impacted by external stimuli, including exposure to addictive substances. A growing body of evidence indicated that this increased sensitivity has physiological consequences. In terms of drugs, addictive substances physically alter the reward centers of the brain more rapidly and intensely in adolescents than in adults, increasing their vulnerability to addiction (CASA, 2011b).

Addictive substances also negatively impact cognitive functioning at great peril to the user. Possible consequences include permanent or temporary deficits in attention, memory, and learning, as well as impaired decision-making and other functions related to academic performance. In other words, since addictive substances impair the judgment of adolescents, they are at increased risk for engaging in risky behaviors—including the continued use of addictive substances despite negative consequences (CASA, 2011b).

Studies of chronic users of substances such as cocaine and methamphetamines overwhelmingly point to resulting deficits in cognitive functioning, including decision-making,

response inhibition, planning, abstraction, memory, and attention (Fernandez-Serrano, Perales, Moreno-Lopez, Perez-Garcia, & Verdejo-Garcia, 2012; Jovanovski, Erb, & Zakzanis, 2005; Nordahl, Salo, & Leamon, 2003; Price et al., 2011; Scott et al., 2007; Simon, Domier, Sim, Richardson, Rawson & Ling, 2002; Stavro, 2012). For example, Jovanovski and coworkers (2005) conducted a meta-analysis involving 481 cocaine users and 586 healthy normal controls to determine the type and magnitude of specific cognitive deficits resulting from cocaine use. The most significant deficits were associated with attention span, although moderate to large effects were also obtained from tests of visual and working memory. Smaller effect sizes were obtained on tests of verbal fluency and other language functions and sensory-perceptual functions.

Similarly, van Gorp et al. (1999) administered a sequence of memory and mood measures to 37 cocaine abusers at various intervals (within 72 hours of last prior use and at 10, 21, and 45 days of abstinence) as well as to 27 control subjects. The authors documented a lasting detrimental effect on a sensitive nonverbal declarative memory task in cocaine-dependent subjects following abstinence of 45 days. In contrast, the researchers noted sustained improvement on a motor learning test in cocaine abusers after 45 days without the drug relative to controls.

Dean, Hellemann, Sugar, & London (2012) recently tested the hypothesis that methamphetamine use interferes with both the quantity and quality of an individual's education by undermining general cognitive functioning while in school and resulting in fewer total years of education. In their study, 36 methamphetamine-dependent participants and 42 drug-free comparison subjects completed cognitive tests and self-report measures. Based on performance scores, the authors confirmed that the drug users had higher levels of cognitive impairment;

additionally, the earlier an individual started using methamphetamines, the fewer years of education he or she was likely to have completed.

Conversely, other studies have failed to identify cognitive deficits among users of certain types of drugs (Bolla, Rothman, & Cadet, 1999; Gillen, Kranzler, Bauer, Burleson, Samarel, & Morrison, 1998). O'Malley, Adamse, Heaton, & Gawin (1992) compared 20 cocaine users—70 percent of those free-basers—with age- and education-matched controls on a number of neuropsychological battery tests. They found that more than half of the cocaine abusers fell within the impaired range, with poorer performance on verbal memory, complex attention, and concept formation tasks in comparison to the control group. Interestingly, the cocaine abusers performed better on an oral fluency task.

A later study (Hoff and workers, 1996) tested whether cognitive measures of metabolic and electrophysiological activity associated with the frontal and temporal regions of the brain are impaired in crack cocaine users relative to non-drug users. They compared 38 individuals with an average of 3.6 years of crack cocaine use and 24.5 days of abstinence to 54 control participants on a series of neuropsychological tests. Resulting data were mixed with respect to executive/frontal functioning outcomes, with worse performance associated with cocaine usage on measures of brain dysfunction but better performance on card sorting tests and word association tests. Overall, the study indicated that repeated crack cocaine use produces a dissociative pattern in neuropsychological test performance with improvement in some measures, but declines in others.

One study compared 30 users of both cocaine and alcohol users in 8 major ability areas with age-, education-, race-, and sex-matched cocaine-only abusers and non-drug users to determine whether cocaine abusers with alcohol dependence were more cognitively impaired

than singly addicted cocaine abusers (Robinson, Heaton & O'Malley (1999). Somewhat surprising was the fact that the results for the cocaine/alcohol users and the "normals" were not appreciably different. In contrast, pure cocaine abusers did worse than the other groups on measures of complex psychomotor and simple motor functioning. These results are consistent with previous reports on generally mild cognitive dysfunction in cocaine abusers.

Substance use has proven to physically change the brain in ways that can interfere with cognition, making learning and concentration more difficult, thereby diminishing academic performance. A persuasive body of evidence suggests that students who use illicit substances are at risk for the following outcomes: lower academic performance, higher rates of absenteeism, higher likelihood of dropping out, and lower educational expectations across the board (Brook, Adams, Balka, & Johnson, 2002; Ellickson, Martino & Collins, 2004; Hill, White, Chung & Hawkins, & Catalano, 2000; Macleod et al., 2004; Schuster, O'Malley, Bachman, Johnston, & Schulenberg, 2001). Some specific examples from the literature are listed below.

Kandel and Davies (1996) analyzed data from students in grades 7 to 12 in more than 50 New York state schools. They found that students who used illicit drugs (marijuana, cocaine and or crack) showed deficits in school performance, quality family relationships, and health and increased psychological symptoms.

Sanders, Field and Diego (2001) used questionnaire responses from 80 high school seniors from middle to upper socioeconomic status families from a suburban private school to assess behavioral and psychological aspects of adolescent life. Academic achievement results showed that both marijuana and cocaine were associated with low academic achievement.

Bryant and Zimmerman (2002) examined substance use among 785 urban high school sudents in the 10^{th} and 12^{th} grades (predominantly African Americans). Results indicate lower

achievement and motivation levels and higher truancy levels among the 10th graders, which reinforces prior findings on the dangers or early drug use among teens.

Chatterji (2006) used data from the National Education Longitudinal Study to confirm that marijuana use and cocaine use in high school are associated with reductions in the number of years of schooling completed. Similarly, a significant Mississippi study involving nearly 1500 respondents investigating the relationship between academic performance and substance use among public high school students. Once again, results confirm an association between marijuana use and low academic performance (Cox, Zhang, Johnson, & Bender, 2007).

It's no surprise that students who do not attend class on a regular basis are at significantly higher risk for dropping out. This is, of course, significant for teens and young adults who use illicit substances since studies confirm the association between drug use and reduced school attendance/completion rates. Researchers tested the effects of adolescent substance use on college attendance and completion by young adulthood in the context of the behavior and familial risk factors that influence substance use (King, Meehan, Trim, & Chassin, 2006). Their report confirmed that teens who use illicit substances are at risk for a number of behavior-related problems that will reduce academic achievement during adolescence, thereby jeopardizing their chances of entering and being successful in college.

Townsend, Flisher and King (2007) recently reviewed 46 articles to determine the relationship between dropping out of high school and the use of substances such as tobacco, alcohol, cannabis/marijuana and other illicit drugs. The research consistently showed a positive relationship between dropping out of high school and substance use.

A number of investigators have examined whether African American students are particularly vulnerable to this perilous paradigm. Obot, Hubbard and Anthony (1999) utilized the

National Household Surveys on Drug Abuse conducted between 1991 and 1995 to investigate the relationship between dropping out of school and the occurrence of injecting drug use. The study concluded that African Americans who dropped out of high school were two times more likely to have injected a drug than high school graduates who did not use such substances. A later longitudinal study explored the impact of problem drug use in an African American population followed for more than 35 years; the researchers reported that those who dropped out of high school were significantly more likely to have reported drug use disorders compared to those who later obtained a college degree (Fothergill, Ensminger, Green, Crum, Robertson, & Juon, 2007).

Despite the seriousness of the drug use-dropout relationship, reports also confirm that students who reduce their use of illicit substances as a result of attending treatment programs do improve academically. Engberg and Morrall (2006) followed over a thousand adolescents on a quarterly basis for one year after they had entered substance abuse treatment to examine if decreases in substance use substantially improved their school attendance. Findings suggest that reductions in the frequency of alcohol, stimulants and other drug use and the elimination of marijuana use were each associated independently with the increased likelihood of school attendance.

Parental and Peer Influence on Drug Use and Academic Achievement

As discussed earlier, adolescent drug use is strongly correlated with parental and peer involvement in drugs (Bergen et al, 2005; Fergusson, Horwood, & Beautrais, 2003; King et al., 2006; Lynskey et al., 2003). There are four principal theories regarding the role of parents in their children's substance use. The first theory posits a direct relationship—that parents who use drugs put their children at significantly greater risk for drug use. Newcomb, Huba and Bentler

(1983) pointed to the linkage between parental modeling of illicit drug use and their children's subsequent use of these substances.

The second theory suggests a child's substance use is based on parental attitudes towards drugs, but in a somewhat selective manner (Bahr, Hoffman, & Yang, 2005). The literature reveals that parental attitudes toward drugs influence their children's initiation to marijuana, but not to illicit drugs. Alternatively, Stice, Barrera and Chassin (1993) examined the influence of parental control and support on adolescents' alcohol and illicit substance use; parental support was not associated with adolescent illicit substance use.

The third theory proposes that a lack of parental monitoring is associated with adolescents' risk behaviors, such as substance use (Chen, Storr, & Anthony, 2005). DiClemente (2001) examined the influence of reduced parental monitoring on a range of adolescent health, including drug use. Adolescents perceiving less parental monitoring were more likely to have a history of drug use. Similarly, Chilcoat and Anthony (1996) examined whether parental supervision and monitoring in middle childhood influenced the risk of drug use later in childhood and adolescence. Results showed that low parental monitoring increased the risk of illegal drug initiation by age ten.

The fourth theory proposes that a lack of closeness between parents and their children increases the likelihood of drug use (Griffin, Botvin, Scheier, Diaz, & Miller, 2000). This relationship appears to be particularly significant when a child does not have a close relationship with his or her father (Farrell & White, 1998; Gill, Vega, & Biafora, 1998; Griffin, Botvin, Scheier, Diaz, & Miller, 2000; Nurco et al., 1996; Sullivan & Farrell, 1999). In a recent comparative study, Mandara and Murray (2006) assessed the effects of a father's absence on

drug use among 86 African American adolescents and found that "father-absent boys" were much more likely than "father-present boys" (or either group of girls) to use drugs.

Studies targeting the influence of peers on adolescent drug use have shown that peer influence surpasses parental influence as a predictor of substance use among youth (Battin, Hill, Abbott, Catalano, & Hawkins, 1998; Dishion & Loeber, 1995; Hops, Davis, & Lewin, 1999; Wilson & Donnermeyer, 2006). In fact, students whose friends use illicit drugs are on average ten times more likely to use illicit drugs in comparison to youth with drug-free friends. Moreover, peer substance use has been found to be strongly correlated with low academic achievement in that students whose friends use alcohol or illicit drugs are more likely to perform poorly in school—even among students who do not themselves use these substances. Peer substance use is also related to student acceptance of antisocial behavior and less positive relationships (CASA, 2001a). The following studies highlight the significant influence of peers on both drug use and academic achievement.

Caldas and Bankston (1997) examined the relationship between the socioeconomic status of peers and individual academic achievement; they found that substance abuse within one's peer group is one of the strongest predictors of individual substance abuse and academic achievement. In a later study, Washington Kids Count (2000) conducted a study to examine the influence of peer substance use on school performance among seventh grade students in Washington State. The researchers found evidence that the level of peer substance use in schools has a considerable impact on the academic performance of students.

Bryant and Zimmerman (2002) compared substance use between 10^{th} and 12^{th} graders in a predominately African American sample of 785 urban adolescents. Results indicate that low

achievement and motivation, high truancy, and perceptions of peer substance use are associated with 10th-grade substance use.

Substance Use and Academic Achievement

Despite a large body of research over the past few decades showing that substance use is associated with academic failures (Dewey, 1999; Perkins & Borden, 2003), the direction of the association between these behaviors is uncertain. Three possible causal pathways have been proposed: (1) substance use leads to problems at school, (2) problems at school lead to substance abuse, or (3) other underlying factors contribute to both outcomes.

First, the relationship between substance use and academic achievement suggests that substance use predicts academic performance (Dewey, 1999). In looking at academic achievement, Beman (1995) examined various risk factors for adolescent substance abuse, including demographic, social, behavioral, and individual factors. He confirmed a positive correlation between substance use and poor academic achievement. Johnson and Kaplan (1990) found that daily drug use is significantly dependent on early psychopathology, and that drug use increases psychological symptoms significantly. The researchers concluded that daily drug use has direct negative effects on education.

Jeynes (2002) assessed the relationship between adolescent consumption patterns of marijuana, cocaine, alcohol and cigarettes and academic achievement; he found that they influence all but one of these substances (cigarettes) had a negative impact on adolescent academic achievement. In a similar study, Bachman et al. (2008) analyzed a large amount of data linking educational experiences with adolescent smoking, drinking, marijuana use, and cocaine use. The researchers concluded that adolescent substance use is negatively correlated with educational success.

The second causal model suggests that students initiate substance use as a means of coping with anxiety over academic failure (Beman, 1995; Hu, Lin & Keeler, 1998). A number of reports have confirmed that low academic achievers are more likely to use marijuana and other illicit drugs (Diego, Field & Sanders, 2003; Hallfors, Vevea, Iritani, Cho, Khatapoush, & Saxe, 2002; Sanders, Field & Diego, 2001; Scal, Ireland, Wagman Borowsky, 2003; Sutherland & Shepherd, 2001a; Sutherland & Shepard, 2001b; Zapata et al., 2004). Moreover, students who fail academically are also likely to associate with peers who engage in substance use (CASA, 2011b). In a related study designed to identify protective factors that could prevent male marijuana users from taking up additional illicit drugs, academic achievement was singled as an important shield against expanded drug use (Stronski, Ireland, Michaud, Narring, & Risnick, 2000). Cox et al. (2007) suggested that multifaceted approaches to encourage high levels of academic performance—while at the same time dissuading student involvement in risky/problem behaviors—may both enhance academic achievement and reduce behaviors that contribute to poor health in adulthood.

The third causal model provides more mixed results regarding the relationship between illicit drug use and educational factors. Researchers examined the relationship between drug use and school progress among a sample of inner-city adolescents. Results indicated that participants who were "old for their grade" were over 40 percent more likely to be drug users in comparison to "grade-appropriate" respondents; moreover, school dropouts were more than twice as likely to engage in drug use (Guagliardo, Huang, Hicks, & D'Angelo, 1998).

Adolescent Drug Use and Violence

As detailed earlier, the relationship between violent crime and drug use among the adolescent population has received a great deal of attention in the literature. A number of these

and other studies have proposed a positive relationship between the two (CASA, 2011b; Valois et al., 1995). Of growing concern is the scale to which violent crimes are linked to drug use amongst adolescents. A review of the literature shows that adolescents who engage in violent behaviors are often under the influence of illicit substances, as indicated by the following reports.

In a study of 4,137 South Carolina mixed-race adolescents, grades nine through twelve, researchers analyzed the types and predictors of violent behavior among this cohort. They reported that the strongest predictor of fighting and carrying a weapon was illegal drug use among Whites—but not among Blacks (Valois, McKeown, Garrison & Vincent, 1995). A similar investigation used data from a nationally representative sample of high school students to investigate the relationship between substance use (specifically, alcohol, marijuana, cocaine, and anabolic steroids) and violent behavior among both male and female drug users and non-drug users. The authors reported a significant increase in the number of adolescents carrying weapons and engaging in physical fighting among those used any of the aforementioned substances; this correlation was observed in equal magnitude for adolescent females and males who were illicit substance users (Dukarm, Byrd, Auinger, & Weitzman, 1996).

Clearly, a part of the growing concern regarding violent behavior and illicit substance use among youth is that in many places it is occurring on school grounds. According to Furlong and Morrison (1994), school violence is a serious educational problem. However, Morrison and Furlong (1994b) argued that school violence has been "indirectly addressed by school psychologists through mental health programs because it has historically been viewed as a juvenile justice, criminal, or public health problem". What's particularly appalling is that school violence is also perceived by some educators as "someone else's problem" (p. 237). In other words, they fail to acknowledge violence as a problem in their own school.

While there is evidence of a link between drug use and school violence, there is a lack of agreement on how to define school violence (Furlong & Morrison, 1994a). The Center for Disease Control and Prevention defines school violence as, "The intentional use of physical force or power against another person, group, or community, with the behavior likely to cause physical or psychological harm". Researchers, on the other hand, tend to defined school violence based on behaviors such as bullying, weapons possession, physical harm, sexual and cultural harassment, and verbal abuse (Furlong et al., 1997).

Numerous studies reveal that drug use in schools is associated with being a victim of violence, as well as with being a perpetrator of school-based violence (Atav & Spencer, 2002; Eron, Gentry, & Schlegel, 1995; Howard & Wang, 2005). Kingery, Pruitt and Hurley (1992) surveyed adolescents to examine the relationships between violence, drug use and victimization. Compared to teens who did not use drugs, those who did fought more, took more risks which increased their likelihood for assault, and were more frequently victims of assault both at school and outside school control.

Cornell and Loper (1997) detailed the results of a school safety survey administered to nearly 11,000 students in grades 8, 9, and 11 in a Virginia suburban school district. The survey evaluated viewpoints toward violent and high-risk behaviors such as carrying weapons, fighting, and substance use. The results found that on average, boys were more likely to report high-risk behaviors than girls. However, over 10 percent of girls reported high-risk behaviors associated with all three variables (i.e., carrying weapons, fighting, and substance use) within a 30-day period.

Furlong, Caas, Corral, Chung and Bates (1997) surveyed middle and high school students from a southern California county to evaluate the relationship between substance use, school

violence, and school victimization. The authors concluded that substance use at school was strongly associated with school violence. Moreover, this report clearly links substance use at school with being a victim of school violence—as well as with being a perpetrator.

Dawkins (1997) surveyed 312 juvenile offenders to determine the extent to which illicit substance use is related to violent and nonviolent criminal activity among adolescent males. The findings revealed that alcohol use was more strongly associated with both violent and nonviolent offenses than marijuana and heroin.

A recent study examined the relationship between drug use and violence between rural and urban youths. The authors found that rural youths were more likely to experience violent behavior, victimization, suicide behaviors, and drug use than their suburban/urban counterparts. The report further revealed that nonwhite youths reported higher rates of violent behavior and victimization than white youths (Johnson, Mink, Harun, Moore, Martin, & Bennett, 2008).

Conceptual Framework

The theoretical framework of this study references Paul Goldstein's Tripartite Conceptual Framework (1985; 1989) to explain the hypothesized relationship. Paul Goldstein developed one of the most comprehensive models to explain the drug and violent crime relationship. Specifically, he introduced a highly influential tripartite framework that distinguishes between psychopharmacological violence, economic-compulsive violence, and systemic violence.

The first factor in the tripartite approach is the psychopharmacological violence crime model. The psychopharmacological crime model suggests that some individuals who have engaged in short- or long-term ingestion of specific substances may become excitable, irrational, and may exhibit violent behavior (Goldstein, 1985). This model emphasizes the physical and psychological effects that substances may have on the brain, including disinhibition, cognitive-

perceptual distortions, attention-deficits, bad judgment, and neurochemical changes, as well as a number of physiological functions that have the potential to either motivate or restrain violence (Casavant & Collins, 2001; Goldstein, 1985; Stevens et al., 2005).

According to this model, some substances, including alcohol, stimulants (amphetamines, methamphetamine, and cocaine), barbiturates, and phencyclidine (PCP), are thought to have a "criminogenic" effect—in other words, these substances are believed to provoke violent or criminal behavior in certain users (Alberta Health Services-Addiction and Mental Health, 2009; Brunelle et al., 2000). Conversely, the assumed psychopharmacological connection between drug use and violent crime has not been linked to other types of drugs—for example during heroin withdrawal when physical discomfort and agitation has reportedly resulted in violent behavior among addicts (Kuhns & Clodfelter, 2009), among marijuana users (Zimmer & Morgan, 1997), or among users of other hallucinogens (e.g., MDMA or "ecstasy") (Kuhn & Clodfelter).

The second factor in the tripartite approach is the economic-compulsive model. This model refers to violence that is committed for the purpose of obtaining money or goods that can later be sold to buy drugs, or actual drug theft to support expensive drug-use habits (Goldstein, 1985). The economic-compulsive link is considered to be the most widely supported link between drug use and violent crime, with higher proportions of violent crime attributed to dependent users of cocaine, heroin and methamphetamine (Goldstein 1985; Stevens, 2005). Since heroin and cocaine are the most expensive drugs, they produce the greatest pressure on users to commit economic-compulsive-related crime in their efforts to feed their drug habit.

The third factor in the tripartite approach is the systemic violence model. This model refers to violence that arises from the need to protect systems of drug distribution and use, and to uphold and regulate cultural norms and values (Goldstein, 1985). In short, it refers to aggressive

patterns of interaction within systems of drug distribution and use (Goldstein, 1985). Examples of systemic violence includes territorial disputes between rival drug dealers, assaults and homicides committed within dealing hierarchies as a means of enforcing normative codes, robberies of drug dealers and the usually violent retaliation by the dealer or his/her bosses, elimination of informers, punishment for selling phony drugs, punishment for failing to pay one's debts, violence against law enforcement personnel, and disputes over drugs, drug paraphernalia, and price gouging (Goldstein, 1985; Miczek, et al., 1994; Reiss & Roth, 1993; White & Gorman, 2000).

The literature details a number of options for reducing the impact of drug use and violent crime. Two traditional approaches include abuse prevention and drug abuse treatment (Dobkin & Nicosia, 2008). Prevention takes the form of education and community action to limit new users (Brunelle et al., 2000; McIntosh et al., 2007; Stevens et al., 2005), while treatment is intended to reduce demand among current users (Dobkin & Nicosia, 2009). Even though a great many prevention and treatment efforts have been successful in addressing the drug use and violent crime relationship, those involved in the battle also acknowledge that efforts must be multifaceted.

Specifically, the literature proposes that strategies that build on strengths, address social health determinants (economic and social conditions that influence the health of people and communities such as economic development and education), and acknowledge the complexity of the factors influencing crime and drug use are proven to be more effective than singular approaches. In other words, strategies that address drug abuse prevention and drug abuse treatment interventions, as well as address social determinants of health (economic development

and educational factors), are believed to be the most effective approaches (Alberta Health Services, 2009.)

CHAPTER III:

METHODOLOGY

The purpose of this study was to examine the relationship between drug-related crimes (i.e., drug-related violent crime and drug-related crime for adults and juveniles) in high-risk, rural Virginia counties and efforts to reduce drug-related crimes (i.e., expenditures-drug abuse prevention, drug abuse treatment, economic development, and education). The dependent variables (drug-related violent crime and drug-related crime) were examined in relationship to efforts to reduce drug-related crimes in the areas of drug abuse prevention, drug abuse treatment, economic development, and education (independent variables). The methodology used is divided into four key components, which include: research design, population, method of data collection and instrumentation, and data analysis.

Research Design

Exploratory, descriptive and explanatory research designs were employed in this study. The study design included the identification of data that were viable indicators of the independent and dependent variables in this study. The study tested for statistically significant inverse correlational relationships between the independent and dependent variables which included an analysis of the relationship between drug-related crimes for adults and juveniles; and drug abuse prevention, drug abuse treatment, economic development, and education. This approach included examining the possible bi-directional relationships between the IVs (i.e., drug abuse prevention, drug abuse treatment, economic development, and education) and the DVs (drug-related violent crime and drug-related crime).

The study also examined and analyzed the relationships between drug-related crimes and total graduates and completers, dropout rates, unemployment rate, and poverty rate.

Linear regression was used to test for hypothesized predictive relationships between the independent and dependent variables which were found to have significant correlational relationships. Multiple regression, a multivariate linear regression analysis, is used when the researcher possesses a single criterion variable and multiple predictor variables.

These approaches acknowledged Paul Goldstein's tripartite framework that provides an explanation of the drug use and violent crime relationship that distinguishes between psychopharmacological violence, economic-compulsive violence, and systemic violence. Additionally, these approaches acknowledged efforts to reduce the drug use and crime relationship through traditional approaches (drug abuse prevention and drug abuse treatment) and social determinants of health (economic development and education).

Population

The population is the Virginia Tobacco Indemnification and Community Revitalization Commissions (VTICRC) service area that consists of 41 Southwest Virginia (SWVA) and Southside Virginia (SSVA) localities. The SWVA region consists of the counties of Bland, Bristol City, Buchanan, Carroll, Dickenson, Floyd, Galax City, Grayson, Lee, Norton City, Russell, Scott, Smyth, Tazewell, Washington, Wise, and Wythe. The SSVA region consists of the counties of Amelia, Appomattox, Bedford, City of Bedford, Brunswick, Buckingham, Campbell, Charlotte, Cumberland, City of Danville, Dinwiddie, City of Emporia, Franklin, Greensville, Halifax, Henry, Lunenburg, City of Martinsville, Mecklenburg, Nottoway, Patrick, Pittsylvania, Prince Edward and Sussex.

The VTICRC, a 31-member body, was created by the Virginia General Assembly in 1999 to use proceeds from the 1998 Tobacco Master Settlement Agreement (MSA) to promote economic growth in the SWVA and SSVA regions. The TICRC awards grants to local

governments, quasi-governmental agencies, and nonprofit organizations with the goal of revitalizing the regions to foster a more stable and growing economy and to enhance the quality of life in these regions that have been plagued with substantial job losses, high levels of poverty, high unemployment rates, and other key economic indicators.

The study sample is comprised of two of the 41 VTICRC service areas localities: Grayson County (located in the Southwest Virginia region) and Brunswick County (located in the Southside Virginia region). Grayson County is situated on the border of North Carolina, west of I-77 and south of I-81; and bisected by Route 58 and Route 21. Brunswick County is situated on the North Carolina border, within I-95 and I-85, and bisected by Route 58 and Route 46. Grayson and Brunswick Counties are classified as rural areas.

The sampling technique utilized was convenience sampling. The convenience sampling is a non-probability sampling technique that permits researchers to sample populations at a low cost and with ease compared to other sampling techniques (Babbi, 1999). Convenience sampling is defined as a sampling technique that allows the researcher to select whatever sampling unit is conveniently available (Nachmias & Nachmias, 1996).

Grayson County and Brunswick County were selected as the study sample for several reasons. First, both counties are identified as high-risk areas based on economic, social, health, and other indicators. Second, they have comparable demographics (e.g., population). Third, they are located within the Virginia TICRC service area. Fourth, both counties are at risk of drug-related crimes.

Method of Data Collection and Instrumentation

State and local governmental officials were requested to provide secondary data over an eleven year period, FY2000-FY2010, to determine the relationship between drug-related crimes

(i.e., drug-related violent crime and drug-related crime) (dependent variables) and efforts to reduce drug-related crimes through drug abuse prevention, drug abuse treatment, economic development and education (independent variables).

The first area of exploration included demographic descriptions of Brunswick County and Grayson County. Secondary data was collected from the U.S. Census Bureau, Brunswick County government, and Grayson County government that were used to analyze the counties. Population data was collected from the U.S. Census Bureau, which was used as denominators to calculate per capita rates. Education data (high school graduate or higher, percent of persons aged 25+ and bachelor's degree or higher, percent of persons age 25+), homeownership rates, median household income, poverty rates, and unemployment rates were also collected from the U.S. Census Bureau. Other education data (i.e., dropout rates and graduates and completers) was collected from the Virginia Department of Education-Superintendents' Annual Report. Drug-related crimes data was collected from the local Sheriff's Office. Audit documents were collected from the Treasurer that were used to determine expenditures in the areas of drug-related violent crime and drug-related crime, drug abuse prevention, drug abuse treatment, economic development, and education. Audit documents were used because it provides the most accurate account of expenditures by category. Both Brunswick County and Grayson County used Robinson, Farmer, Cox Associates to perform the annual audits. In addition to the local audit reports, the VTICRC's audit reports were also collected to determine the expenditures associated with economic development and education (See Appendix A-Brunswick County and Grayson County demographic profile). Demographic data was used to describe the study sample (Brunswick County and Grayson County combined), to describe each county individually, and to compare and contrast the counties.

The second area of exploration included a review of drug-related crime expenditures and drug abuse prevention, drug abuse treatment, economic development, and education to determine statically significant relationships.

Five budget categories were identified to determine expenditures associated with the dependent and independent variables as follows: (1) Drug-related crimes data included both Law Enforcement and Traffic (enforcement, drug task force/asset forfeiture, school resource officer), and Corrections and Detention (adult corrections, juvenile justice and probation, and special drug enforcement programs); (2) Drug abuse prevention data included Drug Abuse Resistance Education (DARE), Safe and Drug Free School, and other prevention initiatives programs; (3) Drug abuse treatment data included inpatient and outpatient treatment and counseling services for adults and adolescents; (4) Economic development data included new business attraction efforts, existing business expansion efforts, infrastructure improvements, and tourism projects; and (5) Education data included expenditures to promote educational achievement.

The third area of exploration included an analysis of drug-related crimes to determine the variables (i.e., drug abuse prevention expenditures, drug abuse treatment expenditures, economic development expenditures, education expenditures) that were found to have a statistically significant relationship with drug-related crimes.

The fourth areas of exploration included a review of drug-related crimes and graduates and completers, dropout rate, unemployment rate, and poverty rate to determine statistically significant relationships.

The final approach, linear and multiple regression analyses, focused on determining the contribution of independent variables to the explanation of the variation observed in the dependent variables.

Method of Data Analysis

This study used descriptive statistics, correlational analyses, linear and multiple regression analyses. First, descriptive statistics were used to analyze the demographic information. This included a review of the means, ranges, and standard deviations in order to describe the independent and dependent variables. Second, correlational analyses were used to assess significant relationships between the independent and dependent variables. Third, linear regression was used to test for hypothesized predictive relationships between independent and dependent variables which were found to have significant correlational relationships. Fourth, the multiple regression, a multivariate linear regression analysis, is used when the researcher possesses a single criterion variable (total drug-related crime expenditures) and multiple predictor variables (drug abuse prevention, drug abuse treatment, economic development and education).

The descriptive and correlational analyses tables were used to analyze the data for the study sample (Brunswick and Grayson County combined), and Brunswick County and Grayson County individually, to determine the relationships between the dependent and the independent variables. The data for the study sample is an aggregate of Brunswick County and Grayson County's data that includes a total of 22 cases (11 years of data for each county or FY2000-FY2010). Brunswick County and Grayson County included a total of 11 cases respectively, representing each of the 11 years from FY 2000-FY2010).

The information obtained from the secondary data was used to construct the demographic profile on the local governments (Brunswick County and Grayson County). All data was analyzed by using SPSS-20 version batch system.

Limitations of the Study

First, it is possible that procurement and other policies that led to the funding of economic development may have produced an expenditure item that may not be directly associated with the magnitude of the problem the expenditure was intended to address. For example, high levels of crime may prompt an acute response from local governments. However, available funds, in addition to the lag time incurred due to procurement, construction, and implementation processes, may make an expenditure identified and approved to address a problem in 2008 unrealizable until as late as 2010 or later (Bar-Ilan & Strange, 1996).

Second, data collected in this study referred to annual funding allocations, but information regarding implementation timelines associated with this funding was not available, or at best unpredictable. Thus efforts to track expenditures at one point in time with effects at another point in time may have been generally unpredictable given lag times between funding, implementation, and results.

Third, the local sheriffs were able to identify the number of drug-related violent crimes. However, they were unable to determine if the drug-related violent crimes were the result of psychopharmacological violence, economic-compulstive violence, or systemic violence.

Finally, the recession of 2008 had significant effects upon key economic indicators---national, state and local unemployment levels---that were used to assess the impact of economic development and education expenditures on drug-related crimes. This was an example of what local, state, and federal policymakers face--the impact of unforeseen social, environmental, and economic events that have far-reaching systemic effects that can eliminate or reduce the likelihood of improved economic or social outcomes. This could not be predicted by even a well-conceived, well-timed, and well-executed prescriptive social policy.

CHAPTER IV:

RESULTS

As previously stated, the purpose of this study was to examine the relationship between drug-related crimes (i.e., drug-related violent crime and drug-related crime for adults and juveniles) in high-risk, rural Virginia counties and efforts to reduce drug-related crimes (i.e., expenditures-drug abuse prevention, drug abuse treatment, economic development, and education). This chapter discussed the findings as well as the statistical analyses used to determine the significance of the variables addressed in the hypotheses.

The 13 data variables reviewed were: drug-related violent crime for adults, drug-related crime for adults, drug-related violent crime for juveniles, drug-related crime for juveniles, drug-related crime expenditures, drug abuse prevention expenditures, drug abuse treatment expenditures, economic development expenditures, education expenditures, total graduates and completers, dropout rates, unemployment rates, and poverty.

The data for the study sample is an aggregate of the 13 data variables above for Brunswick County and Grayson County's data that totaled 22 cases (11 years of data for each county or FY2000-FY2010). Brunswick County and Grayson County contained a total of 11 cases respectively, representing 11 years from FY 2000-FY2010.

Demographic Data

Table 1 describes Brunswick County's population is 17,434 and Grayson County's population is 15,533. Both counties are classified as rural which is defined by the U.S. Census as, "All territory, population, and housing units located outside of urbanized areas and urban clusters." According to the 2010 U.S. Census data, Brunswick County had a higher number of high school graduates or higher, percent of persons aged 25+, 2007-2007 (73.2%), than Grayson

County (69.1%). However, Grayson County has a higher number of bachelor's degree or higher, percent of persons age 25+, 2007-2010 (13.5%), than Brunswick County (11.9%). The homeownership rate, 2007-2011 in Grayson County (80.1%) was higher than Brunswick County (70.4%). The median household income in Brunswick County, 2007-2011 ($34,710), was higher than Grayson County ($31,599). Brunswick County's unemployment rate (10.0%) exceeded Grayson County's unemployment rate (9.0%). Both Brunswick County and Grayson County's unemployment rate exceeded the Commonwealth of Virginia's unemployment rate (6.9%). Brunswick County experienced a higher poverty level, 2007-2011 (24.5%), than Grayson County (17.2%). Brunswick County and Grayson County poverty rates exceeded the Commonwealth of Virginia's poverty rate (10.7%).

Table 1: *Study sample Demographic Profile*

	GRAYSON COUNTY	**BRUNSWICK COUNTY**	**COMMONWEALTH OF VIRGINIA**
Population	15,533	17,434	8,001,024
Geographic Areas Classification	Rural*	Rural*	
Unemployment Rate**	9.0%**	10.0%**	6.9%
Education High school graduate or higher, percent of persons aged 25+, 2007-2011	73.2%	69.1%	86.6%
Bachelor's degree or higher, percent of persons age 25+, 2007-2010	11.9%	13.5%	34.4%
Homeownership rate, 2007-2011	80.1%	70.4%	68.4%
Median household income, 2007-2010	$31,599	$34,710	$63,302
Persons below poverty level, percent, 2007-2011	17.2%	24.5%	10.7%

*The Census Bureaus' classification of rural consists of all territory, population, and housing units located outside of urbanized areas and urban clusters.
**Based U.S. Department of Labor, Bureau of Labor Statistics, October 2011 data.
All other data is based on U.S. Census data, 2010.

Table 2 indicates that the study sample's (Brunswick County and Grayson County combined) drug-related crime for adults is (M = 54.3, SD = 26.42), drug-related violent crime for adults (M = 2.82, SD = 1.26), drug-related crime for juveniles (M = 2.77, SD = 2.37), and drug-related violent crime for juveniles (M = .18, SD = .50).

Table 2 indicates that the study sample's (Brunswick County and Grayson County combined) drug-related crime expenditures is (M = $2,360,395, SD = $846,098), drug abuse prevention expenditures (M = $37,931, SD = $30,082), drug abuse treatment expenditures (M = $47,258, SD = $5,435), economic development (M = $505,613, SD = $555,488), and education expenditures (M = $4,354,505, SD = $617,927).

Table 2 also indicates that the study sample's (Brunswick County and Grayson County combined) unemployment rate (M = 6.80, SD = 2.52), total graduates and completers (M = 143.95, SD = 18.37), dropout rate (M = 28.63, SD = 17.00), and poverty (M = 17.63, SD = 2.54).

Table 2: *Study sample (Grayson and Brunswick County)*

Descriptive Statistics

	N	Range	Minimum	Maximum	Mean	Std. Deviation
DrugRelatedCrimeADULT	22	107.00	17.00	124.00	54.3182	26.41858
DrugRelatedViolentCrimeADULT	22	5.00	.00	5.00	2.8182	1.25874
DrugRelatedCrimeJUVENILES	22	9.00	.00	9.00	2.7727	2.36908
DrugRelatedViolentCrimeJUVENILES	22	2.00	.00	2.00	.1818	.50108
TotalDrugRelatedCrimeExpenditures	22	$2549369.00	$1462341.00	$4011710.00	2360394.727	846097.5872
TotalDrugAbusePreventionExpenditures	22	$94,291.00	$0.00	$94,291.00	$37,930.9545	30082.12066
TotalDrugAbuseTreatmentExpenditures	22	$26,625.00	$33,375.00	$60,000.00	$47,258.0909	$5,434.80077
TotalEducationExpenditures	22	$2399475.00	$3201561.00	$5601036.00	4354504.636	617926.5024
TotalEconomicDevelopmentExpenditures	22	$1988108.00	$0.00	$1988108.00	505612.6818	555488.4833
UnemploymentRate	22	8.50	3.50	12.00	6.8000	2.51775
TotalGradsandCompleters	22	79.00	96.00	175.00	143.9545	18.37047
DropoutRate	22	52.00	6.00	58.00	28.6364	17.00013
PovertyRate	22	8.70	13.50	22.20	17.6364	2.54494
Valid N (listwise)	22					

Tables 3 and 4 indicate that drug-related crime for adults, drug-related violent crime for adults, and drug-related crime for juveniles for Brunswick County were higher than Grayson County. Brunswick County's drug-related crime for adults were significantly higher (M=69.55, SD = 24.15), nearly double, than Grayson County (M=39.09, SD = 19.29). Brunswick County's drug-related crime for juveniles (M = 3.18, SD = 2.27) was higher, but not significantly higher, than Grayson County (M=2.36, SD = 2.50). In addition, Brunswick County's drug-related violent crime for adults was higher (M = 3.45, SD = 1.04), but not significantly higher, than Grayson County (M = 2.18, SD = 1.17). This may help to explain why Brunswick County spent more on crime expenditures (M = $2,848,016, SD = $915,791) than Grayson County (M = $1,872,774, SD = $376,264). Further, the data showed that while there were occurrences of drug-

related crimes committed by juveniles, these crimes do not appear to be a major problem in either county.

Tables 3 and 4 indicate that Grayson County invested more money in drug abuse prevention (M = $40,652, SD = $25,681) than Brunswick County (M = $35,210, SD = $34,994). While Grayson County spent more money in drug abuse prevention, there were small differences between each county in terms of all juvenile drug crimes. However, the rate of drug-related violent crime for juveniles in Brunswick County (M = .18, SD = .40) was exactly the same in Grayson County (M = .18, SD = .60).

Tables 3 and 4 indicate that Brunswick County invested more money in drug abuse treatment (M = $49,713, SD = $2,433) than Grayson County (M = $44,803, SD = $6,546). Yet, Brunswick County's drug-related crime for adults were significantly higher (M = 69.55, SD = 24.15), than Grayson County (M = 39.09, SD = 19.29). Brunswick County's drug-related crime for juveniles (M = 3.18, SD = 2.27) was also higher, but not significantly higher, than Grayson County (M = 2.36, SD = 2.50). In addition, Brunswick County's drug-related violent crime for adults were higher (M = 3.45, SD = 1.04) than Grayson County (M = 2.18, SD = 1.17).

Tables 3 and 4 indicate that Brunswick County invested significantly more money into economic development (M = $847,471, SD = $536,291) than Grayson County (M = $163,754, SD = $321,365). This may help to explain why Brunswick County has a lower rate of unemployment (M = 6.67, SD = 2.64) than Grayson County (M = 6.94, SD = 2.50), which may be a result of additional jobs created through economic development.

Tables 3 and 4 indicate that Brunswick County invested more money into education (M = $4,740,675, SD = $519,707) than Grayson County (M = $3,968,335, SD = $451,303). Yet, Brunswick County had less graduates and completers (M = 138.64, SD = 19.20) than Grayson

County (M = 149.27, SD = 16.67) and more dropouts (M = 36.54, SD = 16.78) than Grayson County (M = 20.72, SD = 13.70). Brunswick County's investment in education may also explain why the unemployment rate was lesser in Brunswick County (M = 6.66, SD = 2.65) than Grayson County (M = 6.94, SD = 2.50).

Tables 3 and 4 indicate that Brunswick County's poverty rate (M = 19.5, SD = 1.84) is higher than Grayson County (M = 15.74, SD = 1.50). This may help to explain why Brunswick County's drug-related crime for adults (M = 69.55, SD = 24.15), drug-related crime for juveniles (M = 3.18, SD = 2.27), and drug-related violent crime for adults (M = 3.45, SD = 1.04) were higher than Grayson County's drug-related crime for adults (M = 39.09, SD = 19.24), drug-related crime for juveniles (M = 2.36, SD = 2.50), and drug-related violent crime for adults (M = 2.18, SD = 1.17).

Table 3: *Brunswick County Descriptives*

Descriptive Statistics

	N	Range	Minimum	Maximum	Mean	Std. Deviation
DrugRelatedCrimeADULT	11	78.00	46.00	124.00	69.5455	24.15104
DrugRelatedViolentCrimeADULT	11	3.00	2.00	5.00	3.4545	1.03573
DrugRelatedCrimeJUVENILES	11	7.00	.00	7.00	3.1818	2.27236
DrugRelatedViolentCrimeJUVENILES	11	1.00	.00	1.00	.1818	.40452
TotalDrugRelatedCrimeExpenditures	11	$2355832.00	$1655878.00	$4011710.00	2848015.909	915790.5865
TotalDrugAbusePreventionExpenditures	11	$94,291.00	$0.00	$94,291.00	$35,209.7273	34994.00045
TotalDrugAbuseTreatmentExpenditures	11	$5,066.00	$47,583.00	$52,649.00	$49,713.4545	$2,433.05871
TotalEducationExpenditures	11	$1714639.00	$3886397.00	$5601036.00	4740674.727	519707.0531
TotalEconomicDevelopmentExpenditures	11	$1924178.00	$63,930.00	$1988108.00	847471.0909	536291.2895
UnemploymentRate	11	8.30	3.50	11.80	6.6636	2.64699
TotalGradsandCompleters	11	72.00	96.00	168.00	138.6364	19.20038
DropoutRate	11	47.00	11.00	58.00	36.5455	16.78311
PovertyRate	11	5.30	16.90	22.20	19.5364	1.84893
Valid N (listwise)	11					

Table 4: *Grayson County Descriptives*

Descriptive Statistics

	N	Range	Minimum	Maximum	Mean	Std. Deviation
DrugRelatedCrimeADULT	11	63.00	17.00	80.00	39.0909	19.29484
DrugRelatedViolentCrimeADULT	11	4.00	.00	4.00	2.1818	1.16775
DrugRelatedCrimeJUVENILES	11	9.00	.00	9.00	2.3636	2.50091
DrugRelatedViolentCrimeJUVENILES	11	2.00	.00	2.00	.1818	.60302
TotalDrugRelatedCrimeExpenditures	11	$1021627.00	$1462341.00	$2483968.00	1872773.545	376263.5397
TotalDrugAbusePreventionExpenditures	11	$75,962.00	$690.00	$76,652.00	$40,652.1818	25680.53984
TotalDrugAbuseTreatmentExpenditures	11	$26,625.00	$33,375.00	$60,000.00	$44,802.7273	$6,545.58376
TotalEducationExpenditures	11	$1487663.00	$3201561.00	$4689224.00	3968334.545	451302.6410
TotalEconomicDevelopmentExpenditures	11	$1051297.00	$0.00	$1051297.00	163754.2727	321365.1042
UnemploymentRate	11	7.40	4.60	12.00	6.9364	2.50291
TotalGradsandCompleters	11	58.00	117.00	175.00	149.2727	16.66788
DropoutRate	11	52.00	6.00	58.00	20.7273	13.69738
PovertyRate	11	4.20	13.50	17.70	15.7364	1.49685
Valid N (listwise)	11					

Overall, Tables 3 and 4 mean values indicate that Brunswick County expended nearly $1 million more than Grayson County in total drug-related crime expenditures. Brunswick County's mean for drug-related crime for adults were nearly double than Grayson County and therefore, contributed to more drug-related crime expenditures for Brunswick County. The mean for drug-related violent crimes for adults and juveniles in Brunswick County is slightly higher, but not significant, than Grayson County. However, the mean for drug-related violent crime for juveniles are exactly the same.

Brunswick County's mean expenditure indicates that they spent approximately five times as much on economic development than Grayson County. However, Brunswick County's unemployment rate is slightly lower, but not significantly different, than Grayson County.

Further, Brunswick County's mean poverty rate is significantly higher than Grayson County. While Brunswick County's investment in economic development was significantly higher than Grayson County, it is postulated that the 2008 recession may have had a major effect on the unemployment rate in Brunswick County due to businesses closing, job layoffs and downsizing. Consequently, Brunswick County's significant investments in economic development were greatly impacted by the recession and they did not realize a good return on their investment.

Brunswick County expended over one-half million more in education than Grayson County. The VTICRC funding contributed to this gap in spending for education and a significant portion of the VTICRC funds were directed to post-secondary education. Yet Brunswick County has a significantly lower graduation and completers mean rate, and a higher mean dropout rate than Grayson County who expended less money in education.

Brunswick County expended $5,000 less in drug abuse prevention and $5,000 more in drug abuse treatment than Grayson County. However, the expenditures for drug abuse prevention and drug abuse treatment for both Brunswick County and Grayson County were negligible when compared to drug-related crime expenditures. The spending patterns for Brunswick County and Grayson County reflect expenditures for law enforcement, incarceration, and other crime-related costs as the priority to address drug-related crimes and not towards preventing and treatment drug use, which has proven to be more effective approaches to reduce drug-related crimes.

Hypotheses Testing

To test the study hypotheses, Table 5 provides an analysis of the correlations between the study sample's (Brunswick County and Grayson County combined) independent and dependent variables to determine the relationship.

Research Question 1: Is there a relationship between drug-related crime expenditures and drug abuse prevention, drug abuse treatment, economic development, and education?

$H_{1:}$ There is a statistically significant inverse correlation between drug-related crime expenditures and expenditures for drug abuse prevention, drug abuse treatment, economic development, and education.

To test for this hypothesis, the correlation analysis was used to examine the relationship between expenditures in the areas of drug abuse prevention, drug abuse treatment, economic development, and education and drug-related crime for the study sample (Brunswick County and Grayson County combined). The correlation analysis in Table 5 indicates there is a statistically significant inverse relationship between drug-related criminal expenditures and drug abuse prevention expenditures ($r = -.59$, $p<.01$). There is also a statistically significant relationship between drug-related criminal expenditures and drug abuse treatment expenditures ($r = .64$, $p<.01$) and between drug-related crime expenditures and education expenditures ($r = .53$, $p<.05$). There was no statistically significant relationship between drug-related crime expenditures and economic development expenditures ($r = .27$, $p>.05$).

The correlation analysis was also used to examine the relationship between expenditures in the areas of drug abuse prevention, drug abuse treatment, economic development, and education and drug-related crime for Brunswick County. The correlation analysis in Table 6 indicates there is a statistically significant inverse correlation between drug-related criminal expenditures and drug abuse prevention expenditures ($r = -.81$, $p<.01$), and a significant relationship between drug related crime expenditures and drug abuse treatment ($r = .70$, $p<.05$). There was no statistically significant relationship between drug-related criminal expenditures and

economic development expenditures (r = -.37, p>.05), and between drug-related crime expenditures and education expenditures (r = .29, p>.05).

The correlation analysis was further used to examine the relationship between expenditures in the areas of drug abuse prevention, drug abuse treatment, economic development, and education and drug-related crime for Grayson County. The correlation analysis in Table 7 indicates there is a statistically significant correlation between drug-related criminal expenditures and drug abuse treatment expenditures (r = .79, p<.01), and between drug-related crime expenditures and economic development expenditures (r = .67, p<.05). There was no statistically significant relationship between drug-related criminal expenditures and drug abuse prevention (r = -.24, p>.05), and between drug-related criminal expenditures and education (r = .14, p>.05).

Research Question 2: Is there a relationship between expenditures for drug abuse prevention expenditures and drug-related crimes?

$H_{2:}$ There is a statistically significant inverse relationship between expenditures for drug abuse prevention expenditures and drug-related crimes.

To test for this hypothesis, the correlation analysis was used to examine the relationship between drug-related crimes and drug abuse prevention for the study sample (Brunswick County and Grayson County combined). The correlation analysis in Table 5 indicates there is a statistically significant inverse correlation between drug abuse prevention expenditures and drug-related crimes for juveniles (r = -.43, p<.05). There was no statistically significant relationship between drug abuse prevention expenditures and drug-related violent crimes for adults (r = -.30, p>.05), between drug abuse prevention and drug-related crimes for adults (r = -.24, p>.05), and

between drug abuse prevention expenditures and drug-related violent crimes for juveniles (r = -.18, p>.05).

The correlation analysis was used to examine the relationship between drug-related crimes and drug abuse prevention for the Brunswick County. The correlation analysis in Table 6 indicates there was no statistically significant relationship between drug abuse prevention expenditures and drug-related violent crimes for adults (r = -.03, p>.05), between drug abuse prevention expenditures and drug-related crimes for adults (r = -.29, p>.05), between drug abuse prevention expenditures and drug-related crimes for juveniles (r = -.55, p>.05), and between drug abuse prevention expenditures and drug-related violent crimes for juveniles (r = -.22, p>.05).

The correlation analysis was used to examine the relationship between drug-related crimes and drug abuse prevention, Grayson County. The correlation analysis in Table 7 indicates there was no statistically significant relationship between drug abuse prevention expenditures and drug-related violent crimes for adults (r = .08, p>.05), between drug abuse prevention expenditures and drug-related crimes for adults (r = .16, p>.05), between drug abuse prevention expenditures and drug-related crimes for juveniles (r = -.28, p>.05), and between drug abuse prevention expenditures and drug-related violent crimes for juveniles (r = -.18, p>.05).

Research Question 3: Is there a relationship between expenditures for drug abuse treatment and drug-related crimes?

$H_{3:}$ There is a statistically significant inverse relationship between expenditures for drug abuse treatment and drug-related crimes.

To test for this hypothesis, the correlation analysis was used to examine the relationship between drug-related crimes and drug abuse treatment for the study sample (Brunswick County and Grayson County combined). The correlation analysis in Table 5 indicates is a statistically

significant relationship between drug abuse treatment expenditures and drug-related violent crimes for adults (r = .56, p<.01), between drug abuse treatment and drug-related crimes for adults (r = .45, p<.05). There is no statistically significant relationship between drug abuse treatment expenditures and drug-related violent crimes for juveniles (r = .39, p>.05), and between drug abuse treatment expenditures and drug-related crimes for juveniles (r = .13, p>.05).

The correlation analysis was used to examine the relationship between drug-related crimes and drug abuse treatment for the Brunswick County. The correlation analysis in Table 6 indicates there is no statistically significant relationship between drug abuse treatment expenditures and drug-related violent crimes for adults (r = .26, p>.05), between drug abuse treatment expenditures and drug-related crimes for adults (r = .16, p>.05), between drug abuse treatment expenditures and drug-related crimes for juveniles (r = .31, p>.05), and between drug abuse treatment expenditures and drug-related violent crimes for juveniles (r = .08, p>.05).

The correlation analysis was used to examine the relationship between drug-related crimes and drug abuse treatment, Grayson County. The correlation analysis in Table 7 indicates there is no statistically significant relationship between drug abuse treatment expenditures and drug-related violent crimes for adults (r = .51, p>.05), between drug abuse treatment expenditures and drug-related crimes for adults (r = .35, p>.05), between drug abuse treatment expenditures and drug-related crimes for juveniles (r = .40, p>.05), and between drug abuse treatment expenditures and drug-related violent crimes for juveniles (r = .15, p>.05).

Research Question 4: Is there a relationship between expenditures for economic development and drug related crimes?

$H_{4:}$ There is a statistically significant inverse correlation between expenditures for economic development and drug-related crimes.

To test for this hypothesis, the correlation analysis was used to examine the relationship between drug-related crimes and economic development expenditures for the study sample (Brunswick County and Grayson County combined). The correlation analysis in Table 5 indicates there is a statistically significant correlation between economic development expenditures and drug-related violent crimes for adults (r = .43, p<05), and between economic development expenditures and drug-related crimes for adults (r = .47, p<.05). There was no statistically significant relationship between economic development expenditures and drug-related crimes for juveniles (r = .08, p>.05), and between economic development expenditures and drug-related violent crimes for juveniles (r = -.04, p>.05).

The correlation analysis was used to examine the relationship between drug-related crimes and economic development for Brunswick County. The correlation analysis in Table 6 indicates there is no statistically significant relationship between economic development expenditures and drug-related violent crimes for adults (r = .18, p>.05), between economic development expenditures and drug-related crimes for adults (r = .15, p>.05), between economic development expenditures and drug-related crimes for juveniles (r = .00, p>.05), and economic development expenditures and drug-related violent crimes for juveniles (r = .05, p>.05).

The correlation analysis was used to examine the relationship between drug-related crimes and economic development for Grayson County. The correlation analysis in Table 7 indicates there is no statistically significant relationship between economic development expenditures and drug-related violent crimes for adults (r = .13, p>.05), between economic development expenditures and drug-related crimes for adults (r = .16, p>.05), between economic development expenditures and drug-related crimes for juveniles (r = -.11, p>.05), and economic development expenditures and drug-related violent crimes for juveniles (r = -.17, p>.05).

Research Question 5: Is there a relationship between expenditures for drug abuse education and drug related crimes?

$H_{5:}$ There is a statistically significant inverse correlation between expenditures for education and drug-related crimes.

To test for this hypothesis, the correlation analysis was used to examine the relationship between drug-related crimes and education for the study sample (Brunswick County and Grayson County combined). The correlation analysis in Table 5 indicates there is no statistically significant relationship between education expenditures and drug-related violent crimes for adults (r = .26, p>.05), between education expenditures and drug-related crimes for adults (r = .41, p>.05), between education expenditures and drug-related crimes for juveniles (r = .37, p>.05), and education expenditures and drug-related violent crimes for juveniles (r = .27, p>.05).

The correlation analysis was used to examine the relationship between drug-related crimes and education for the Brunswick County. The correlation analysis in Table 6 indicates there is no statistically significant relationship between education expenditures and drug-related violent crimes for adults (r = .01, p>.05), between education expenditures and drug-related crimes for adults (r = .24, p>.05), between education expenditures and drug-related crimes for juveniles (r = .36, p>.05), and education expenditures and drug-related violent crimes for juveniles (r = .16, p>.05).

The correlation analysis was used to examine the relationship between drug-related crimes and education for Grayson County. The correlation analysis in Table 7 indicates there is no statistically significant relationship between education expenditures and drug-related violent crimes for adults (r = -.24, p>.05), between education expenditures and drug-related crimes for

adults (r = -.21, p>.05), between education expenditures and drug-related crimes for juveniles (r = .32, p>.05), and education expenditures and drug-related violent crimes for juveniles (r = .53, p>.05).

Research Question 6: What is the relationship between drug-related crimes, total graduates and completers, dropout rate, unemployment rate, and poverty rate.

$H_{6:}$ There is a statistically significant relationship between drug related crimes and total graduates and completers, dropout rate, unemployment rate, and poverty rate.

To test for this hypothesis, the correlation analysis was used to examine the relationship between total dropout rates, graduates and completers, unemployment rates, and poverty rate for the study sample (Brunswick County and Grayson County combined). The correlation analysis in Table 5 indicates there is a statistically significant relationship between dropout rate and drug-related violent crimes adult (r = .46, p<.05) and between dropout rate and drug-related violent crimes for juveniles (r = .52, p<.01). There is no statistically significant relationship between dropout rate and drug-related arrest for adults (r = .30, p>.05), between dropout rate and drug-related crimes for juveniles (r = .42, p>.05). There are no statistically significant relationships between graduates and completers and drug-related violent crimes for adults (r = -.18, p>.05), between graduates and completers and drug-related crimes for adults (r = -.32, p>.05), and between graduates and completers and drug-related crimes for juveniles (r = -.18, p>.-05), and between graduates and completers and drug-related violent crimes for juveniles (r = .01, p>.05). There are no statistically significant relationships between unemployment rate and drug-related violent crimes for adults (r = -.20, p>.05), between unemployment rate and drug-related crimes for adults (r = -.02, p>.05), and between unemployment rate and drug-related crimes for

juveniles (r = -.05, p>.05), and between unemployment rate and drug-related violent crimes for juveniles (r = .11, p>.05). There are statistically significant relationships between poverty rate and drug-related violent crimes for adults (r = .50, p<.05), between poverty rate and drug-related crimes for adults (r = .49, p<.05). There are no statistically significant relationships between poverty rate and drug-related crimes for juveniles (r = .29, p>.05), and between poverty rate and drug-related violent crimes for juveniles (r = .07, p>.05).

To test for this hypothesis, the correlation analysis was used to examine the relationship between total dropout rates, graduates and completers, unemployment rates, and poverty rate for Brunswick County. The correlation analysis in Table 6 indicates there are no statistically significant relationship between dropout rate and drug-related violent crimes adult (r = .38, p>.05), between dropout rate and drug-related arrest for adults (r = .10, p>.05), between dropout rate and drug-related crimes for juveniles (r = .06, p>.05), and between dropout rate and drug-related violent crimes for juveniles (r = .28, p>.05). There are statistically significant inverse relationships between graduates and completers and drug-related crimes for juveniles (r = -.64, p<.05). There are no statistically significant relationships between graduates and completers and drug-related violent crimes for adults (r = -.34, p>.05), between graduates and completers and drug-related crimes for adults (r = -.43, p>.05), and between graduates and completers and drug-related violent crimes for juveniles (r = -.57, p>.05). There is a statistically significant relationships between unemployment rate and drug-related violent crimes for adults (r = -.63, p<.01). There are no statistically significant relationships between unemployment rate and drug-related crimes for adults (r = -.26, p>.05), and between unemployment rate and drug-related crimes for juveniles (r = -.12, p>.05), and between unemployment rate and drug-related violent crimes for juveniles (r = -.20, p>.05). There are no statistically significant relationships between

poverty rate and drug-related violent crimes for adults (r = -.27, p>.05), between poverty rate and drug-related crimes for adults (r = -.07, p>.05), between poverty rate and drug-related crimes for juveniles (r = -.05, p>.05), and between poverty rate and drug-related violent crimes for juveniles (r = -.26, p>.05).

To test for this hypothesis, the correlation analysis was used to examine the relationship between total dropout rates, graduates and completers, unemployment rates, and poverty rate for Grayson County. The correlation analysis in Table 7 indicates there are statistically significant relationship between dropout rate and drug-related crimes for juveniles (r = .75, p<.01) and between dropout rate and drug-related violent crimes for juveniles (r = .90, p<.01). There are no statistically significant relationships between drug-related violent crimes adult (r = .20, p>.05), between dropout rate and drug-related arrest for adults (r = -.10, p>.05). There are no statistically significant relationships between graduates and completers and drug-related violent crimes for adults (r = .29, p>.05), between graduates and completers and drug-related crimes for adults (r = .15, p>.05), between graduates and completers and drug-related crimes for juveniles (r = .24, p>.05), and between graduates and completers and drug-related violent crimes for juveniles (r = .51, p>.05). There are no statistically significant relationships between unemployment rate and drug-related violent crimes for adults (r = .20, p>.05), between unemployment rate and drug-related crimes for adults (r = .37, p>.05), and between unemployment rate and drug-related crimes for juveniles (r = .03, p>.05), and between unemployment rate and drug-related violent crimes for juveniles (r = .06, p>.05). There is a statistically significant relationship between poverty rate and drug-related violent crimes for adults (r = .71, p<.05). There are no statistically significant relationships between poverty rate and drug-related crimes for adults (r = .30, p>.05),

between poverty rate and drug-related crimes for juveniles (r = .57, p>.05), and between poverty rate and drug-related violent crimes for juveniles (r = .44, p>.05).

Table 5: *Study sample Correlations Matrix (Brunswick County and Grayson County)*

Correlations

		DrugRelatedViolentCrimeADULT	TotalDrugRelatedCrimeADULT	DrugRelatedCrimeJUVENILES	DrugRelatedViolentCrimeJUVENILES	TotalDrugRelatedCrimeExpenditures	TotalDrugAbusePreventionExpenditures	TotalDrugAbuseTreatmentExpenditures	TotalEconomicDevelopmentExpenditures	TotalEducationExpenditures	TotalGradsandCompleters	DropoutRate	UnemploymentRate	PovertyRate
DrugRelatedViolentCrimeADULT	Pearson Correlation	1	.884**	.465*	.357	.377	-.030	.557**	.425*	.255	-.177	.464*	-.195	.502*
	Sig. (2-tailed)		.000	.029	.103	.084	.895	.007	.049	.252	.429	.030	.384	.017
	N	22	22	22	22	22	22	22	22	22	22	22	22	22
TotalDrugRelatedCrimeADULT	Pearson Correlation	.884**	1	.390	.295	.448*	-.245	.453*	.466*	.410	-.321	.297	-.021	.489*
	Sig. (2-tailed)	.000		.072	.183	.036	.271	.034	.029	.058	.146	.180	.927	.021
	N	22	22	22	22	22	22	22	22	22	22	22	22	22
DrugRelatedCrimeJUVENILES	Pearson Correlation	.465*	.390	1	.839**	.276	-.427*	.389	.080	.366	-.179	.416	-.053	.290
	Sig. (2-tailed)	.029	.072		.000	.214	.047	.074	.724	.094	.426	.054	.816	.191
	N	22	22	22	22	22	22	22	22	22	22	22	22	22
DrugRelatedViolentCrimeJUVENILES	Pearson Correlation	.357	.295	.839**	1	.055	-.184	.126	-.038	.273	.037	.517*	-.113	.073
	Sig. (2-tailed)	.103	.183	.000		.809	.411	.577	.868	.219	.870	.014	.616	.747
	N	22	22	22	22	22	22	22	22	22	22	22	22	22
TotalDrugRelatedCrimeExpenditures	Pearson Correlation	.377	.448*	.276	.055	1	-.586**	.635**	.269	.526*	-.426*	-.130	.392	.884**
	Sig. (2-tailed)	.084	.036	.214	.809		.004	.001	.226	.012	.048	.565	.072	.000
	N	22	22	22	22	22	22	22	22	22	22	22	22	22
TotalDrugAbusePreventionExpenditures	Pearson Correlation	-.030	-.245	-.427*	-.184	-.586**	1	-.393	-.017	-.466*	.369	.332	-.482*	-.347
	Sig. (2-tailed)	.895	.271	.047	.411	.004		.070	.941	.029	.091	.131	.023	.113
	N	22	22	22	22	22	22	22	22	22	22	22	22	22
TotalDrugAbuseTreatmentExpenditures	Pearson Correlation	.557**	.453*	.389	.126	.635**	-.393	1	.368	.274	-.239	.096	.331	.693**
	Sig. (2-tailed)	.007	.034	.074	.577	.001	.070		.092	.217	.284	.672	.132	.000
	N	22	22	22	22	22	22	22	22	22	22	22	22	22
TotalEconomicDevelopmentExpenditures	Pearson Correlation	.425*	.466*	.080	-.038	.269	-.017	.368	1	.506*	-.005	.496*	.061	.411
	Sig. (2-tailed)	.049	.029	.724	.868	.226	.941	.092		.016	.981	.019	.787	.058
	N	22	22	22	22	22	22	22	22	22	22	22	22	22
TotalEducationExpenditures	Pearson Correlation	.255	.410	.366	.273	.526*	-.466*	.274	.506*	1	-.174	.332	.137	.585**
	Sig. (2-tailed)	.252	.058	.094	.219	.012	.029	.217	.016		.439	.131	.544	.004
	N	22	22	22	22	22	22	22	22	22	22	22	22	22
TotalGradsandCompleters	Pearson Correlation	-.177	-.321	-.179	.037	-.426*	.369	-.239	-.005	-.174	1	.194	.005	-.296
	Sig. (2-tailed)	.429	.146	.426	.870	.048	.091	.284	.981	.439		.386	.984	.181
	N	22	22	22	22	22	22	22	22	22	22	22	22	22
DropoutRate	Pearson Correlation	.464*	.297	.416	.517*	-.130	.332	.096	.496*	.332	.194	1	-.508*	.155
	Sig. (2-tailed)	.030	.180	.054	.014	.565	.131	.672	.019	.131	.386		.016	.490
	N	22	22	22	22	22	22	22	22	22	22	22	22	22
UnemploymentRate	Pearson Correlation	-.195	-.021	-.053	-.113	.392	-.482*	.331	.061	.137	.005	-.508*	1	.206
	Sig. (2-tailed)	.384	.927	.816	.616	.072	.023	.132	.787	.544	.984	.016		.357
	N	22	22	22	22	22	22	22	22	22	22	22	22	22
PovertyRate	Pearson Correlation	.502*	.489*	.290	.073	.884**	-.347	.693**	.411	.585**	-.296	.155	.206	1
	Sig. (2-tailed)	.017	.021	.191	.747	.000	.113	.000	.058	.004	.181	.490	.357	
	N	22	22	22	22	22	22	22	22	22	22	22	22	22

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 6: *Correlations Matrix (Brunswick County)*

Correlations

		DrugRelatedViolentCrimeADULT	TotalDrugRelatedCrimeADULT	DrugRelatedCrimeJUVENILES	DrugRelatedViolentCrimeJUVENILES	TotalDrugRelatedCrimeExpenditures	TotalDrugAbusePreventionExpenditures	TotalDrugAbuseTreatmentExpenditures	TotalEconomicDevelopmentExpenditures	TotalEducationExpenditures	TotalGradsandCompleters	DropoutRate	UnemploymentRate	PovertyRate
DrugRelatedViolentCrimeADULT	Pearson Correlation	1	.875**	.556	.738*	-.142	-.028	.256	.177	.006	-.343	.376	-.628*	-.271
	Sig. (2-tailed)		.000	.076	.010	.678	.934	.448	.602	.986	.302	.255	.039	.421
	N	11	11	11	11	11	11	11	11	11	11	11	11	11
TotalDrugRelatedCrimeADULT	Pearson Correlation	.875**	1	.653*	.829**	.044	-.287	.159	.148	.238	-.428	.101	-.255	-.074
	Sig. (2-tailed)	.000		.029	.002	.898	.393	.641	.664	.481	.190	.767	.450	.829
	N	11	11	11	11	11	11	11	11	11	11	11	11	11
DrugRelatedCrimeJUVENILES	Pearson Correlation	.556	.653*	1	.831**	.199	-.551	.306	.003	.358	-.649*	.063	-.115	-.045
	Sig. (2-tailed)	.076	.029		.002	.558	.079	.360	.994	.280	.031	.855	.736	.896
	N	11	11	11	11	11	11	11	11	11	11	11	11	11
DrugRelatedViolentCrimeJUVENILES	Pearson Correlation	.738**	.829**	.831**	1	-.038	-.217	.082	.050	.159	-.570	.264	-.199	-.264
	Sig. (2-tailed)	.010	.002	.002		.912	.522	.811	.884	.641	.067	.433	.558	.433
	N	11	11	11	11	11	11	11	11	11	11	11	11	11
TotalDrugRelatedCrimeExpenditures	Pearson Correlation	-.142	.044	.199	-.038	1	-.812**	.695*	-.370	.293	-.642*	-.840**	.527	.895**
	Sig. (2-tailed)	.678	.898	.558	.912		.002	.018	.263	.381	.033	.001	.096	.000
	N	11	11	11	11	11	11	11	11	11	11	11	11	11
TotalDrugAbusePreventionExpenditures	Pearson Correlation	-.028	-.287	-.551	-.217	-.812**	1	-.622*	.165	-.697*	.638*	.624*	-.445	-.722*
	Sig. (2-tailed)	.934	.393	.079	.522	.002		.041	.628	.017	.035	.040	.171	.012
	N	11	11	11	11	11	11	11	11	11	11	11	11	11
TotalDrugAbuseTreatmentExpenditures	Pearson Correlation	.256	.159	.306	.082	.695*	-.622*	1	-.325	.250	-.734*	-.394	-.176	.651*
	Sig. (2-tailed)	.448	.641	.360	.811	.018	.041		.330	.459	.010	.231	.606	.030
	N	11	11	11	11	11	11	11	11	11	11	11	11	11
TotalEconomicDevelopmentExpenditures	Pearson Correlation	.177	.148	.003	.050	-.370	.165	-.325	1	.144	.193	.596	-.204	-.346
	Sig. (2-tailed)	.602	.664	.994	.884	.263	.628	.330		.673	.569	.053	.548	.298
	N	11	11	11	11	11	11	11	11	11	11	11	11	11
TotalEducationExpenditures	Pearson Correlation	.006	.238	.358	.159	.293	-.697*	.250	.144	1	-.256	-.179	.312	.262
	Sig. (2-tailed)	.986	.481	.280	.641	.381	.017	.459	.673		.446	.599	.351	.436
	N	11	11	11	11	11	11	11	11	11	11	11	11	11
TotalGradsandCompleters	Pearson Correlation	-.343	-.428	-.649*	-.570	-.642*	.638*	-.734*	.193	-.256	1	.288	-.001	-.438
	Sig. (2-tailed)	.302	.190	.031	.067	.033	.035	.010	.569	.446		.390	.997	.177
	N	11	11	11	11	11	11	11	11	11	11	11	11	11
DropoutRate	Pearson Correlation	.376	.101	.063	.264	-.840**	.624*	-.394	.596	-.179	.288	1	-.657*	-.841**
	Sig. (2-tailed)	.255	.767	.855	.433	.001	.040	.231	.053	.599	.390		.028	.001
	N	11	11	11	11	11	11	11	11	11	11	11	11	11
UnemploymentRate	Pearson Correlation	-.628*	-.255	-.115	-.199	.527	-.445	-.176	-.204	.312	-.001	-.657*	1	.502
	Sig. (2-tailed)	.039	.450	.736	.558	.096	.171	.606	.548	.351	.997	.028		.115
	N	11	11	11	11	11	11	11	11	11	11	11	11	11
PovertyRate	Pearson Correlation	-.271	-.074	-.045	-.264	.895**	-.722*	.651*	-.346	.262	-.438	-.841**	.502	1
	Sig. (2-tailed)	.421	.829	.896	.433	.000	.012	.030	.298	.436	.177	.001	.115	
	N	11	11	11	11	11	11	11	11	11	11	11	11	11

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 7: *Correlations Matrix (Grayson County)*

Correlations

		DrugRelatedViolentCrimeADULT	TotalDrugRelatedCrimeADULT	DrugRelatedCrimeJUVENILES	DrugRelatedViolentCrimeJUVENILES	TotalDrugRelatedCrimeExpenditures	TotalDrugAbusePreventionExpenditures	TotalDrugAbuseTreatmentExpenditures	TotalEconomicDevelopmentExpenditures	TotalEducationExpenditures	TotalGradsandCompleters	DropoutRate	UnemploymentRate	PovertyRate
DrugRelatedViolentCrimeADULT	Pearson Correlation	1	.823**	.352	.232	.672*	.082	.513	.126	-.241	.290	.203	.210	.705*
	Sig. (2-tailed)		.002	.289	.492	.023	.810	.106	.712	.475	.387	.549	.536	.015
	N	11	11	11	11	11	11	11	11	11	11	11	11	11
TotalDrugRelatedCrimeADULT	Pearson Correlation	.823**	1	.039	.012	.513	-.155	.353	.161	-.213	.151	-.097	.368	.297
	Sig. (2-tailed)	.002		.909	.972	.106	.649	.286	.635	.530	.658	.777	.266	.375
	N	11	11	11	11	11	11	11	11	11	11	11	11	11
DrugRelatedCrimeJUVENILES	Pearson Correlation	.352	.039	1	.880**	.329	-.275	.403	-.113	.316	.403	.751**	.025	.573
	Sig. (2-tailed)	.289	.909		.000	.323	.414	.219	.741	.344	.219	.008	.942	.065
	N	11	11	11	11	11	11	11	11	11	11	11	11	11
DrugRelatedViolentCrimeJUVENILES	Pearson Correlation	.232	.012	.880**	1	.276	-.179	.162	-.169	.530	.512	.903**	-.058	.435
	Sig. (2-tailed)	.492	.972	.000		.411	.599	.634	.619	.094	.107	.000	.866	.181
	N	11	11	11	11	11	11	11	11	11	11	11	11	11
TotalDrugRelatedCrimeExpenditures	Pearson Correlation	.672*	.513	.329	.276	1	-.243	.791**	.666*	.139	.495	.099	.659*	.791**
	Sig. (2-tailed)	.023	.106	.323	.411		.472	.004	.025	.685	.122	.773	.028	.004
	N	11	11	11	11	11	11	11	11	11	11	11	11	11
TotalDrugAbusePreventionExpenditures	Pearson Correlation	.082	-.155	-.275	-.179	-.243	1	-.400	-.198	-.275	-.073	.105	-.565	.059
	Sig. (2-tailed)	.810	.649	.414	.599	.472		.222	.559	.412	.830	.758	.070	.864
	N	11	11	11	11	11	11	11	11	11	11	11	11	11
TotalDrugAbuseTreatmentExpenditures	Pearson Correlation	.513	.353	.403	.162	.791**	-.400	1	.433	-.169	.118	-.090	.695*	.708*
	Sig. (2-tailed)	.106	.286	.219	.634	.004	.222		.183	.640	.729	.792	.018	.015
	N	11	11	11	11	11	11	11	11	11	11	11	11	11
TotalEconomicDevelopmentExpenditures	Pearson Correlation	.126	.161	-.113	-.169	.666*	-.198	.433	1	.237	.354	-.336	.710*	.276
	Sig. (2-tailed)	.712	.635	.741	.619	.025	.559	.183		.484	.286	.313	.014	.412
	N	11	11	11	11	11	11	11	11	11	11	11	11	11
TotalEducationExpenditures	Pearson Correlation	-.241	-.213	.316	.530	.139	-.275	-.169	.237	1	.389	.351	.118	.095
	Sig. (2-tailed)	.475	.530	.344	.094	.685	.412	.640	.484		.236	.289	.729	.780
	N	11	11	11	11	11	11	11	11	11	11	11	11	11
TotalGradsandCompleters	Pearson Correlation	.290	.151	.403	.512	.495	-.073	.118	.354	.389	1	.557	-.026	.349
	Sig. (2-tailed)	.387	.658	.219	.107	.122	.830	.729	.286	.236		.075	.939	.293
	N	11	11	11	11	11	11	11	11	11	11	11	11	11
DropoutRate	Pearson Correlation	.203	-.097	.751**	.903**	.099	.105	-.090	-.336	.351	.557	1	-.411	.349
	Sig. (2-tailed)	.548	.777	.008	.000	.773	.758	.792	.313	.289	.075		.209	.293
	N	11	11	11	11	11	11	11	11	11	11	11	11	11
UnemploymentRate	Pearson Correlation	.210	.368	.025	-.058	.659*	-.565	.695*	.710*	.118	-.026	-.411	1	.236
	Sig. (2-tailed)	.536	.266	.942	.866	.028	.070	.018	.014	.729	.939	.209		.484
	N	11	11	11	11	11	11	11	11	11	11	11	11	11
PovertyRate	Pearson Correlation	.705*	.297	.573	.435	.791**	.059	.708*	.276	.095	.349	.349	.236	1
	Sig. (2-tailed)	.015	.375	.065	.181	.004	.864	.015	.412	.780	.293	.293	.484	
	N	11	11	11	11	11	11	11	11	11	11	11	11	11

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Discussion of Dependent and Independent Variables

The following is a detailed discussion of the six hypotheses based on data analysis for the study sample (Brunswick County and Grayson County):

H_1: There is a statistically significant inverse correlation between drug-related crime expenditures and expenditures for drug abuse prevention, drug abuse treatment, economic development, and education.

H_1 produced mixed results. First, the relationship between drug-related crime expenditures and drug abuse treatment expenditures was rejected. The data analysis revealed that there was a significant correlation, but not an inverse correlation, between drug abuse treatment expenditures and drug-related crime expenditures for the study sample (Brunswick County and Grayson County combined). Expenditures for drug abuse treatment in the study sample are

negligible in comparison to drug-related crime expenditures. This has been a common spending practice for policymakers whose response to address substance use problems have been to spend the bulk of its substance abuse funding on the consequences of substance abuse instead of mitigating its effects through drug abuse treatment and and drug abuse prevention. Case in point, The National Center for Addiction and Substance Abuse (CASA) (2001, 2009) study to estimate the burden of substance abuse to local, state, and federal governments concluded that governments spend billions of dollars annually to address the issue of substance abuse. One of the primary costs associated with the drug use is justice related costs. However, governments spend less than 2 cents of every dollar spent on substance abuse towards drug abuse treatment and drug abuse prevention. This spending pattern is in spite of the literature that overwhelmingly states that community-based and prison-based drug abuse treatment programs have been found to reduce the burden and consequences of drug-related crimes. Specifically, drug abuse treatment and drug abuse prevention expenditures have been found to contribute to the reduction in drug-related criminal costs due to reduced drug use, crime rates and recidivism (French et al., 2000; McCollister & French, 2002; McCollister et al., 2003a).

The CASA studies also suggest that policymakers redirect funding towards drug abuse treatment and prevention to reduce crime-related costs, including psychopharmacological violence, economic-compulsive violence, and systemic violence, associated with drug use. Consequently, the study sample's limited investment in drug abuse treatment has not been effective in reducing drug-related crime expenditures, which is consistent with the CASA studies.

Second, the relationship between drug-related crime expenditures and economic development expenditures was rejected. The data analysis revealed that there was no significant

correlation between economic development expenditures and drug-related crime expenditures for the study sample (Brunswick County and Grayson County combined).

Economic development is an important factor of social determinants of health, which is a concept of improving the economic and social deficits that impact the health of people in communities. Economic development has important implications for outcomes such as income/poverty levels, employment opportunities, and improvements in the physical/built environment, and the quality of life. When these factors are addressed, they play a critical role in reducing drug-related crime expenditures (CSDH, 2008; Tarlov, 1999). Hyra (2008), for example, revealed that many cities have been revitalized as a result of economic improvements such as increases in the number of jobs, residents, and available housing. In turn crime tends to go down, and revitalized cities are more likely to be targeted for investment by local, state, and the federal government, as well as by businesses and private developers. These changes have important implications for indicators of community well-being.

However, the impact of unforeseen social, environmental, and economic events can have a wide-range of systemic effects that can eliminate or reduce the likelihood of an anticipated increase positive economic or social outcomes predicted by even a well-conceived, well-timed, and well-executed social policy. The 2008 recession was an unforeseen event that dramatically impacted economic development expenditures, resulting in substantial job losses, income losses, and higher unemployment rates, and increased drug-related crime expenditures in the study area. The effects of the recession appeared to virtually eliminate the efforts of local government and their partners to enhance economic development and to reduce drug-related crime expenditures in two rural communities.

Third, the relationship between drug-related crime expenditures and education expenditures was rejected. The data analysis revealed that education expenditures were not correlated to drug-related crime expenditures for the study sample (Brunswick County and Grayson County combined). Similar to economic development, education is also an important factor of social determinants of health. Education has important implications for outcomes such as improved graduation rates, reductions in dropout rates, and factors associated with educational attainment. When these factors are addressed, they also play a critical role in reducing drug-related crime expenditures (CSDH, 2008; Tarlov, 1999).

This study's finding was not consistent with the literature. Studies have found that educational institutions are successful in reducing illicit drug use (CASA, 2001b; Figlio and Ludwig, 2000), and the subsequent drug-related crime expenditures. However, rural youth tend to engage in "hard" illicit drugs such as cocaine and methamphetamine at greater rates than their urban counterparts (SAMHSA, 2004). A considerable proportion of these adolescents initiation into drug use occurred while at school (CASA, 2001a). Substance use not only results in academic failure, lower wages, dropping out of school, but it may also leads to violent behavior, and subsequent incarceration. Dawkins (1997) found that youth offenders that used drugs were associated with violent and non-voilent behavior which lead to their arrest, thereby, resulting in increased expenditures for drug-related crimes.

Rural area classification may be the reason why there was no relationship, particularly inverse relationship, between education expenditures and drug-related crime expenditures. Many rural areas, such as Brunswick County and Grayson County, are faced with mounting social ills that have devastating impacts on children and families (e.g., poverty rates, lower educational

attainment, fewer resources against drug gangs, substance abuse), as well as a declining tax base that creates barriers for policymakers to give priority to address substance use.

Fourth, the relationship between drug-related crime expenditures and drug abuse prevention expenditures was accepted. The data analysis revealed that there was a statistically significant inverse relationship between drug-related crime expenditures and drug abuse prevention expenditures. In other words, the more money invested in drug abuse prevention results in reduction in drug-related criminal expenditures. Numerous studies have consistently found that the benefits of drug-abuse prevention programs exceed the costs of drug abuse prevention programs. The Washington State Institute for Public Policy found that investments in effective drug abuse prevention programs for juvenile offenders had the highest net benefit per youth. In addition, studies have found that drug abuse prevention programs can reduce the consumption of illicit drugs such as cocaine, heroin and methamphetamine more effectively than crime related programs (Caulkins et al., 1999; Caulkin et al., 2002).

These findings are supported by those from national organizations such as The Center for Substance Abuse Prevention and the National Center on Addiction and Substance Abuse, which have confirmed and supported substance abuse prevention as one of the most effective approaches to reducing psychopharmacological violence, economic compulsive violence, and systemic violence. Reductions in the drug use and crime relationship ultimately results in reductions in crime-related expenditures.

Further, the linear regression data predicted a statistically significant inverse relationship between drug-related crime expenditures and drug abuse prevention expenditures. In this model, drug abuse prevention expenditures accounted for 34% of the drug-related crime expenditures.

H_2: There is a statistically significant inverse relationship between expenditures for drug abuse prevention and drug-related crimes.

H_2 was accepted. The data analysis revealed that there was a statistically significant inverse relationship between expenditures for drug abuse prevention and drug-related crimes for juveniles for the study sample (Brunswick County and Grayson County combined). In other words, the more money invested in drug abuse prevention results in reduced drug-related crimes for juveniles. Further, linear regression data predicted a statistically significant inverse relationship between drug-related crimes for juveniles and drug abuse prevention expenditures. This model accounted for 18% of the variance that drug-related crimes for juveniles predict drug abuse prevention expenditures.

Schools are the primary location for providing drug abuse prevention programs for adolescents to avoid tobacco, alcohol, and illicit drugs. Substance abuse prevention programs, such as Safe and Drug Free School and the Drug Abuse Resistance Education Program (DARE), are provided in both Brunswick County and Grayson County schools. While there is a great deal of controversy regarding the efficacy of the DARE program, this study's findings is consistent with those that state that DARE programs are having a significant impact on adolescents in terms of their attitudes towards avoiding drugs, their assertiveness, their knowledge of the costs associated with drugs and media pressures, and their understanding of peer influences (Ringwalt, Ennett, & Holt, 1991), and ultimately, their reductions in psychopharmacological violence, economic-compulsive violence, and systemic violence. This finding is supported by Brunswick County and Grayson County's drug-related violent crime for juveniles mean rate of .18 respectively.

H_3: There is a statistically significant inverse relationship between expenditures for drug abuse treatment and drug-related crimes.

Hypothesis Three was rejected. The data analysis revealed a statistically significant relationship between drug abuse treatment expenditures and drug-related violent crimes for adults and between drug abuse treatment expenditures and drug-related crimes for adults. However, the relationships were not an inverse and therefore are inconsistent with the literature.

A growing body of research has provided evidence that community-based treatment modalities (e.g., detoxification, inpatient treatment, outpatient treatment, and therapeutic communities) can be effective in reducing substance use, recidivism, criminal behavior, and arrests associated with psychopharmacological violence, economic-compulsive violence, systemic violence (Holloway et al., 2006, Jofre-Bonet & Sindelar, 2002). In-prison drug abuse treatment is also found to be effective in reducing drug use, psychopharmacological violence, economic-compulsive violence, systemic violence, and recidivism rates. In-prison drug abuse treatment programs and subsequent community-based treatment programs provided to offender once released from prison, further enhances the likelihood of reducing drug-related crimes (Butzin, Martin & Inciardi, 2002; Inciardi et al., 1997).

However, drug abuse treatment has not been a priority on the public policy agenda and drug abuse treatment programs in rural regions have historically been challenging for individuals and families to access (e.g., barriers such as transportation, child care, and financial resources). Therefore, many rural citizens tend not to seek needed drug abuse treatment services and policymakers tend to focus on the consequences of drug abuse through enforcement and incarceration instead of treating and preventing the disease. A report by the Virginia Department of Behavioral Health and Developmental Services (2012) stated that SWVA and SSVA had the

lowest rates of individuals receiving treatment for an illicit drug in the Commonwealth of Virginia. Further, Brunswick County and Grayson County do not provide in-prison treatment services to offenders needing drug abuse treatment services. Studies found that over 52% of offenders that are substance users are more likely to recidivate compared to those who are not substance users. Since Brunswick County and Grayson County's priority has been towards enforcement and incarceration for drug-related crimes rather than on drug abuse treatment to reduce drug-related crimes, it is possible the rates of drug-related crimes are the result of repeat offenders who engage in psychopharmacological violence, economic-compulsive violence, systemic violence, and other crimes associated with the drug market.

H_4: There is a statistically significant inverse relationship between expenditures for economic development and drug-related crimes.

H_4 was rejected. The data analysis revealed a statistically significant relationship, but not an inverse relationship, between economic development expenditures and drug-related crimes for adults, and between economic development expenditures and drug-related violent crimes for adults. In other words, this study found that as economic development expenditures increase, drug-related crimes for adults and drug-related violent crimes for adults also increased. Contrary to this study's findings, the literature supports that economic development plays a major role in reducing crime, including drug-related crimes. For example, Loukaitou-Siderisas (2004) found that as economic development increases, violent crime decreases (e.g., psychopharmacological violence, economic-compulsive violence, and systemic violence).

The 2008 recession may be a major factor that contributed to the rejection of this hypothesis. The significant investments made in economic development were greatly impacted

by the recession which resulted in business closures, job layoffs and downsizing, and greater income inequality in the SWVA and SSVA regions. Studies have found a significant relationship between income inequality and crime (Arvanites & Asher, 1998) which may account for the significant relationship between economic development and drug-related crimes for adults.

H_5: There is a statistically significant inverse relationship between expenditures for education and drug-related crimes.

H_5 was rejected. The data analysis revealed that education expenditures were not correlated to drug-related crimes for adults or juveniles for the study sample (Brunswick County and Grayson County combined). This finding is inconsistent with the body of evidence that suggests that education is a critical factor to reduce criminal behavior and incarceration (Lochner & Moretti (2003).

Studies have confirmed that teens that use illicit substances are at risk of behavior problems, such as drug use, that will reduce academic achievement during adolescence, thereby jeopardizing their chances of entering and being successful in college (King, Meehan, Trim, & Chassin, 2006). Studies have also revealed that student who use illicit drugs are at greater risk of dropping out of school than students that do not use illicit drugs (Townsend, Flisher & King, 2007). The SWVA and SSVA regions were reported to have the highest percentage of adults without a high school diploma, which has serious implications for social and economic conditions in the regions. In 2000, the percentage of adults without a high school diploma in these areas was above 30 percent (Council on Virginia's Future, 2009). Even with reports that a high school drop-out is about eight times more likely to be in jail or prison as a high school graduate, and nearly twenty times as likely to be incarcerated as a college graduate (Council on

Virginia's Future, 2009), the rate of drug-related crimes for juveniles for the study sample was relatively low.

H_6: There is a statistically significant relationship between drug-related crimes and total graduates and completers, dropout rate, unemployment rate, and poverty rate.

H_6 produced mixed results. The data analysis revealed that the relationship between drug-related crimes and graduates and completers was rejected. There was no statistically significant relationship between drug-related crimes and graduates and completers. Studies have shown that drug use is associated with reductions in the number of years of schooling completed (Chatterji, 2006). It is possible that parents and peers in the study sample areas have a positive influence of averting drug use amongst adolescents. Parental and peer relationships are the primary predictor of a child's behavior. Intervention that focus on protective factors (e.g., close and supportive peer and parent-child relationships, positive discipline techniques, close monitoring and supervision, involvement in church, sports, and other positive activities) are essential to prevent drug use (Akers & Sellers, 2004; Kumpfer et al., 1998). Parents and peers may have a negative attitude towards drug use which may explain why drug-related crimes for juveniles were very low in both counties. In addition, demographic data revealed that the rate of high school graduate or higher, percent of persons aged 25+, 2007-2011, was 73.2% for Grayson County and 69.1% for Brunswick County. The combined positive parental and peer influences towards drug use and the graduation rates may have contributed to no significant relationship between drug-related crimes and total graduates and completers.

Second, the relationship between drug-related crimes and dropout rate was accepted. The study found a statistically significant relationship between dropout rate and drug-related violent

crimes for adults and between dropout rate and drug-related violent crimes for juveniles. The literature consistently showed a positive relationship between dropping out of high school and psychopharmacological violence, economic-compulsive violence, and systemic violence.

Three theories have been offered to explain why drug use is associated with academic failure: drug use leads to problems at school, problems at school lead to drug use, and other underlying factors contribute to both outcomes. Regardless of the direction of academic failure, students who used drugs were at higher risk of dropping out of school than those that did not use drugs (King et al., 2006), and other risky behaviors such as continued drug use into adulthood, and engaging in drug-related crime (Cox et al., 2007). Further, studies have shown that adolescents that use drugs tend to carrying weapons and engaging in physical fighting than those that did not use illicit drugs (Dukarm et al., 1996).

Third, the relationship between drug-related crimes and unemployment rate was rejected. There was no correlational relationship between drug-related crimes and unemployment rate. Studies of the relationship between unemployment and crime have produced conflicting results. On one hand, the literature revealed a positive relationship between unemployment and violent crimes (Agell & Nilsson, 2003; Raphael & Winter-Ebmer, 2001), as well as property crimes (Long & Witte, 1981). On the other hand, other studies did not show a significant relationship between the two (Box, 1987).

As stated previously, the economic development expenditures in the Brunswick County and Grayson County were greatly impacted by the 2008 recession which resulted higher unemployment rates. Case in point, in the years 2007 and 2008, the unemployment rates in Brunswick County were 4.8% and 6.7% respectively. In 2009 and 2010, the unemployment rates were nearly double, and in some cases more than double, the rates for 2007 and 2008 years.

Brunswick County's unemployment rate reached 11.4% in 2009 and 11.8% in 2010. For Grayson County, the unemployment rates in the years 2007 and 2008 were 5.1% and 6.5% respectively. Grayson County's unemployment rates exploded to 10.9% for 2009 and 12% for 2010. Yet, the escalating unemployment rate that resulted from the recession, did not affect drug-related crimes in the study sample. This finding supports Wilson & Cook (1985) who's overall findings is that unemployment rates have resulted in insignificant rates of crime.

Fourth, the relationship between drug-related crimes and poverty rate was accepted. The study also found a statistically significant relationship between poverty rate and drug-related violent crimes for adults and between poverty and drug-related crimes for adults. A report from the Weldon Cooper Center for Public Service (Cable & Tippett, 2012) indicates that the SWVA and SSVA regions have the highest rates of poverty in the Commonwealth. Many of the localities within these regions have poverty rates above 20 percent due to decline in key industries such as the agriculture and tobacco industries that resulted in substantial job losses. The 2008 recession resulted in additional job losses due to business closing, low-wages, and unemployment, and other barriers which left families that were already facing financial hardships in extreme poverty. There is substantial body of literature that indicates a positive relationship between poverty and violent crime. While poverty is consistently associated with property crimes, studies have also shown a positive relationship between poverty and violent crimes. The extreme poverty rates, along with income inequality, may have resulted in a significant relationship with drug-related crimes for adults (Arvanites & Asher, 1998; Sampson & Groves, 1989).

Linear Regression

Two linear regressions were performed to test for the hypothesized predictive relationships between the independent and dependent variables that were found to have statistically significant inverse correlational relationships for the study sample (Brunswick County and Grayson County combined). Drug abuse prevention expenditures were found to have a statistically significant inverse relationship with drug-related offenses for juveniles and drug-related crime expenditures.

Table 8, Coefficients, indicates the significance and contribution of the independent variable (drug abuse prevention) in predicting drug-related criminal expenditures. The summary of regression coefficients indicate that there is a significant inverse relationship between drug-related criminal expenditures and drug abuse prevention expenditures with a $\beta = -.586$, $p < .004$.

Table 8: *Coefficients*

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2985131.131	244632.538		12.203	.000
	TotalDrugAbusePreventionExpenditures	-16.470	5.098	-.586	-3.231	.004

a. Dependent Variable: TotalDrugRelatedCrimeExpenditures

Table 9, the Model Summary, indicates that drug abuse prevention expenditures significantly predict drug-related crime expenditures, $R^2 = .343$. This model accounts for 34% of the variance that drug abuse prevention expenditures predict drug-related crime expenditures.

Table 9: *Model Summary*

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.586[a]	.343	.310	702792.3655	.343	10.437	1	20	.004

a. Predictors: (Constant), TotalDrugAbusePreventionExpenditures

Table 10, Coefficients, determines the accuracy of the independent variable (drug abuse prevention) in predicting drug-related crimes for juveniles. The summary of regression coefficients indicate a statistically significant inverse relationship between drug-related crimes for juveniles and drug abuse prevention expenditures with a $\beta = -.427$, p=.047. Expenditures for drug abuse prevention reduced drug-related crimes for juveniles in this sample.

Table 10: *Coefficients*

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.048	.764		5.298	.000
	TotalDrugAbusePreventionExpenditures	-3.363E-005	.000	-.427	-2.112	.047

a. Dependent Variable: DrugRelatedCrimeJUVENILES

Table 11, the Model Summary, indicates that drug abuse prevention significantly predicts drug-related crimes for juveniles, $R^2 = .182$. This model accounts for 18% of variance that drug abuse prevention predicts drug-related crimes for juveniles.

Table 11: *Model Summary*

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.427[a]	.182	.141	2.19514	.182	4.460	1	20	.047

a. Predictors: (Constant), TotalDrugAbusePreventionExpenditures

Multiple Regression

Based on the correlations found, there was a weak association between drug abuse prevention and drug-related crimes for juveniles and between drug abuse prevention and drug-related crime expenditures. Given that, the researcher wanted to determine what other independent variables may provide a greater explanation for the dependent variable. Therefore, multiple regression was performed to determine the independent variables (i.e., drug abuse prevention, drug abuse treatment, economic development, and education) that predict drug-related crime expenditures. The regression results indicated the independent variables (drug abuse prevention, drug abuse treatment, economic development, and education) significantly predict drug-related crime expenditures, $R^2 = .596$, $F = 6.273$, $p<.01$. The regression results also indicated that one predictor (drug abuse treatment expenditures) makes the strongest and only significant contribution to explain drug-related crime expenditures, $\beta = .474$, $p<.05$. However, the relationship was not inversely correlated (See Table 12).

Table 12: *Regression Analysis*

	Unstandardized Coefficients		Standardized Coefficients		
Model	B	Std. Error	Beta	T	Sig.
(Constant)	-2657511.273	2037329.767		-1.304	.209
Drug Abuse Prevention	-7.187	5.650	-.256	-1.272	.221
Drug Abuse Treatment	73.808	28.688	.474	2.573	.020
Economic Development	-.102	.310	-.067	-.330	. 746
Education	.426	.292	.311	1.460	.163

Note: R^2 = .596; F = 6.273; p = .003

Table 13, the Model Summary accounted for 59.6% of drug-related crime expenditures, which is a strong association. In addition, the *p* value indicated significant at a .003 value.

Table 13: *Multiple Regression*

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.772[a]	.596	.501	597637.6636	.596	6.273	4	17	.003

a. Predictors: (Constant), TotalEducationExpenditures, TotalDrugAbuseTreatmentExpenditures, TotalDrugAbusePreventionExpenditures, TotalEconomicDevelopmentExpenditures

CHAPTER V:

CONCLUSIONS, RECOMMENDATIONS AND IMPLICATIONS

The purpose of this study was to examine the relationship between drug-related crimes (i.e., drug-related violent crime and drug-related crime for adults and juveniles) in high-risk, rural Virginia counties and efforts to reduce drug-related crimes (i.e., expenditures-drug abuse prevention, drug abuse treatment, economic development, and education). The study was based on the premise that the reduction of drug-related crimes is linked to several factors. The researcher investigated four independent variables: drug abuse prevention, drug abuse treatment, economic development, and education. The variables were examined in relationship to drug-related crimes. The following demographic variables were also analyzed: unemployment rates, educational outcomes (high school graduate or higher, bachelor's degree or higher, dropout rates, total graduates and completers), homeownership rates, median household income, poverty rates).

This investigation included a review and critique of selective relevant literature. Key components addressed included the following: an overview of drug-related crimes, the burden of substance abuse, and efforts to reduce drug-related crimes in the areas of drug abuse prevention, drug abuse treatment, economic development, and education.

The theoretical framework focused on Paul Goldstein's tripartite framework to explain the drug use and violent crime relationship which described psychopharmacological violence, economic compulsive violence, and systemic violence. In addition, four approaches to reduce the drug use and crime relationship (i.e., drug abuse prevention, drug abuse treatment, economic development, and education) were also explored. Drug abuse prevention and drug abuse treatment are traditional approaches to address the drug use and crime relationship. Economic development and education are factors of social determinants of health (economic and social

deficits that impact the health of people in communities). The literature suggests that strategies that build on traditional approaches to reduce substance use and addiction and simultaneously address social determinants of health are proven to be the most effective approaches at mitigating the drug use and crime relationship.

The researcher also identified and elaborated on the following key components: hypotheses, research design, population, method of data collection and instrumentation, method of data analysis.

The hypotheses investigated were:

H_1: There is a statistically significant inverse correlation between drug-related crime expenditures and expenditures for drug abuse prevention, drug abuse treatment, economic development, and education.

H_2: There is a statistically significant inverse relationship between expenditures for drug abuse prevention and drug-related crimes.

H_3: There is a statistically significant inverse relationship between expenditures for drug abuse treatment and drug-related crimes.

H_4: There is a statistically significant inverse correlation between expenditures for economic development and drug-related crimes.

H_5: There is a statistically significant inverse correlation between expenditures for education and drug-related crimes.

H_6: There is a statistically significant relationship between drug-related crimes and total graduates and completers, dropout rate, unemployment rate, and poverty rate.

The research designs employed in the study were the exploratory, descriptive and explanatory research designs were employed in this study. The designs were used to examine the relationship between drug-related crimes and efforts to reduce drug-related crimes in the areas of drug abuse prevention, drug abuse treatment, economic development, and education. The research used secondary data, over an eleven-year period, to analyze the relationship between drug-related crimes and efforts to reduce drug-related crimes in the areas of drug abuse prevention, drug abuse treatment, economic development, and education. Secondary data was collected from state and local government officials as follows: demographic data (population, education-high school graduates and higher, bachelors' degree and higher, homeownership rates, median household income, poverty rates, and unemployment rates) was collected from the U.S. Census Bureau. Dropout rates and graduate and completers data was collected from the Virginia Department of Education-Superintendents' Annual Report. Drug-related arrest data was collected from the local Sheriff's Office. Audit documents were collected from the local Treasurer in both Brunswick County and Grayson County, and the Virginia Tobacco and Indemnification and Community Revitalization Commission (VTICRC) to determine expenditures for the dependent and independent variables. The data collected from the secondary sources were reviewed and analyzed.

The data was analyzed using descriptive statistics, correlational analyses, linear and multiple regression analyses. First, descriptive statistics were used to analyze the demographic data. Second, correlational analyses were first used to assess significant relationships between the independent and dependent variables. Third, linear regression was used to test for hypothesized predictive relationships between independent and dependent variables that were found to have significant correlational relationships. Fourth, the multiple regression, a

multivariate linear regression analysis, is used when the researcher possesses a single criterion variable (drug-related criminal expenditures) and multiple predictor variables (drug abuse prevention, drug abuse treatment, economic development and education).

Research Implications

The statistically significant correlations between the study dependent variables and the independent variables identified in the data analyses suggest that policy decisions to allocate funding to address chronic social issues may require a substantial initial financial investment, particularly as it relates to drug abuse prevention. It appears that such financial investment is often required at a time when potential funding (e.g. reductions in tax bases due to increased unemployment, closed businesses, and population reductions) is shrinking. This revenue shrinkage can be attributed to the need to stem the effects of chronic social conditions while failing to invest in much needed prevention or protective efforts. This dilemma may present a quandary to policymakers. Future research should explore how acute and chronic needs to stem the effects of social or economic conditions, while tackling the challenges of conceptualizing and implementing preventive actions, can be effectively undertaken by communities facing the brunt of the equivalent of an economic tsunami (e.g., the 2008-2010 recession).

Implications for public policy for localities with limited resources are reinforced by the data which suggests that governments should invest in drug abuse prevention programming for juvenile offenders in order to reduce psychopharmacological violence, economic-compulsive violence, and systemic violence. Future research should explore a quasi-experimental research design, with a random sampling of the VTICRC regions, to allow one to collect a larger data set and to generalize across the population to determine if investments in drug abuse prevention

reduce negative life outcomes (e.g., dropout, illicit substance use, psychopharmacological violence, economic-compulsive violence, and systemic violence) for juveniles and adults.

Recommendations

This research shows that Brunswick and Grayson counties expended a substantial amount of funding to address drug abuse, with annual budget increases targeted to crime-related expenditures, while a lesser amount is spent to minimize its effects through drug abuse prevention and drug abuse treatment. There is growing literature that has proven that drug use is a preventable and treatable disease, and is effective in reducing expenditures associated with the drug use and crime relationship, including violent crime. Thus, both counties may want to consider where expenditures can be more effectively used to yield a better return.

Even with the amount of expenditures that Brunswick and Grayson counties continue to expend on the drug use and crime relationship, including violent crime, this study reflects a positive relationship between drug abuse prevention and reduction in crime expenditures in the entire sample. Therefore, Brunswick and Grayson counties' policymakers may consider adopting drug abuse prevention policies and programs to further avert and reduce the economic and social burden associated with drug use and crime, including violent crime.

The drug abuse prevention policies and programs should incorporate a comprehensive approach to minimizing the risk factors and maximizing the protective factors associated with drug use in the five principal domain areas: schools, community, individual, family and peers. This approach may engage stakeholders (e.g., government, school officials, community leaders, parents, business community, and the faith-based community) in each respective county to work collaboratively to address the issue of drug use. Comprehensive intervention approaches have been proven to be more effective than singular approaches in reducing drug use, and subsequent

crime. Albeit, an initial investment to implement a comprehensive drug abuse prevention programs may create further hardship for counties that are already facing fiscal challenges due to declining revenues and a recent recession in the short run, investments in drug abuse prevention is necessary to alleviate the continuous economic and social burden of drug use and abuse long-term. Based on this research, policymakers in each county cannot afford not to invest in drug abuse prevention programs, particularly when the extant research has proven that investments in drug abuse prevention programs may give taxpayers a good return on their dollars invested and concomitantly, reduce the consequences of drug use in their respective counties.

I also suggest that Brunswick and Grayson counties' policymakers consider adopting policies to support regional drug abuse prevention interventions to address the issue of drug use and crime, including violent crime. Since drug use has no boundaries and drug users and dealers tend to travel from county-to-county and region-to-region to sell, purchase and use illicit drugs—many of them consequently engage in crimes as a result of the drug market. Therefore, regional drug abuse prevention programs may also have widespread effects in reducing the economic and social burden of drug use and crime throughout the Virginia Tobacco Indemnification and Community Revitalization Commissions (TICRC) service areas.

Further, the literature suggests the drug abuse prevention interventions, in combination with efforts to address the social determinants of health (improving the economic and social deficits that compromise the health of people in communities) is also effective in mitigating drug-related crimes. This study has shown that drug abuse prevention is significantly inversely correlated with unemployment for the entire sample. Therefore, policymakers should consider adopting a drug abuse prevention policy and simultaneously address the social determinants of

health such as unemployment efforts, which may have an even greater effect on reducing the economic and social burden of drug-related crimes.

Based on the Joint Legislative Audit and Review Committee and the National Center on Addiction and Substance Abuse studies, governmental spending is overwhelmingly targeted at the burden of substance abuse and addiction rather than towards investing in cost-effective approaches to minimize the disease and its consequences such as drug abuse prevention. Despite a significant and emergent body of knowledge documenting that substance abuse and addiction is a preventable and treatable disease—as well as a growing array of prevention, treatment and policy interventions of proven efficacy—government policymakers seem more inclined to do damage control than take proactive steps to stop it before it starts. Therefore, local, state and federal policymakers should begin to reprioritize limited funding to ensure maximum impact of reducing drug-related crimes and its consequences through drug abuse prevention policies and increased funding allocations.

LIST OF REFERENCES

Agell, J. & Nilsson, A. 2003. Crime, unemployment and labor market program in turbulent times. Research paper in economics. Stockholm University, Department of Economics.

Aguirre-Molina, M. & Gorman, D. M. 1996. Community-based approaches for the prevention of alcohol, tobacco, and other drug use. *Annual Reviews Public Health*, 17:337-358.

Aguirre-Molina, M. & Parra, P. A. 1995. Latino youth and families as active participants in planning change. In R. Zambrana, *Understanding Latino families-Scholarship, policy, and practice* (pp. 130-153). Thousand Oaks, CA: Sage.

Akers, R. L. & Sellers, C. S. 2004. *Criminological theories: Introduction, evaluation, and application* (4th ed.). Los Angeles: Roxbury.

Alberta Health Services-Addiction and Mental Health. 2009. *Challenging assumptions. The association between substance use and criminal behaviour*. Edmonton, AB: Author.

Alcoholism & Drug Abuse Weekly. 2004. Meth use linked to identity theft. *Alcoholism and Drug Abuse Weekly*, 16:7.

Alcoholism & Drug Abuse Weekly. 2005. White collar crime up among drug addicts. *Alcoholism and Drug Abuse Weekly*, 17.

Allen, C. 2005. The links between heroin, crack cocaine, and crime: Where does street crime fit in? *The British Journal of Criminology*, 45:355-372.

Allen, R. 1996. Socioeconomic conditions and property crime: a comprehensive review and test of the professional literature. *American Journal of Economics and Sociology*, 55:293-308.

Altschuler, D. M. & Brounstein, P. J. 1991. Patterns of drug use, drug trafficking, and other delinquency among inner-city adolescent males in Washington, D.C. *Criminology,* 29:589-622.

American Economic Development Council (AEDC). 1984. *Economic development today: A report to the profession*. Schiller Park, IL: AEDC.

Ammerman, R. T., Ott, P. J., & Tarter, R. E. 1999. *Prevention and societal impact of drug and alcohol abuse*. Lawrence Erlbaum Associates, Publishers.

Andrews, J. A., Hops, H., Ary, D., Tidlesley, E., & Harris, J. 1993. Parent influence on early adolescent substance use: Specific and nonspecific effects. *The Journal of Early Adolescence*, 13:285-310.

Andrews, D. A., Zinger, I., Hoge, R. D., Bonta, J. L., Gendreau, P., & Cullen, F. T. 1990. Does correctional treatment work? A clinically relevant and psychologically informed meta-analysis. *Criminology*, 28:369-404.

Anglin, M. D. 1984. A review of alcohol, drugs, and aggression. *Journal of Studies on Alcohol,* 35:469-490.

Anglin, M. D., Burke, C., Perrochet, B., Stamper, E., & Dawud-Noursi, S. 2000. History of methamphetamine problem. *Journal of Psychoative Drugs*, 32:137-141.

Anglin, M. D. & Hser, Y.-I. 1990a. Treatment of drug abuse. In M. Tonry & J. Wilson (Eds.), *Crime and justice 13, drugs and crime* (pp. 393-460). Chicago: University of Chicago Press.

Anglin, M. D. & Hser, Y.-I. 1990b. Legal coercion and drug treatment: Research findings and social policy implications. In J. Inciardi (Ed.), *Handbook of drug control in the United States* (pp. 151-176). New York: Greenwood.

Anglin, M. D., Longshore, D., & Turner, S. 1999. Treatment alternatives to street crime: An evaluation of five programs. *Criminal Justice and Behavior*, 26:168-195.

Anglin, M. D., Longshore, D., Turner, S., McBride, D., Inciardi, J., & Prendergast, M. 1996. Studies on the functioning and effectiveness of treatment alternatives to street crime (TASC) programs. UCLA Drug Abuse Research Center, Angeles, Ca.

Anglin, M. D. & Perrochet, B. 1998. Drug use and crime: A historical review of research conducted by the UCLA Drug Abuse Research Center. *Substance Use and Misuse*, 33:1871-1914.

Antonowicz, D. H. & Ross, R. R. 1994. Essential components of successful rehabilitation programs for offenders. *International Journal of Offender Therapy and Comparative Criminology*, 38:97-104.

Aos, S., Miller, M. & Drake, E. 2006. *Evidence-based public policy options to reduce future prison construction, criminal justice costs, and crime rates*. Olympia WA: Washington Institute for Public Policy.

Aos, S., Phipps,P., Barnoski, R., & Lieb, R. 2001. *The comparative costs and benefits of programs to reduce crime: A review of national research findings with implications for Washington State*. Olympia, WA: Washington State Institute for Public Policy.

Arnett, J. 2000. Emerging adulthood: A theory of development from the late teens through the twenties. *American Psychologist*, 55:469-480.

Aronson, L. & Shapiro, C. 1980. The state's role in urban economic development: An urban government perspective. Washington: U. S. Department of Commerce, Economic Development Administration, Economic Research Division.

Arvanites, T. and Asher, M. 1998. State and county incarceration rates: The direct and indirect effects of race and inequality. American Journal of Economic and Sociology, 57:207-221.

Ashery, R. S., Robertson, E., & Kumpfer, K. L. 1998. Drug abuse prevention through family interventions (pp. 103-129). NIDA Research Monograph 177. Rockville, MD: National Institute on Drug Abuse.

Atav, S. & Spencer, G.A. 2002. Health risk behaviors among adolescents attending rural, suburban, and urban schools: A comparative study. *Family and Community Health*, 25:53-64.

Bachman, J. G., O'Malley, P. M., Schulenberg, J. E., Johnston, L. D., Freedman-Doan, P. & Messersmith, E. E. 2008. The education-drug use connection: How successes and failures in school relate to adolescent smoking, drinking drug use, and delinquency. Taylor & Francis Group, LLC.

Backer, T. E. 2000. The failure of success: Challenges of disseminating effective substance abuse prevention program. *Journal of Community Psychology*, 28:363-373.

Bahr, S. J., Hoffmann, J. P., & Yang, X. 2005. Parental and peer influences on the risk of adolescent drug use. *The Journal of Primary Prevention*, 26:529-551.

Bahr, S. J., Maughan, S. L., Marcos, A. C., & Li, B. 1998. Family, religion, and the risk of adolescent drug use. *Journal of Marriage and the Family*, 60:979-992.

Bale, R. N., Van Stone, W. W., Kaldau, J. M., Engelsing, T. M. J., Elashoff, R. M., & Zarcone, V. P., Jr. 1980. Therapeutic communities vs. methadone maintenance. A prospective study of narcotic addiction treatment: design and one year followup results. *Archives of General Psychiatry*, 37:179-193.

Bandura, A. 1977. *Social learning theory*. Englewood Cliff, NJ: Prentice Hall.

Barnard, M. 2005. *Drugs in the family: The impact on parents and siblings*. Joseph Rowntra Foundation.

Bartik, T. J. 1995. Economic Development Strategies. W. E. Upjohn Institute. Working Paper No. 95-33. Kalamazoo, Michigan.

Bartik, T. J. 2003. Local economic development policies. W. E. Upjohn Institute for Employment Research. Kalamazoo, Michigan.

Bartik, T. J. 2004. Jobs, Productivity, and local economic development: What implications does economic research have on the role of government? W. E. Upjohn Institute for Employment Research. Kalamazoo, Michigan.

Basile, V. D. 2005. Getting Serious about corrections. *Federal Probation*. 69:29-31.

Baskin-Sommers, A. & Sommers, I. 2006a. The co-occurrence of substance use and high-risk behaviors. *Journal of Adolescent Health*, 38:609-611.

Baskin-Sommers, A. & Sommers, I. 2006b. Methamphetamine use and violence among young adults. *Journal of Criminal Justice*, 34:661-674.

Battin, S. R., Hill, K. G., Abbott, R. D., Catalano, R. F. & Hawkins, J. D. 1998. The contribution of gang membership to delinquency beyond delinquent friends. *Criminology*, 36:92-115.

Battistich, V., Solomon, D., Kim, D., Watson, M., & Schaps, E. 1995. Schools as communities, poverty levels of student populations, and students' attitudes, motives, and performance: A multilevel analysis. *American Educational Research Journal*, 32:627-658.

Bayer, L. 2000. *Crack and cocaine*. New York: Chelsea House Publishers.

Beaston-Blaakman, A. 2005. *A three-part study to advance economic analysis of substance abuse treatment*. The Heller School for Social Policy and Management, Brandeis University, Waltham, Massachusetts.

Belenko, S., Patapis, N., & French, M. T. 2005. *Economic benefits of drug treatment: A critical review of the evidence for policy makers*. Philadelphia: University of Pennsylvania, Treatment Research Institute.

Belenko, S., Peugh, J., Califano, J., Jr., Usdansky, M., & Foster, S. E. 1998. Substance abuse and the prison population: A three-year study by Columbia University reveals widespread substance abuse among offending population. *Corrections Today*, 154:82-89.

Beman, D. S. 1995. Risk factors leading to adolescent substance abuse. *Adolescence*, 30:201-208.

Bergen, H. A., Martin, G. Roeger, L. & Allison, S. 2005. Perceived academic performance and alcohol, tobacco and marijuana use: Longitudinal relationships in young community adolescents. *Addictive Behaviors*, 30:1563-1573.

Bennett, R. R. 1991. Development and crime: A cross-national, time-series analysis of competing models. *The Sociological Quarterly*, 32:343-363.

Bennett, T. & Holloway, K. 2005. *Understanding drugs, alcohol and crime*. Open University Press, McGraw-Hill Education.

Bennett, T. & Holloway, K. 2009. The causal connection between drug misuse and crime. *The British Journal of Criminology*, 49:513-531.

Bergen, H. A., Martin, G. Roeger, L. & Allison, S. 2005. Perceived academic performance and alcohol, tobacco and marijuana use: Longitudinal relationships in young community adolescents. *Addictive Behaviors*, 30:1563-1573.

Berman, S. M. Kuczenski, R., McCracken, J. T., & London, E. D. 2009. Potential adverse effects of amphetamine treatment on brain and behavior: A review. *Molecular Psychiatry*, 14:123-142.

Beschner, G. & Thompson, P. 1981. Women and drug abuse treatment: Needs and services. National Institute on Drug Abuse Research Monograph. DHHS Pub. No. (ADM) 81-1057. Washington, DC: Supt. Of Docs., U.S. Government Printing Office.

Biglan, A., Ary, D. V., Smolkowski, K., Duncan, T., & Black, C. 2000. A randomized controlled trial of a community intervention to prevent adolescent tobacco use. *Tobacco Control*, 9:24-32.

Biglan, A., Mrazek, P. J., Carnine, D., & Flay, B. R. 2003. The integration of research and practice in the prevention of youth problem behaviors. *American Psychologist*, 58:433-440.

Blackburn, R. 1993. The psychology of criminal conduct: Theory, research and practice. Toronto: John Wiley and Sons.

Blakely, E. J. & Bradshaw, T. K. 2002. *Planning local economic development: Theory and Practice* (3rd ed.). Thousand Oaks, CA: Sage Publications.

Blakely, E. J. & Leigh, N. G. 2010. *Planning Local Economic Development* (4th ed.). Thousand Oaks, CA: Sage Publications.

Blankenstein, A. & Haynes, K. 2001. 23 arrests made in series of drug task force raids: Crime: the long-running probe targeted alleged methamphetamine makers and traffickers. *Los Angeles Times*, p. B3.

Blumstein, A., Rivara, F., & Rosenfeld, R. 2000. The rise and decline of homicide – and why. *Annual Reviews of Public Health*, 21:505-541.

Boles, S., Casas, J. M., Furlong, M. J., Gonzalez, G. & Morrison, G. M. 1994. Alcohol and other drug use patterns among Mexican American, Mexican, and Caucasian adolescents: New directions for assessment and research. *Journal of Clinical Child Psychology*, 23:39-46.

Boles, S. M. & Miotto, K. 2003. Substance abuse and violence: A review of the literature. *Aggression and Violent Behaviour*, 8:155-174.

Bolla, K. I., Rothman, R. & Cadet, J. L. 1999. Dose-related neurobehavioral effects of chronic cocaine use. *The Journal of Neuropsychiatry and Clinical Neurosciences,* 11:361-369.

Botvin, G. J. 1995. Drug abuse prevention in school settings. In: G. J. Botvin, S. Schinke, & Orlandi, M. A. (Eds), *Drug Abuse Prevention with Multiethnic Youth*. Thousand Oaks, CA: Sage, 1995.

Botvin, G. J. 1996. Substance abuse prevention through life skills training. In R. Peters & R. McMahon (Eds.), *Preventing childhood disorders, substance abuse, and delinquency* (pp. 215-240). Thousand Oaks, CA: Sage Publications.

Botvin, G. J. 1999. Prevention in schools. In R. T. Ammerman, P. J. Ott, and R. E. Tarter. Prevention and societal impact of drug and alcohol abuse (Eds.). Lawrence Erlbaum Associates. Mahwah, New Jersey.

Botvin, G. J. 2000. Preventing drug abuse in schools: Social and competence enhancement approaches targeting individual-level etiologic factors. *Addictive Behaviors*, 25:887-897.

Botvin, G. J., Baker, E., Dusenbury, L. D., Botvin, E. M., & Diaz, T. 1995. Long-term follow-up results of a randomized drug abuse prevention trial in a White middle-class population. Journal of the American Medical Association, 273:1106-1112.

Botvin, G. J. & Eng, A. 1980. A comprehensive school-based smoking prevention program. *Journal of School Health*, 50:209-213.

Botvin, G. J., & Eng, A. 1982. The efficacy of a multicomponent approach to the prevention of cigarette smoking. *Preventive Medicine,* 11:199-211.

Botvin, G. J. & Eng, A., & Williams, C. L. 1980. Preventing the onset of cigarette smoking through life skills training. *Prevention Medicine*, 9:135:143.

Botvin, G. J., Epstein, J. A., Baker, E., Diaz, T., & Ifill-Williams, M. 1997. School-based drug abuse prevention with inner-city minority youth. *Journal of Child and Adolescent Substance Abuse*, 6:5-20.

Botvin, G. J. & Griffin, K. W. 2003. Drug abuse prevention curricula in schools. In Z. Sloboda & W. J. Bukoski (Eds.), *Handbook of drug abuse prevention: Theory, science, and practice* (pp. 454-74). New York: Kluwer Academic//Plenum Publishers.

Botvin, G. J. & Griffin, K. W. 2005. Prevention science, drug abuse prevention, and Life Skills Training: Comments on the state of the science. *Journal of Experimental Criminology*, 1, 63-78.

Botvin, G. J. & Griffin, K. W. 2007. School-based programmes to prevent alcohol, tobacco and other drug use. *International Review of Psychiatry*, 19:607-615.

Botvin, G. J., Griffin, K. W., Diaz, T. & Ifill-William, M. 2001. Drug abuse prevention among minority adolescents: Posttest and one-year follow-up of a school-based prevention intervention. *Prevention Science*, 2:1-13.

Botvin, G. J., Griffin, K. W., Diaz, T., Scheier, L. M., Williams, C., & Epstein, J. A. 2000. Preventing illicit drug use in adolescents: Long-term follow-up data form a randomized control trial of a school population. *Addictive Behaviors*. 25:769-774.

Botvin, G. J., Resnick, N. L., & Baker, E. 1983. The effects of scheduling format and booster sessions on a broad spectrum psychosocial approach to smoking prevention. *Journal of Behavioral Medicine*, 64:359-379.

Botvin, G. J. & Wills, T. A. 1985. Personal and social skills training: Cognitive-behavioral approaches to substance abuse prevention. In C. S. Ball & R. Battjes (Eds.) *Preventive research: Deterring drug abuse among children and adolescents*. NIDA Research Monograph 63. Rockville, MD: National Institute on Drug Abuse.

Bowes, M. 2008. Two Chesterfield men charged in drug-related slaying of Ettrick man. Richmond Times-Dispatch. October 24.

Box, S. 1987. *Recession, crime and punishment*. Barnes & Noble.

Boyum, D. A., Caulkins, J. P., & Kleiman, M. 2010, Drugs, crime, and public policy. In J. Q. Wilson & J. Petersilia (Eds.), *Crime and public policy*. Oxford University Press.

Boyum, D. A. & Kleiman, M. 2001. Substance-abuse policy from a crime-control perspective. In J. Q. Wilson & J. Petersillia (Eds.), *Crime: Public policies for crime-control* (pp. 331-382). Oakland, CA: Institute for Contemporary Studies.

Bradshaw, T. K. & Blakely, E. J. 1999. What are third wave state economic development efforts?: From incentives to industrial policy. *Economic Development Quarterly*, 13:229-244.

Brecht, M. L., O'Brien, A., von Mayrhauer, C. & Anglin, M. D. 2004. Methamphetamine use behaviors and gender differences. *Addictive Behaviors*, 29:89-106.

Brisman, A. 2006. *Meth chic and the tyranny of the immediate: Reflections on the culture-drug/drug-crime relationships*. North Dakota Law Review, University of North Dakota School of Law. Grand Forks, ND, 82(4).

Brody, S. L. 1990. Violence associated with acute cocaine use in patients admitted to a medical emergency department. In M. De La Rosa, E. Y. Lambert, & B. Gropper (Ed.), *Drugs and Violence: Causes, Correlates, and Consequences.* NIDA Research Monograph Series, No. 103. Rockville, MD: National Institute on Drug Abuse.

Brook, J. S. 1993. Interactional theory: Its utility in explaining drug use behavior among African-American and Puerto Rican youth. In M. R. De La Rosa & J-L. R. Adrados (Eds.), *Drug abuse among minority youth: Advances in research and methodology* (pp. 79-101). National Institute on Drug Abuse Research Monograph 130. NIH. Pub. No. 93-3479. Washington, DC: Supt. of Docs., U.S. Government Printing Office.

Brook, J. S. Adams, R. E., Balka, E. B., Johnson E. 2002. Early adolescent marijuana use: Risks for the transition of adulthood. *Psychological Medicine*, 32:79-91.

Brook, J. S., Brook, D. W., & Richter, L. 2001. Risk factors for adolescent marijuana use across cultures and across time. *Journal of Genetic Psychology*, 162:357-374.

Brown, A. H. 2004. Integrating research and practice in the CSAT methamphetamine treatment project. *Journal of Substance Abuse Treatment*, 26:103-108.

Brown, E. R. 1991. Community action for health promotion: A strategy to empower individuals and communities. *International Journal of Health Services,* 21:441-456.

Brownstein, H. H. & Goldstein, P. J. 1988. *Drugs and homicide in New York State*. Albany: New York State Division of Criminal Justice Services.

Brunelle, N., Brochu, S., & Cousineau, M. M. 2000. Drug-crime relations among drug-consuming juvenile delinquents: A tripartite model and more. *Contemporary Drug Problems,* 27:835-866.

Bry, B. H., Catalano, R. F., Kumpfer, K. L., Lochman, J. E., & Szapocznik, J.1998. Scientific findings from family prevention intervention research. In R. S. Ashery, E. B. Robertson, & K. L. Kumpfer, *Drug Abuse Prevention through Family Intervention*, (pp103-129). NIDA Research Monograph 177. Rockville, MD: National Institute on Drug Abuse.

Bryant, A. L. & Zimmerman, M. A. 2002. Examining the effects of academic beliefs and behaviors on changes in substance use among urban adolescents. *Journal of Educational Psychology*, 94:621-637.

Burdon, W. M., Messina, N., & Prendergast, M. L. 2004. The California treatment expansion initiative: Aftercare participation, recidivism, and predictors of outcomes. *Prison Journal*, 84:61-80.

Bureau of Justice Statistics. 1991a. Survey of inmates in federal correctional facilities. Washington, DC: U. S. Department of Justice, Bureau of Justice Statistics and Federal Bureau of Prisons.

Bureau of Justice Statistics. 1991b. Survey of inmates in state correctional facilities. Washington, DC: U. S. Department of Justice, Bureau of Justice Statistics.

Butterfield, F. 2001 (June 24). Violence rises as club drug spreads out into the streets. The New York Times Company.

Butterfield, F. 2002. As drug use drops in big cities, small towns confront upsurge. *New York Times*, 11 February 2002, Sec. A1.

Butterfoss, F. D., Goodman, R. M., & Wandersman, A. 1993. Community coalitions for prevention and health promotion. *Health Education Research*, 8:315-330.

Butters, J. 1997. *Drug market violence and criminality among two groups of drug dealers*. Paper presented at the American Society of Criminology annual meeting, San Diego.

Butzin, C. A., Martin, S. S., & Inciardi, J. A. 2002. Evaluating component effects of a prison-based treatment continuum. *Journal of Substance Abuse Treatment*, 22:63-69.

Buxton, J. 2006. *The political economy of narcotics: Production, consumption and global markets*. London: Zed.

Cable, D. A. & Tippett, R. M. 2012. Poverty and the social safety net. Part 1: Who are Virginia's poor? Weldon Cooper Center for Public Service. University of Virginia.

Cadoret, R. J., Cain, C. A., Troughton, E., & Heywood, E. 1985. Alcoholism and antisocial personality: Interrelationships, genetic and environmental factors. *Archives of General Psychiatry*, 42:161-167.

Caldas, S. & Blankston, C. III. 1997. Effect on school population socioeconomic status on individual academic achievement. *The Journal of Educational Research*, 90:269-277.

Campbell, B. K. & Stark, M. J. 1990. Psychopathology and personality characteristics in different forms of substance abuse. *International Journal of the Addiction*, 25:1467-1474.

Cantor, D. & Land, K. C. 1985. Unemployment and crime rates in the post-World War II United States: A theoretical and empirical analysis. *American Sociological Review*, 50:317:332.

Cartier, J., Farabee, D. & Prendergast, M. L. 2006. Methamphetamine use, self-reported violent crime and recidivism among offenders in California who abuse substances. *Journal of Interpersonal Violence*, 21:435-445.

Cartwright, W. S. 2008. Economic costs of drug abuse: Financial, cost of illness, and services. *Journal of Substance Abuse Treatment*, 34:224-233.

Casavant, L. & Collin, C. 2001. Illegal drug use and crime: A complex relationship. (Report for the Special Senate Committee on Illegal Drugs. Ottawa, ON: Parliamentary Research Branch. Retrieved October 12, 2010, from http://www.parl.gc.ca/37/1/parlbus/commbus/senate/com-e/ille-e/library-e/collin-e.htm#2,%20%20Economic-compulsive%20link. Accessed 2010 June 3.

Cashin, P., Mauo, P., Sahay, R. 2001. Macroeconomic policies and poverty reduction: Some cross-country evidence. Finance and Development, 38:46-49

Catalano, R. F., Hawkins, J. D., Krenz, C., Gillmore, M. Morrison, D., Wells, E., & Abbott, R. 1993. Using research to guide culturally appropriate drug abuse prevention. *Journal of Consulting and Clinical Psychology*, 61:804-811.

Caulkin, J. P., Pacula, R. L., Paddock, S., & Chiesa, J. 2002. *School-based drug prevention: What kind of drug use does it prevent?* RAND. Santa, Monica, CA.

Caulkin, J. P., Pacula, R. L., Paddock, S., & Chiesa, J. 2004. What we can-and cannot-expect from school-based drug prevention. *Drug and Alcohol Review*, 23-79-87.

Caulkins, J. P., Rydell, C. P., Everingham, S. S., Chiesa, J., & Bushway, S. 1999. *An ounce of prevention: A pound of uncertainty-The cost-effectiveness of school-based drug prevention programs*. RAND. Santa, Monica, CA.

Center for Disease Control and Prevention. 2000. Fact sheet: Youth risk behavior trends from CDC's 1991, 1993, 1995, 1997, and 1999 Youth Risk Behavior Surveys. Atlanta, GA: U.S. Department of Health and Human Services.

Center for Disease Control and Prevention. 2010. Youth risk behavior surveillance-United States, 2009. Atlanta, Georgia: U.S. Department of Health and Human Services.

Chaiken, J. & Chaiken, M. 1982. *Varieties of criminal behavior*. RAND. Santa Monica, CA.

Chaiken, J. & Chaiken M. 1990. Drugs and predatory crime. In M. Tonry and J. Q. Wilson (eds.) *Drugs and Crime,* pp. 203-239. Chicago: University of Chicago Press.

Chambliss, W. J. 1994. Policing the ghetto underclass: The politics of law and law enforcement. *Social Problems*. 41:177-194.

Chanhatasilpa, C., MacKenzie, D. L. & Hickman, L. J. 2000. The effectiveness of community-based programs for chemically dependent offenders: A review and assessment of the research. *Journal of Substance Abuse Treatment*, 19:383-393.

Chatterji, P. 2006. Illicit drug use and educational attainment. *Health Economics*, 15:489-511.

Chen, C. Y., Storr, C. L. & Anthony, J. C. 2005. Influences of parenting practices on the risk of having a chance to try cannabis. Pediatrics, 115:1631-1693.

Cheon, J. W. 2008. Best practices in community-based prevention for youth substance reduction: Towards strengths-based positive development policy. *Journal of Community Psychology*, 36:761-779.

Chermack, S. T. & Blow, F. C. 2002. Violence among individuals in substance abuse treatment: The role of alcohol and cocaine consumption. *Drug and Alcohol Dependence*, 66:29-37,

Chilcoat, H. D. & Anthony, J. C. 1996. Impact of parent monitoring on initiation of drug use through late childhood. *Journal of the American Academy of Child and Adolescent Psychiatry*, 35:91-100.

Chilcoat, H. D., Dishion, T. J., & Anthony, J. C. 1995. Parent monitoring and the incidence of drug sampling in urban elementary school children. *American Journal of Epidemiology*, 141:25-31.

Chisholm, J. & Choe, C. 2005. Income variables and the measures of gains from crime. Oxford Economic Papers. Oxford University Press, 57:112-119.

Chinman, M., Hannah, G., Wandersman, A., Ebener, P., Hunter, S. B., Imm, P., & Sheldon, J. 2005. Developing a community science research agenda for building community capacity for effective preventive interventions. *American Journal of Community Psychology*, 35:143-157.

Chitwood, D. Rivers, J. & Inciardi, J. 1996. *The American Pipe Dream: Crack Cocaine and the Inner City.* Austin: Harcourt Brace College Publishers.

Clayton, R. R., Cattarello, A. M., & Johnstone, B. M. 1996. The effectiveness of Drug Abuse Resistance Education (Project D.A.R.E.): Five-year follow-up results. *Preventive Medicine*, 25:307-318.

Click2Houston.com. 2011. Drug-related violence increased in Houston Area.

Cloninger, C. R., Bohman, M. & Sigvardsson, S. 1981. Inheritance of alcohol abuse. *Archives of General Psychiatry*, 38:861-868.

Cohen, J. B., Dickow, A., Horner, K., Zweben, J. E., Balabis, J., & Vandersloot, D. 2003. Abuse and violence history of men and women in treatment for methamphetamine dependence. *American Journal on Addiction*, 12:377-385.

Coie, J. D., Watt, N. F., West, S. G., Hawkins, J. D., Asarnow, J. R., Markman, H. J., Ramey, S. L., Shure, M. B., & Long, B. 1993. The science of prevention: A conceptual framework and some direction for a national research program. *American Psychologist*, 48:1013-1022.

Collins, D. J. & Lapsley, H. M. 1991. *Estimating the economic costs of drug abuse in Australia.* National Campaign Against Drug Abuse. Monograph Series No. 15. Commonwealth of Australia.

Collins, D. J. & Lapsley, H. M. 1996. *The social costs of drug abuse in Australia in 1988 and 1992*. National Drug Strategy. Monograph Series No. 30. Commonwealth of Australia.

Collins, D. J. & Lapsley, H. M. 2002. *Counting the cost: estimates of the social costs of drug abuse in Australia in 1998-9*. National Drug Strategy, Monograph Series No. 49. Commonwealth of Australia.

Collins, D. J. & Lapsley, H. M. 2008. *The costs of tobacco, alcohol and illicit drug abuse to Australian society in 2004/05*. National Drug Strategy, Monograph Series No. 64. Commonwealth of Australia.

Collins, J. J., Powers, L. L., and Craddock, A. 1988. Recent drug use and violent arrest charges in three cities. Center for Social Research and Policy Analysis, Research Triangle Institute, N.C. Presented at the American Society of Criminology, Chicago, IL.

Collins, L. M., Murphy, S. A., & Bierman, K. L. 2004. A conceptual framework for adaptive preventive interventions. *Prevention Science*, 5:185-196.

Commission on Chronic Illness. 1957. *Chronic illness in the United States*. Volume 1. Published for the Commonwealth Fund. Cambridge: Harvard University Press.

Commission on Social Determinants of Health. 2008. Closing the gap in a generation: Health equity through action on the social determinants of health. Final Report of the Commission on Social Determinants of Health. Geneva: World Health Organization.

Condelli, W. S. 1986. Client evaluations of therapeutic communities and retention. In G. De Leon & J. T. Ziegenfuss (Eds.), *Therapeutic communities for addictions* (pp. 131-139). Springfield, IL: Charles C. Thomas.

Condelli, W. S. 1989. External pressure and retention in a therapeutic community. *International Journal of Therapeutic Communities*, 10:21-33.

Condelli, W. S. 1994. Predictors of retention in therapeutic communities, In: F. M. Tims, G. De Leon & N. Jainchill (Eds.), *Therapeutic community: Advances in research and practice* (pp. 16-53). NIDA Research Monograph 144, DHHS Publication No. ADM 94-3633. Rockville, MD, National Institute on Drug Abuse.

Condelli, W. S. & Hubbard, R. L. 1994. Client outcomes from therapeutic communities. In F. M. Tims, G. De Leon, & N. Jainchill, N. (Eds.), *Therapeutic community: Advances in research and practice* (pp. 16-53). NIDA Research Monograph 144, DHHS Publication No. ADM 94-3633, (Rockville, MD, National Institute on Drug Abuse.

Cook, P. & Laub, J. 1998. The unprecedented epidemic in youth violence. In Michael Tonry (ed.) *Crime and justice: An annual review of research*, 26-64. Universityof Chicago Press.

Cornell, D. G. & Loper, A. B. 1998. Assessment of violence and other high-risk behaviors with a school survey. *School Psychology Review*, 27:317-330.

Council on Virginia's Future. 2009. Educational attainment in Virginia. Council on Virginia's Future.

Council on Virginia's Future. 2010. http://www.future.virginia.gov/index.php

Cox, R. G., Zhang, L., Johnson, W. D., & Bender, D. R. 2007. Academic performance and substance use: Findings from a state survey of public high school students. *Journal of School Health*, 77:109-115.

Cretzmeyer, Margaret, Sarrazin, Mary V., Huber, Diane L., Block, Robert I., & Hall, James A. 2003. Treatment of methamphetamine abuse: Research findings and clinical directions. *Journal of Substance Abuse Treatment*, 24:267-277.

Crosnoe, R., Erickson, K. G., & Dornbusch, S. M. 2002. Protective functions of family relationships and school factors on the deviant behavior of adolescent boys and girls: Reducing the impact of risky friendships. *Youth and Society*, 33:515-544.

Crutchfield, R., Geerken, M., & Gove, W. 1982. Crime rates and social integration: The impact of metropolitan mobility. *Criminology*, 20:467-478.

Cruze, A. M., Harwood, H. J., Kristiansen, P. L., Collins, J. J., & Jones, D. C. 1981. *Economic costs to society of alcohol and drug abuse and mental illness, 1977*. Research Triangle Institute, Research Triangle Park, NC.

Cuijpers, P. 2002. Effective ingredients of school-based drug prevention programs. A systematic review. *Addictive Behaviors*, 27:1009-1023.

Cuijpers, P. 2003. Three decades of drug prevention research. *Drugs: Education, Prevention and Policy*, 10:7-20.

Daley, M., Love, C. T., Shepard, D. S., Petersen, C. B., White, K. L., & Hall, F. B. 2004. Cost effectiveness of Connecticut's in-prison substance abuse treatment. *Journal of Offender Rehabilitation*, 39:69-92.

Dawkins, M. P. 1997. Drug use and violent crime among adolescents. *Adolescence*, 32:395-405.

Day, J. C. & Newburger, E. C. 2002. The big payoff: Educational attainment and synthetic estimates of work-life earnings. U.S. Bureau of the Census, Current Population Reports, P23-210. Washington, DC: U.S. Government Printing Office.

Dean, A. C., Hellemann, G., Sugar, C. A. & London, E. D. 2012. Educational attainment is not a good proxy for cognitive function in methamphetamine dependence. *Drug and Alcohol Dependence*, 123:249-254.

Deaton, A. 2001. Counting the world's poor: Problems and possible solutions. World Bank Research Observer, 16:125-147.

De La Rosa, M., Lambert, E., & Gropper, B. 1990. *Drugs and violence: Causes, correlates and consequences*. Rockville, MD: National Institute on Drug Abuse.

De Leon G. 1994. The therapeutic community: toward a general theory and model. In F. M. Tims, G. De Leon, & N. Jainchill (Eds.), *Therapeutic community: Advances in research and practice* (pp. 16-52). NIDA Research Monograph 144, DHHS Publication No. ADM 94-3633. Rockville, MD, National Institute on Drug Abuse.

De Leon, G. 2000. *The therapeutic community. Theory, model and method*. New York: Springer-Verlag.

De Leon, G., Melnick, G., Thomas, G., Kressel, D., & Wexler, H. K. 2000. Motivation for treatment in a prison-based therapeutic community. *The American Journal of Drug and Alcohol Abuse*, 26:33-46.

Dembo, R., Hughes, P., Jackson, L., & Mieczhowski, T. 1993. Crack cocaine dealing by adolescents in two public housing projects. *Human Organization*, 52:89-96.

Dembo, R., Williams, L., Wothke, W., Schmeidler, J., & Brown, C. H. 1992. The role of family factors, physical abuse, and sexual victimization experiences in high-risk youths' alcohol and other drug use and delinquency: A longitudinal model. *Violence and Victims*, 7:234-266.

Dewey, J. D. 1999. Reviewing the relationship between school factors and substance use for elementary, middle, and high school students. *The Journal of Primary Prevention*, 19:177-225.

Dick, D. M. & Agrawal, A. 2008. The genetics of alcohol and other drug dependence. Alcohol Research and Health, 31:111-118.

DiClemente, R. J., Wingood, G. M., Crosby, R., Sionean, C., Cobb, B. K., Harrington, K., Davies, S., Hook, E. W. 3rd, Oh, M. K. 2001. Parental monitoring: Association with adolescents' risk behaviors. *Pediatrics*, 107:1363-1363.

Diego, M. A., Field, T. M. & Sanders, C. E. 2003. Academic performance, popularity, and depression predict adolescent substance sue. *Adolescence*, 38:35-42.

Dobkin, C. & Nicosia, N. 2008. The war on drugs: Methamphetamine, public health and crime. *American Economic Review,* 99:327-349

Doyle, J., Ahmed, E., & Horn, R. 1999. The effects of labor markets and income inequality on crime: Evidence from panel data. *Southern Economic Journal, 65*:717-738.

Dukes, R. L., Ullman, J. B., & Stein, J. A. 1996. Three-year follow-up of drug abuse resistance education (D.A.R.E.). *Evaluation Review*, 20:49-66.

Dukarm, C. P., Byrd, R. S., Auinger, P. & Weitzman, M. (1996). Illicit substance use, gender, and the risk of violent behavior among adolescents. *Archives of Pediatrics and Adolescent Medicine*, 150:797-801.

Dunsenbury, L. & Hansen, W. B. 2004. Pursuing the course from research to practice. Prevention Science, 5:55-59.

Dye, J. 2011. 37 arrested in Albanian crime-syndicate sweep. Thomson Reuters.

Economic Research Services. 2006. Rural employment at a glance (Bulletin no. 21). Washington, DC: U.S. Department of Agriculture, Economic Information Research, December.

Edelman, M. W. 2002. The shame of child poverty in the richest land on earth. Washington, D.C.: Children's Defense Fund.

Ellickson, P. L. 1999. School-based substance-abuse prevention. What works, for whom, and how? In S. B. Kar (Ed.), *Substance abuse prevention: A multicultural perspective* (pp. 101-128). Amityville, NY: Baywood.

Ellickson, P. L. & Bell, R. M. 1990. Drug prevention in junior high: A multi-site longitudinal test. *Science*, 247:1299-1305.

Ellickson, P. L., Bell, R. M., & McGuigan, K. 1993. Preventing adolescent drug use: Long term results of a junior high program. *American Journal of Public Health*, 83:856-861.

Ellickson, P. L. & McGuigan, K. A. 1999. Early predictors of adolescent violence. American Journal of Public Health, 90:566-572.

Ellickson, P. L., Martino, S. C. & Collins, R. L. 2004. Marijuana use from adolescence to young adulthood: Multiple developmental trajectories and their associated outcomes. *Health Psychology*, 23:299-307.

Elliott, D. S., Huizinga, D., & Menard, S. 1989. *Multiple problem youth: Delinquency, substance use, and mental health problems*. New York: Springer-Verlag.

Elliott, D. S. & Mihalic, S. 2004. Issues in disseminating and replicating effective prevention programs. *Prevention Science*, 5:47-53.

Elliott, J. C., Lubin, D. A., Walker, C. H., & Johns, J. M. 2001. Acute cocaine alters oxytocin levels in the medial preoptic area and amygdale in lactating ram dams: Implications for cocaine-induced changes in maternal behavior and maternal aggression. *Neuropeptides*, 35:127-134.

Eng. M. 1999. The rising methamphetamine crisis: An examination of state responses. *Policy and Practice*, 2:1-12.

Engstrom, M., Jason, L. A., Townsend, S. M., Pokorny, S. B., & Curie, C. J. 2002. Community readiness for prevention: Applying stage theory to multi-community interventions. *Journal of Prevention and Intervention in the Community*, 24:29-46.

Ensminger, M. E., Juon, H. S. & Fothergill, K. E. 2000. Childhood and adolescent antecedents of substance use in adulthood. *Addiction*, 97:833-844.

Erickson, P. G. 2001. Drugs, violence and public health: What does the harm reduction approach have to offer? The Frazier Institute (Vancouver, British Columbia, Canada).

Erickson, P. G. & Watson, V. 1990. Women, illicit drugs and crime. *Research Advances in Alcohol and Drug Problems*, 10:859-877.

Erikson, E. 1968. *Identity, youth, and crisis*. New York: Norton.

Ehrlich, I. 1996. Crime, punishment, and the market for offenses. *Journal of Economic Perspectives, 10*:43-67.

Etz, K. E., Robertson, E. B., & Ashery, R. S. 1998. Drug abuse prevention through family-based interventions: Future research. In R. S. Ashery, E. B. Robertson, & K. L. Kumpfer (pp.

430-458). NIDA Research Monograph 177. Rockville, MD: National Institute on Drug Abuse.

Evans, R. I. 1976. Smoking in children: Developing a social psychological strategy of deterrence. *Preventive Medicine*, 5:122-127.

Evans, R. I., Rozelle, R. M., Mittlemark, M. B., Hansen, W. B., Bane, A. L., & Havis, J. 1978. Deterring the onset of smoking in children: Knowledge of immediate physiological effects and coping with peer pressure, media pressure, and parent modeling. *Journal of Applied Social Psychology*, 8:126-135.

Fagan, J. 1994. Women and drugs revisited: Female participation in the cocaine economy. *Journal of Drug Issues*, 24:179-226.

Fagan, J. 1996. *Gangs, drugs, and neighborhood change.* In gangs in America (2nd ed.). Thousand Oaks, CA: Sage Publications, 39-74.

Fagan, J. & Chin, J. 1990. Violence as regulation and social control in distribution of crack. In M. De La Rosa, E. Y. Lambert, & B. Gropper (Eds), *Drugs and violence: Causes, correlates, and consequences*. U. S. Department of Health and Human Services, National Institute on Drug Abuse: Rockville, MD.

Farabee, D., Prendergast, M., Cartier, J., Wexler, H. K., Knight, K., & Anglin, M. D. 1999. Barriers to implementing effective correctional drug treatment programs. *The Prison Journal*, 79:150-162.

Farrell, A. D. & White, K. S. 1998. Peer influences and drug use among urban adolescents: Family structure and parent-adolescent relationship as protective factors. *Journal of Consulting and Clinical Psychology*, 66:248-258.

Farrington, D. P., Petrosino, A., & Welsh, B. C. 2001. Systematic reviews and cost-benefit analyses of correctional interventions. *The Prison Journal*, 81:339-359.

Feinberg, M. E., Greenberg, M. T., & Osgood, D. W. 2004. Readiness, functioning, and perceived effectiveness in community prevention coalitions: A study of communities that care. *American Journal of Community Psychology*, 33:163-176.

Feldman, P. 1993. *The psychology of crime: A social science textbook*. New York: Cambridge: Cambridge University Press.

Fenoglio, P. J., Parel, V., & Kopp, P. 2003. The social cost of alcohol, tobacco and illicit drugs in France, 1997. *European Addiction Research*, 9:18-28.

Fenton, J. 2011. More than 60 people, including 'Snoop' of 'The Wire,' arrested in drug raids. *The Baltimore Sun*. March 10.

Fergusson, D. M., Horwood, L. J., Beautrais, A. L. 2003. Cannabis and educational achievement. *Addiction*, 98:1681-1692.

Figlio, D. & Ludwig, J. 2000. Sex, drugs, and Catholic schools: Private schooling and non-market adolescent behaviors. Cambridge, MA: National Bureau of Economic Research.

Field, G. 1985. The Cornerstone Program: A client outcome study. *Federal Probation*, 49:50-55.

Field, G. 1989. A study of the effects of intensive treatment on reducing the criminal recidivism of addicted offenders. *Federal Probation*, 53:51-56.

Fiscal Research Program. 1998. *Results of Georgia Statewide Poll: Economic Development*. FRP Report No. 30. Atlanta, GA: Applied Research Center, Andrew Young, School of Policy Studies, Georgia State University.

Fitzgerald, J. & Leigh, N. G. 2002. Economic revitalization: Cases and strategies for city and suburb. Thousand Oaks, CA: Sage Publication.

Flay, B. R. 2000. Approaches to substance use prevention utilizing school curriculum plus social environmental change. *Addictive Behaviors*, 25:861-885.

Flynn, B. S., Worden, J. K., Secker-Walker, R. H., Pirie, P. L., Badger, G. J., Carpenter, J. H., & Geller, B. M. 1994. Mass media and school interventions for cigarette smoking prevention: Effects two years after completion. *American Journal of Public Health*, 84:1148-1150.

Flynn, P. M., Kristiansen, PJ. L., Porto, J. V., & Hubbard, R. L. 1999. Costs and benefits of treatment for cocaine addiction in DATOS. *Drug and Alcohol Dependence*, 57:167-174.

Foster, S. E. & Modi, D. 2001. Estimating the cost of substance abuse to state budgets in the United States of America. In Bulletin on Narcotics. *Economic and social costs of substance abuse*. Vol. LII, Nos. 1 and 2, 2000. United Nations.

Fothergill, K. E., Ensminger, M. E., Green, K. M., Robertson, J. A., & Juon, H. S. 2008. Pathways to adult marijuana and cocaine use: A prospective study of African Americans from age 6 to 42. *Drug and Alcohol Dependence*, 92:191-199.

Fougene, D., Kramarz, F., & Pouget, J. Youth unemployment and crime in France (March 2006), *IZA Discussion paper No. 2009*, available at SSRN: http://ssrn.com/abstract=890289.

Fowles, R. & Merva, M. 1996. Wage inequality and criminal activity: An extreme bounds analysis for the United States, 1975-90. *Criminology*, 34:163-182.

Frank, A. G. 1996. The development of underdevelopment. In K. P. Jameson and C. K. Wilber (Eds.), *The political economy of development and underdevelopment* (6th ed.). New York: McGraw Hill, Inc.

French, M. T. 2000. Economic evaluation of alcohol treatment services. *Evaluation and Program Planning*, 23-27-39.

French, M. T. & Drummond, M. C. 2005. A research agenda for economic evaluation of substance abuse services. *Journal of Substance Abuse Treatment*, 29:125-137.

French, M. T., Fang, H., & Fretz, R. 2010. Economic evaluation of a prerelease substance abuse treatment program for repeat criminal offenders. *Journal of Substance Abuse Treatment*, 38:31-41.

French, M. T., McCollister, K. E., Cacciola, J., Durell, J., & Stephens, R. L. 2002. Benefit-cost analysis of addiction treatment in Arkansas: Specialty and standard residential programs for pregnant and parenting women. *Substance Abuse*, 23:31-51.

French, M. T., McCollister, K. E., Sacks, S., McKendrick, K., & De Leon, G. 2002. Benefit-cost analysis of a modified therapeutic community for mentally ill chemical abusers. *Evaluation and Program Planning*, 21:137:148.

French, M. T., Popovici, I., & Tapsell, L. 2008. The economic costs of substance abuse treatment: Updated estimates and cost bands for program assessment and reimbursement. *Journal of Substance Abuse Treatment*, 35:462-469.

French, M. T., Sacks, S., De Leon, G., Staines, G. L., & McKendrick, K. 1999. Modified therapeutic community for mentally ill chemical abusers: Outcomes and costs. *Evaluation and the Health Professions*, 22:60-85.

French, M. T., Salome, H. J., & Carney, M. 2002a. Using the DATCAP and ASI to estimate the costs and benefits of residential addiction treatment in the State of Washington. *Social Science and Medicine*, 55:2267-2282.

French, M. T., Salome, H. J., Krupski, A., McKay, J. R., Donovan, D. M., McLellan, A. T., & Durrell, J. 2000. Benefit-cost analysis of residential and outpatient addiction treatment in the State of Washington. *Evaluation Review*, 24:609-634.

French, M. T., Salome, H. J., Sindelar, J. L. & McLellan, A. T. 2002b. Benefit-cost analysis of addiction treatment: Methodological guidelines and empirical applications: using the DAT-CAP and ASI. *Health Services Research*, 37:433-456.

Fryer Jr., R. G., Heaton, P. S., & Levitt, S. D. 2005. Measuring the impact of crack cocaine. University of Chicago.

Fulknier, Jr., C. W. 1992. What is this thing called economic development? *Economic Development Review*, Spring:3.

Furdell, P. 1994. Poverty and economic development: views from City Hall. Washington, D.C.: National League of Cities.

Furlong, M., Caas, J. M., Corral, C., Chung, A., & Bates, M. 1997. Drugs and school violence. Education and Treatment of Children, 20:263-280.

Furlong, M. J. & Morrison, G. M. 1994a. Introduction to the miniseries: School violence and safety in perspective. *School Psychology Review*, 23:139-150.

Furlong, M. J. & Morrison, G. M. 1994b. Status update of research related to National Education Goal Seven: School violence content area. In R. C. Tally & G. R. Walz (Eds.). Safe schools, safe students, p. 85-101. Chapel Hill, NC: ERIC, National Education Goals Panel and the National Alliance of Pupil Services Organization.

Fussell, H., Haaken, J., Lewy, C., & McFarland, B. 2009. Clinical perception: A study of intimate partner violence versus methamphetamine use as presenting problems. *Psychiatry*, 72:382-392

Galano, J., Credle, W., Perry, D., Berg, S. W., Huntington, L., & Stief, E. 2001. Developing and sustaining a successful community prevention initiative: The Hampton Healthy Families Partnership. *Journal of Primary Prevention*, 21:495-509.

Garcia-Altes, A., Ollie, J. M., Antonanzas, F., & Colom, J. 2002. The social cost of illegal drug consumption in Spain. *Addiction*, 97:1145-1153.

Gerra, G., Zaimovic, A., Ampollini, R., Giusti, F., Delsignore, R., Raggi, M. A., Laviola, G., Macchia, T., & Brambilla, F. 2001. Experimentally induced aggressive behavior in subjects with 3,4-methlenedioxy-methamphetamine ("ecstasy") use history: Psychobiological correlates. *Journal of Substance Abuse*, 13:471-491.

Gerstein, D. & Harwood, H. 1990. Treatment drug problems: A study of evolution, effectiveness and financing for public and private drug treatment system. Washington, DC: National Academy Press.

Gerstein, D., Johnson, R., Harwood, H., Fountain, D., Suter, N., & Malloy K. 1994. *Evaluating recovery services: The California drugs and alcohol treatment assessment*. Sacramento: State of California, Department of Alcohol and Drug Programs.

Gillen, R. W., Kranzler, H. R., Bauer, L. O., Burleson, J. A., Samarel, D., Morrison, D. J. 1998. Neuropsychologic findings in cocaine-dependent outpatients. *Progress in Neuro-Psychopharmacology & Biological Psychiatry*, 22:1061-1076.

Glaeser, E. and Sacerdote, B. 1999. Why is there more crime in cities? *Journal of Political Economy*, 107:225-258.

Glaser, D. J. 2009. Teenage dropouts and drug use: Does the specification of peer group structure matter? *Economics of Education Review*, 28:497-504.

Godley, S. H. 2006. Substance use, academic performance and the village school. *Addiction*, 101:1685-1687.

Goldstein, P. J. 1985. The drugs/violence nexus: a tripartite conceptual framework. *Journal of Drug Issues*, 15:493-506.

Goldstein, P. J. 1987. Drug-related crime analysis-Homicide. A report to the National Institute of Justice. July.

Goldstein, P. J. 1989. Drugs and violent crime. In Pathways to criminal violence. Edited by N. A. Weiner and M. E. Wolfgang. Beverly Hills: Sage Publication.

Goldstein, P. J. 1998. Drugs, violence and federal funding: A research odyssey. *Substance Use and Misuse*, 33:1915-1936.

Goldstein, P. J., Bellucci, P. A., Spunt, B. J. and Miller, T. 1991a. Frequency of cocaine use and violence: A comparison between men and women. In S. Schober & C. Schade (Eds.), *The epidemiology of cocaine use and abuse*. Rockville: NIDA Research Monograph 100:113-138.

Goldstein, P. J., Bellucci, P. A., Spunt, B. J., & Miller, T. 1991b. Volume of cocaine use and violence: A comparison between men and women. *Journal of Drug Issues*, 21:345-367.

Goldstein, P. J., Brownstein, H. H., & Ryan, P. J. 1992. Drug-related homicides in New York: 1984 and 1988. *Crime and Delinquency*, 38:459-476.

Goldstein, P. J., Brownstein, H. H., Ryan, P. J., & Belluci, P. A. 1989. Crack and homicide in New York City, 1989: A conceptually based event analysis. *Contemporary Drug Problems*, 16:651-679.

Goldstein, P. J.; Brownstein, H. H.; Ryan, P. J. & Bellucci, P. A. 1997. Crack and homicide in New York City: A case study in the epidemiology of violence. In C. Reinarman & H. G. Levine (Eds.). *Crack in America demon drugs and social justice*. University of California Press.

Goodrum, S., Wiese, H. J., & Leukefeld, C. G. 2004. Urban and rural differences in the relationship between substance use and violence. *International Journal of Offender Therapy and Comparative Criminology*, 48:613-628.

Goodstadt, M. 1986. Alcohol education research and practice: a logical analysis of the 2 realities. *Journal of Drug Education*, 16, 349-365.

Gordon, R. 1987. An operational classification of disease prevention. In J. A. Steinberg & M. M. Silverman (Eds.), *Preventing mental disorders* (pp. 20-26). Rockville, MD: Department of Health and Human Services

Gottfredson, D. C., Gottfredson, G. D., & Weisman, S. A. 2001. The timing of delinquent behavior and its implications for after-school programs. *Criminology and Public Policy*, 1:61-86.

Gottfredson, D. C. & Wilson, D. B. 2003. Characteristics of effective school-based substance abuse prevention. *Prevention Science*, 4:27-38

Greene, K., Kremar, M., Walters, L. H., Rubin, D. L., & Hale, J. L. 2000. Targeting adolescent risk-taking behaviors: The contribution of egocentrism and sensation-seeking. *Journal of Adolescence*, 23:439-461.

Griffin, K. W., Botvin, G. J., Scheier, L. M., Diaz, T. & Miller, N. L. 2000. Parenting practices as predictors of substance use, delinquency, and aggression among urban minority youth: Moderating effects of family structure and gender. *Psychology of Addictive Behaviors*, 14:174-184.

Griffith, J. D., Hiller, M. L., Knight, K., & Simpson, d. D. 1999. A cost-effectiveness analysis of in-prison therapeutic community treatment and risk classification. *The Prison Journal*, 79:352-368.

Grogger, J. & Willis, M. 2000. The emergence of crack cocaine and the rise in urban crime rates. *Review of Economics and Statistics,* 82:519-529.

Guagliardo, M. F., Huang, Z., Hicks, J., & D'Angelo, L. 1998. Increased drug use among old-for-grade and dropout urban adolescents. *American Journal of Preventive Medicine*, 15:42-28.

Hale, C. & Sabbagh, D. 1991. Testing the relationship between unemployment and crime: A methodological comment and empirical analysis using time series data from England and Wales. *Journal of Research in Crime and Delinquency*, 28:400-417.

Hallfors, D., Vevea, J. L., Iritani, B., Cho, H., Khatapoush, S. & Saxe, L. 2002. Truancy, grade point average, and sexual activity: A meta-analysis of risk indicators for youth substance use. *Journal of School Health*, 72:205-211.

Hananel, S. 2008. Study shows meth use still declining. Seattle Times Company.

Harmon, M. A. 1993. Reducing the risk of drug involvement among early adolescents: An evaluation of Drug Abuse Resistance Education (DARE). *Evaluation Review*, 17:221-239.

Harwood, H. J. 1991. Economics and drugs: Promises, problems, and prospects. In W. S. Cartwright, Ph.D. & J. M. Kaple, Ph.D., *Economic costs, cost-effectiveness, financing, and community-based drug treatment.* National Institute on Drug Abuse (NIDA) Research Monograph Series, No. 13. Bethesda, MD: NIH, DHHS. NIH Publication Number (ADM) 91-1823.

Harwood, H. J., Fountain, D., & Livermore, G. 1998. *The economic costs of alcohol and drug abuse in the United States, 1992*. National Institute on Drug Abuse and National Institute on Alcohol Abuse and Alcoholism. Bethesda, Maryland. Publication No. 98-4327.

Harwood, H. J., Napolitano, D. M., Kristiansen, P., & Collins, J. J. 1984. Economic costs to society of alcohol and drug abuse and mental illness: 1980. Report to Alcohol, Drug Abuse, and Mental Health Administration. Research Triangle Institute, Research Triangle Park, NC.

Harwood, H., Collins, J., Hubbard, R., Marsden, M., & Rachal, J. 1988. The costs of crime and benefits of drug abuse treatment: A cost benefit analysis using TOPS data. In C. Leukefeld & F. Tims (Eds.). *Compulsory treatment of drug abuse: Research and clinical practice*. NIDA Research Monograph 86, pp. 209-235. Rockville, MD: National Institute on Drug Abuse.

Hawkins, J. D., Catalano, R. F., & Miller, J. Y. 1992. Risk and protective factors for alcohol and other drug problems in adolescence and early adulthood: Implications for substance abuse prevention. *Psychological Bulletin*, 112:64-105.

Heath, A. C., Slutske, W. S., Bucholz, K. K., Madden, P. A. F., & Martin, N. G. 1997. Behavioral genetic methods in prevention research: An overview. In K. J. Bryant, M. Windle, & S. G. West (Eds.). *The science of prevention: Methodological advances from alcohol and substance abuse research*. American Psychological Association. Washington, D.C.

Henry, K. L. 2010. Academic achievement and adolescent drug use: An examination of reciprocal effects and correlated growth trajectories. *The Journal of School Health*, 80:38-43

Henry, K. L., Knight, K. E. & Thornberry, T. P. 2012. School disengagement as a predictor of dropout, delinquency, and problem substance use during adolescence and early adulthood. *Journal of Youth and Adolescence*, 41:156-166.

Hill, K. G., White, H. R., Chung, I. J., Hawkins, J. D., & Catalano, R. F. 2000. Early adult outcomes of adolescent binge drinking: Person- and variable-centered analyses of binge drinking trajectories. *Alcoholism: Clinical and Experimental Research*, 24:892-901.

Hoaken, P. N.S., & Stewart, S. 2003. Drugs of abuse and the elicitation of human aggressive behavior. *Addictive Behaviors*, 28:1533-1554.

Hoff, A. L., Riordan, H., Morris, L., Cestaro, V. Wieneke, M., Alpert, R., Wang, G. J. & Volkow, N. 1996. Effects of crack cocaine on neurocognitive function. *Psychiatry Res*, 60:167-176.

Hoffmann, J. P. 1993. Exploring the direct and indirect family effects on adolescent drug use. *Journal of Drug Issues*, 23:535-557.

Hogan, J. A., Gabrielsen, K. R., Luna, N., & Grothaus, D. 2003. *Substance abuse prevention: The intersection of science and practice*. New York: Pearson Education, Inc.

Holder, H. & Giesbrecht, N. 1989. Conceptual issues: Perspectives on the community in action research. In N. Giesbrecht, P. Conley, R. W. Denniston, L. Gliksman, H. Holder, A. Pederson, R. Room, & M. Shain (Eds.), *Research, action, and the community: Experiences in the prevention of alcohol and other drug problems* (pp. 27-40). Office of Substance Abuse Prevention Monograph 4, DHHS Publication No. (ADM) 89-1651. Rockville, MD: Office for Substance Abuse Prevention.

Holloway, K. R., Bennett, T. H., & Farrington, D. P. 2006. The effectiveness of drug treatment programs in reducing criminal behavior: A meta-analysis. *Psicothema*, 18:620-629.

Hops, H., Davis, B., & Lewin, L. M. 1999. The development of alcohol and other substance use: A gender study of family and peer context. *Journal of Studies on Alcohol*, 13:22-31.

Hornik, R., Maklan, D., Judkins, D., Cadell, D., Yanovitzky, I., Zador, P., Southwell, B., Mak, K., Das, B., Prado, A., Barmada, C., Jacobsohn, L., Morin, C., Steele, D., Baskin, R., & Zanutto, E. 2001. *Evaluation of the national youth anti-drug media campaign: Second semi-annual report of findings*. Rockville, MD: Westat.

Howard, D. E. & Wang, M. Q. 2005. Psychosocial correlates of U.S. adolescents who report a history of forced sexual intercourse. *Journal of Adolescent Health*, 36:372-379.

Hoyle, R. H., Stephenson, M. T., Palmgreen, P., Pugzles Lorche., & Donohew, L. R. 2002. Reliability and validity of a brief measure of sensation seeking. *Personality and Individual Differences*, 32:401-414.

Hrubec, Z. & Omenn, G. S. 1981. Evidence of genetic predisposition to alcoholic cirrhosis and psychosis: Twin concordances for alcoholism and its biological points by zygosity among male veterans. *Alcoholism: Clinical and Experimental Research*, 5:207-215.

Hser, Y-I, Grella, C. E., Hubbard, R. L., Hsieh, S. C., Fletcher, B. W., Brown, B. S. & Anglin, M. D. 2001. An evaluation of drug treatments for adolescents in four U.S. cities. *Archives of General Psychiatry*, 58:689-695.

Hu, T., Lin, Z. & Keeler, T. E. 1998. Teenage smoking, attempts to quit, and school performance. *American Journal of Public Health*, 88:940-943.

Hubbard, R. L., Craddock, S., Flynn, P., Anderson, J., & Etheridge, R. 1997. Overview of 1-year follow-up outcomes in the Drug Abuse Treatment Outcome Study (DATOS). *Psychology of Addictive Behaviors*, 11:261-278.

Hubbard, R. L., Marsden, M. E., Rachal, J. V., Harwood, H. J., Cavanaugh, E. R., & Ginsburg, H. M. 1989. Drug abuse treatment: A national study of effectiveness. Chapel Hill: University of North Carolina Press.

Huizinga, D. H., Mensard, S., & Elliott, D. S. 1989. Delinquency and drug use: temporal and developmental patterns. *Justice Quarterly*, 6:419-455.

Hunt, D., Kuck, S., & Truitt, L. 2006. Methamphetamine use: Lessons learned. U. S. Department of Justice, Contract No. 99-C-008, ABT Associates, Inc.

Hyndman, B., Giesbrecht, D. R., Bernardi, N. C., Douglas, R. R., Ferrence, R. G., Gliksman, L., Goodstadt, M., Graham, D. G., & Loranger, P. D. 1992. Preventing substance abuse through multicomponent community action research projects: Lessons from past experiences and challenges for future initiative. *Contemporary Drug Problems*, 20:133-164.

Hyra, Derek S. 2008. *The new urban renewal*. Chicago: University of Chicago Press.

Inciardi, J. A. 1990. The crack-violence connection within a population of hard-core adolescent offenders. In: M. De La Rosa, E. Y. Lambert & B. Gropper, *Drugs and violence: Causes, correlates and consequences*. U.S. Department of Health and Human Services, National Institute on Drug Abuse, Rockville, MD.

Inciardi, J. A. 1991. Crack-cocaine in Miami. National Institute on Drug Abuse, Research Monograph Series 110. The Epidemiology of Cocaine Use and Abuse, 110:263-274.

Inciardi, J. A., Horowitz, R., & Pottieger, A. 1993. Street kids, street drugs, street crime: An examination of drug use and serious delinquency in Miami. Belmont, CA: Wadsworth.

Inciardi, J. A. & McElrath, K. 1995. *The American drug scene: An anthropology*. Roxburry Publishing Company. Los Angeles, California.

Inciardi, J. A. & Martin, S. S. 1993. Drug abuse treatment in criminal justice settings. *Journal of Drug Issues*, 23:1-6.

Inciardi, J. A., Martin, S. S., Butzin, C. A., Hooper, R. M., & Harrison, L. D. 1997. An effective model of prison-based treatment for drug-involved offenders. Journal of Drug Issues, 27:261-278.

Inciardi, J. A. & Pottieger, A. 1986. Drug use and crime among two cohorts of women narcotics users: An empirical assessment. *Journal of Drug Issues*, 16:91-106.

Inciardi, J. A. & Pottieger, A. E. 1991. *Kids, crack, and crime*. *Journal of Drug Issues*, 21:257-270.

Inciardi, J. A. & Pottieger, A. E. 1994. Crack-cocaine use and street crime. *Journal of Drug Issues*, 24:273-292.

Irvin, J. E., Bowers, C. A., Dunn, M. E., & Wang, M. C. 1999. Efficacy of relapse prevention: A meta-analytic review. *Journal of Consulting and Clinical Psychology*, 67:563-570.

Israel, B. A. 1985. Social networks and social support: Implications for natural helper and community level intervention. *Health Education Quarterly*, 12:65-80.

Izzo, R. L. & Ross, R. R. 1990. Meta-analysis of rehabilitation programs for juvenile delinquents. *Criminal Justice and Behavior*, 17:134-142.

Jackson, D., Usher, K., & O'Brien, L. 2006. Fractured families: Parental perspectives of the effects on adolescent drug use on family life. *Contemporary Nurs*e, 23:321-330.

Jessor, R. & Jessor, S. L. 1977. *Problem behavior and psychosocial development: A longitudinal study of youth*. New York: Academic Press.

Jeynes, W. H. 2002. The relationship between the consumption of various drugs by adolescents and their academic achievement. *American Journal of Drug and Alcohol Abuse*, 28:15-35.

Jofre-Bonet, M. & Sindelar, J. L. 2001. Drug treatment as a crime fighting tool. The Journal of Mental Health Policy and Economics, 4:175-188).

Johnson, A. O., Mink, M. D., Harun, N., Moore, C. G., Martin, A. B. & Bennett, K. 2008. Violent and drug use in rural teens: National prevalence estimates form the 2003 youth risk behavior survey. Journal of School Health, 78:554-561.

Johnson, R. J. & Kaplan, H. B. 1990. Stability of psychological symptoms: Drug use consequences and intervening process. *Journal of Health and Social Behavior*., 31:277-291.

Johnston, L. D., O'Malley, P. M., Bachman, J. G. 1993. National survey results on drug use from Monitoring the Future Study, 1975-1992. Vol 1: Secondary students. Rockville, MD: National Institute on Drug Abuse.

Johnston, L. D., O'Malley, P. M., Bachman, J. G. & Schulenberg, J. E. 2010. Monitoring the Future national results on adolescent drug use: Overview of key findings, 2009. NIH Publication No. 10-7583. Bethesda, MD: National Institute on Drug Abuse.

Johnston, L. D., O'Malley, P. M., Bachman, J. G. & Schulenberg, J. E. 2012. Monitoring the Future national results on adolescent drug use: Overview of key findings, 2011. Ann Arbor: Institute for Social Research, The University of Michigan.

Joint Legislative Audit and Review Commission (JLARC). 2007. *Interim Status Briefing: Costs of Substance Abuse to State and Local Government in Virginia*. Commission Briefing.

Jones, Weatherburn, Freeman, & Matthews. 2005. Psycho-stimulant use, health and criminal activity among injecting heroin users. NDLERF, Monograph No. 10.

Jovanovski, D., Erb, S. & Zakzanis, K. K. 2005. Neurocognitive deficits in cocaine users: A quantitative review of the evidence. *Journal of Clinical and Experimental Neuropsychology*, 27:189-204.

Kandel, D. B. & Davies, M. 1992. Progression to regular marijuana involvement: Phenomenology and risk factors for near-daily uses. In M. Glantz & R. Pickens (Eds.). *Vulnerability to drug abuse* (pp. 211-242). Washington, DC: American Psychological Association.

Kandel, D. B. & Davies, M. 1996. High school students who use crack and other drugs. *Archive of General Psychiatry*, 53:71-80.

Kane, M. 2004. *Public sector economic development: Concepts and approaches*. Washington, DC: Northeast-Midwest Institute.

Kaplan, H. B. & Johnson, R. J. 2001. Social deviance: Testing a general theory. New York: Kluwer/Plenum.

Kellam, S. G., & Langevin, D. J. 2003. A framework for understanding 'evidence' in prevention research and programs. *Prevention Science*, 4:137-153.

Kelly, M. 2000. Inequality and crime. *Review of Economics and Statistics*, 82:540-554.

Khan, M. H. 2000. Rural poverty in developing countries. *Finance and Development, 37*:26-29.

Khantzian, E. J. 1985.The self-medication hypothesis of addictive disorders: Focus on heroin and cocaine dependence. *American Journal of Psychiatry*, 142:1259-1264.

Khantzian, E. J. 2003. The self-medication hypothesis revisited: The dually diagnosed patient. *Primary Psychiatry*, 10:47-48.

Khantzian, E. J., Mack, J. E., & Schatzberg, A. F. 1974. Heroin use as an attempt to cope: Clinical observations. *American Journal of Psychiatry*, 131:160-164.

Khavari, K. A. 1993. Interpersonal influences in college students' initial use of alcohol and drugs-the role of friends, self, parents, doctors, and dealers. *International Journal of the Addictions*, 28:377-388.

King, K. M., Meehan, B. T., Trim, R. S. & Chassin, L. 2006. Marker or mediator? The effects of adolescent substance use on young adult educational attainment. *Addiction*, 101:1730-1740.

Kingery, P. M. Pruitt, B. E., Heuberger, G. & Brizzolara, J. A. 1995. Violence in rural schools: An emerging problem near the United States-Mexico border. *School Psychology International*, 16:335-344.

Kingery, P. M., Pruitt, B. E. & Hurley, R. S. 1992. Violence and illegal drug use among adolescents: Evidence from the U.S. National Adolescent Student Health Survey. *International Journal of the Addition*, 27:1445-1464.

Klee, H. & Morris, J. 1994. Crime and drug misuse: Economic and psychological aspects of the criminal activities of heroin and amphetamine injectors. *Addiction Research*, 1:337-386.

Klein, M. W. & Maxson, C. L. 1994. Gangs and cocaine trafficking. In D. MacKenzie and C. Uchida, *Drugs and crime: Evaluating Public Policy Initiatives*, pp. 42-58. Thousand Oaks, CA: Sage Publications.

Knight, K., Simpson, D. D., & Hiller, M. L. 1999. Three-year reincarceration outcomes for in-prison therapeutic community treatment in Texas. *The Prison Journal*, 79, 337-351.

Koenig, L., Siegel, J. M., Harwood, H., Gilani, J.., Chen, Y.-J., Leahy, P., & Stephens, R. 2005. Economic benefits of substance abuse treatment: Findings from Cuyahoga County, Ohio. *Journal of Substance Abuse Treatment*, 28:S41-S50.

Koven, S. G. & Lyons, T. S. 2003. *Economic development: Strategies for state and local practice*. International City/County Management Association (ICMA).

Kraman, P. 2004. *Drug abuse in America: Rural meth*. The Council of State Governments, Lexington KY.

Krohn, M. D. & Thornberry, T. P. 1993. Network theory: A model for understanding drug abuse among African-Americanand Hispanic youth. In M. R. De La Rosa & J-L. R. Adrados (Eds.), *Drug abuse among minority youth: Advances in research and methodology* (pp. 102-128). National Institute on Drug Abuse Research Monograph 130. NIH Pub. No. 93-3479. Washington, DC: Supt. Of Docs., U.S. Government Printing Office.

Kuhns, J. B. & Clodfelter, T. A. 2008 January-February. Illicit drug-related psychopharmacological violence: The current understanding within a causal context. *Aggression and Violent Behavior*. 14:69-78

Kuhns, J. B. & Clodfelter, T. A. 2009. Illicit drug-related psychopharmacological violence: The current understanding within a causal context. *Aggression and Violent Behavior*, 14:69-78.

Kumpfer, K. L., Olds, D. K., Alexander, J. F., Zucker, R. A., & Gary, L. E. 1998. Family etiology of youth problems. In R. S. Ashery, E. B. Robertson, & K. L. Kumpfer, *Drug Abuse Prevention through Family Intervention.* NIDA Research Monograph 177. Rockville, MD: National Institute on Drug Abuse.

Lambert, D., Gale, J. A. & Hartley, D. 2008. Substance abuse by youth and young adults in rural America. *The Journal of rural Health*, 24:221-228.

Lapsley, D. K. & Hill, P. 2010. Subjective invulnerability, optimism bias and adjustment in emerging adulthood. *Journal of Youth and Adolescence*, 39:847-857.

Laties, V. G. & Weiss, B. 1981. The amphetamine margin in sports. *Federation Proceedings*, 40:2689-2692.

Lattimore, P. K., Trudeau, J., Riley, K. J., Leiter, J. & Edwards, S. 1997. *Homicide in eight U. S. cities: Trends, context, and policy implications: An intramural research project*. Research Report, NCJ 167262. Washington, DC: U.S. Department of Justice, National Institute of Justice.

Lavine, R. 1997. Psychopharmacological treatment of aggression and violence in the substance using population. *Journal of Psychoactive Drugs*, 29:321-329.

Leland, John. 2006. Meth users, attuned to detail, add another habit: ID theft. New York Times (July 11).

Levitt, S. 1999. The changing relationship between income and crime victimization. *Economic Policy Review, 5*:87-98.

Levitt, S. D. & Murphy, K. M. 2006. *How bad was crack cocaine? The economics of an illicit drug market*. Capital Ideas. The University of Chicago Booth School of Business.

Li, D. 1995. Economic development, social control, and murder rates: A cross-national approach. *Cross-Cultural Research*, 29:361-382.

Lipsey, M. W., Chapman, G. L., & Landenberger, N. A. 2001. Cognitive-behavioral programs for offenders. *Annals of the American Academy of Political and Social Science*, 578:144-157.

Littner, M., Johnson, S. F., McCall, W. V., Anderson, M., Davila, D., Hartse, K., Kushida, C., Wise, M. S., Hirshkowitz, M. & Woodson, T. 2001. Practice Parameters for the treatment of narcolepsy: An update for 2000. *SLEEP*, 24:451-466.

Lobao, L. & Kraybill, D. S. 2005. The emerging roles of county governments in metropolitan and nonmetropolitan areas: Findings from a national survey. *Economic Development Quarterly*, 19:245-259.

Lochner, L. & Moretti, E. 2004. The effect of education on crime: Evidence from prison inmates, arrests, and self-reports, *American Economic Review*, *American Economic Association,* Vol. 94(1), pages 155-189, March.

Lockwood, D. & Inciardi, J. A. 1993. CREST Outreach Center: A work release iteration of the TC model. In J. A. Inciardi, F. M. Tims, & B. W. Fletcher (EDS.), *Innovative approaches in the treatment of drug abuse: Program models and strategies* (pp. 61-69). Westport, CT: Greenwood.

Logan, B. K. 2002. Methamphetamine-effects on human performance and behavior. Forensic Science Review, 14:133-151.

Long, S. & Witte, A. D. 1981. Current economic trends: Implications for crime and criminal justice. In K. N. Wright (Ed.), *Crime and Criminal Justice in a Declining Economy* (pp. 69-143). Cambridge, MA: Oelgeschlanger, Gunn and Hain.

Luepker, R. V., Johnson, C. A., Murray, D. M., & Pechacek, T. F. 1983. Prevention of cigarette smoking: Three year follow-up of educational programs for youth. *Journal of Behavioral Medicine*, 6:53-61.

Lynskey, M. T., Coffey, C. & Degenhardt, L., Carlin, J. B., Patton, G. A. 2003. A longitudinal study of the effects of adolescent cannabis use on high school completion. *Addiction*, 98:685-692.

Lynskey, M. T., Heath, A. C., Bucholz, K. K., Slutske, W. S., Madden, P. A. F., Nelson, E. C., Statham, D. J., & Martin, N. G. 2003. Escalation of drug use in early onset Canabis users vs. Co-twin controls. *JAMA*, 289:427-433.

Macdonald, S., Erickson, P., Wells, S., Hathaway, A., & Pakula, B. 2008. Predicting violence among cocaine, cannabis, and alcohol treatment clients. *Addictive Behaviors*, 33:201-205.

Machalova, A., Slais, K., Vrskova, D. and Sulcova, A. 2012. Differential effects of modafinil, methamphetamine, and MDMA on antagonistic behavior in male mice. *Pharmacology, Biochemistry and Behaviors*, 102:215-223.

Macleod, J., Oakes, R., Copello, A., Crome, I., Egger, M., Hickman, M., et al. 2004. Psychological and social sequelae of cannibal and other illicit drug use by young people: A systematic review of longitudinal, general population studies. *Lancet*, 363:1579-1588.

Maine Office of Substance Abuse. 2007. The cost of alcohol and drug abuse in Maine, 2005. Augusta, ME: Author.

Mancini, J. A., Martin, J. A., & Bowen, G. L. 2003. Community capacity. In T. Gullotta & M. Bloom (Eds.), Encyclopedia of Primary Prevention and Health Promotion (pp. 319-330). New York: Kluwer Academic/Plenum Publishers.

Mancini, J. A., Nelson, J. P., Bowen, G. B., & Martin, J. A. 2006. Preventing intimate partner violence: A community capacity approach. *Journal of Aggression, Maltreatment, and Trauma*, 13:203-227.

Mandara, J. & Murray, C. B. 2006. Father's absence and African American adolescent drug use. Journal of Divorce & Remarriage, 46:1-12.

Mark, T. L., Woody, G. E., Juday, T., & Kleber, H. D. 2001. The economic costs of heroin addiction in the United States. *Drug and Alcohol Dependence*. 61:195-206.

Mark, T. L., Levit, K. R., Coffey, R. M., McKusick, D. R., Harwood, H. J., King, E. C., Bouchery, E., Genuardi, J. S., Vandivort-Warren, R., Buck, J. A., & Ryan, K. 2007. National expenditures for mental health services and substance abuse treatment, 1993-2003. SAMHSA Publication No. SMA 07-4277. Rockville, MD: Substance Abuse and Mental Health Administration.

Martin, S. E., Maxwell, C. D., White, H. R. & Zhang, Y. 2004. Trends in alcohol use, cocaine use, and crime: 1989-1998. *Journal of Drug Issues*, 34:333-359.

Martin, S. S., Butzin, C. A., Saum, C. A., & Inciardi, J. A. 1999. Three-year outcomes of therapeutic community treatment for drug-involved offenders in Delaware: From prison to work release to aftercare. *The Prison Journal*, 79, 294-320.

Mauser, E., Van Stelle, K. R., & Moberg, D. P. 1994. The economic impact of diverting substance abusing offenders into treatment. *Crime and Delinquency*, 40, 568-588.

Maxson, C. L. 1998. Gang homicide: A review and extension of the literature. In D. Smith & M. Zahn, *Homicide: A Sourcebook of Social Research*. Thousand Oaks, CA: Sage Publications.

McBride, N. 2003. A systematic review of school drug education. *Health Education Research*, 18:729-742.

McCollister, K. E. & French, M. T. 2002. The cost of drug abuse treatment in criminal justice settings. In C. Leukefeld, F. Timms, D. J. Farabee, D. J (Eds.), *Treatment of drug offenders: Policies and Issues* (pp. 22-37). Springer Publishing Company. New York.

McCollister, K. E., French, M. T., Inciardi, J. A., Butzin, C. A., Martin, S. S. & Hooper, R. M. 2003a. Post-release substance abuse treatment for criminal offenders: A cost-effectiveness analysis. *Journal of Quantitative Criminology*, 19:389-407.

McCollister, K. E., French, M. T., Prendergast, M., Hall, E., & Sacks, S. 2004. Long-term cost-effectiveness of addiction treatment for criminal offenders. *Justice Quarterly*, 21:659-679.

McCollister, K. E., French, M. T., Prendergast, M., Wexler, H., Sacks, S., & Hall, E. 2003b. Is in-prison treatment enough? A cost-effectiveness analysis of prison-based treatment and aftercare services for substance-abusing offenders. *Law and Policy*, 25:63-82.

McCoy, H. V., Messiah, S., & Zhinuan, Yu. 2001. Perpetrators, victims, and observers of violence: Chronic and non-chronic drug users. *Journal of Interpersonal Violence*, 16:890-909.

McEwan, T., Uchida, C., Castellano, T., McGarrell, E., Osnick, S., Pennell, S., Putnam, C., Schlegal, K., Scott, M., & Schneider, M. 2003, Combating meth laboratories and abuse: Strategies for success. COPS Innovations: A Closer Look. U. S. Department of Justice.

McGuire, W. J. 1964. Inducing resistance to persuasion: Some contemporary approaches. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (pp. 192-277). New York: Academic Press.

McGuire, W. J. 1968. The nature of attitudes and attitude change. In G. Lindzey and E. Aronson (Eds.), *Handbook of social psychology,* pp. 136-314. Reading, MA: Addison-Wesley.

McIntosh, J., Bloor, M., & Robertson, M. 2007. The effect of drug treatment upon the commission of acquisitive crime. *Journal of Substance Use*, 12:375-384.

McKetin, R., McLaren, J., & Kelly, E. 2005. The Sydney methamphetamine market: patterns of supply, use personal harms and social consequences, NDLERF monograph series, No. 13, Sydney: National Drug and Law Enforcement Research Fund.

Menard, S. & Mihalic, S. 2001a. The tripartite conceptual framework in adolescence and adulthood: Evidence from a national sample. *Journal of Drug Issues*, 31:905-940.

Menard, S., Mihalic, S., & Huizinga, D. 2001b. Drugs and crime revisited. *Justice Quarterly*, 18:269-299.

Messner, S. F. 1982a. Societal development, social equality, and homicide: A cross-national test of a Durkheimian model. *Social Forces*, 61:225-240.

Messner, S. F. 1982b. Poverty, inequality, and the urban homicide rate: Some unexpected findings. *Criminology*, 20:103-114.

Miczek, K. A., Debold, J. F., Haney, M., Tidey, J., Vivian, J., & Weerts, E. M. 1994. Alcohol, drugs and abuse, aggression, and violence. In A. J. Reiss & J. A. Roth (Eds.), *Understanding and preventing violence* (vol. 3). Washington, D.C.: National Academy Press.

Miczek, K. A.; Weerts, E. M., & Debold, J. F. 1993. Alcohol, benzodiazepine-GABA(a) receptor complex and aggression: Ethological analysis of individual differences in rodents and primates. *Journal of Studies on Alcohol* (Suppl. 11), 170-179.

Mieczowski, T. 1990. The operational styles of crack houses in Detroit. In M. De La Rosa, E. Y. Lambert, & B. Gropper (Eds.), *Drugs and Violence: Causes, Correlates, and Consequences*. NIDA Research Monograph Series, No. 103. Rockville, MD: National Institute on Drug Abuse.

Mieczowski, T. 1994. The experiences of women who sell crack: Some descriptive data from the Detroit ethnography project. *Journal of Drug Issues*, 24:227-248.

Milhorn, H. T. 1994. *Drug and alcohol abuse: The authoritative guide for parents, teachers, and counselors*. Plenum Press. New York and London.

Miller, J. 1998. Up It Up: Gender and the accomplishment of street robbery. *Criminology,* 36:1:37–66.

Miller, R. L. & Shinn, M. 2005. Learning from communities: Overcoming difficulties in dissemination of prevention and promotion efforts. *American Journal of Community Psychology*, 35:169-183.

Miller, T. & Hendrie, D. 2008. Substance abuse prevention dollars and cents: A cost-benefit analysis, DHHS Pub. No. (SMA) 07-4298. Rockville, MD: Center for Substance Abuse Prevention, Substance Abuse and Mental Health Services Administration.

Mink, M., Moore, C., Johnson, A., Probst, J. & Martin, A. 2005. Violence and rural teens. Rockville, MD: South Carolina Rural Health Research Center.

Minkler, M. 1991. Improving health through community organization. In K. Glanz, F. M. Lewis, B. K. Rimer (Eds.), *Health Behavior and Health Education-Theory, Research and Practice* (pp, 257-287). San Francisco, CA: Jossey, Bass.

Moon, D. G., Hecht, M. L., Jackson, K. M., & Spellers,R. E. 1999. Ethnic and gender differences and similarities in adolescent drug use and refusals of drug offers. *Substance Use and Misuse*, 34:1059-1083.

Morentin, B., Callado, L. F., & Meana, J. J. 1998. Differences in criminal activity between heroin abusers and subjects without psychiatric disorders: Analysis of 578 detainees in Bilbao, Spain. *Journal of Forensic Sciences*, 43:993-999.

Moretti, E. 2005. Does education reduce participation in criminal activities? In H. M. Lewin, *Symposium on the social costs of inadequate education conducted at Teachers College*. New York: Columbia University.

Morgan, J. Q. 2009. The role of local government in economic development: Survey findings from North Carolina. Chapel Hill, NC: UNC School of Government.

Morral, A., McCaffrey, D. & Ridegway, G. 2005. Effectiveness of community-based treatment for substance-abusing adolescents: Twelve-month outcomes of youths entering Phoenix Academy or alternative probation dispositions. *Psychology of Addictive Behaviors*, 18:257-268.

Morrison, G. M. & Furlong, M. J. 1994a. Factors associated with the experience of school violence among general education, leadership class, opportunity class, and special day class pupils. *Education & Treatment of Children*, 17:356-369.

Morrison, G. M. & Furlong, M. J. 1994b. School violence to school safety: Reframing the issue for school psychologists. *School Psychology Review*, 23:236-256.

Moskowitz, A. S. & Goodman, R. R. 1985. Autoradiographic analysis of mu1, mu2, and delta opioid binding in the central nervous system of C57BL/6BY and CXBK (opioid receptor-deficient) mice. *Brain Research*, 360:108-116.

Muennig, P. 2005. Health returns to education interventions. In H. M. Lewin, *Symposium on the social costs of inadequate education conducted at Teachers College*. New York: Columbia University.

Nation, M., Crustro, C., Wandersman, A., Kumpfer, K. L., Seybolt, D., Morrissey, Kane, E., & Davino, K. 2003. What works in prevention: Principles of effective prevention programs. *American Psychologist*, 58:449-456.

National Association of Counties (NACO). 2007. *The meth epidemic: The changing demographics of methamphetamine*. Washington, D.C.: National Association of Counties, Research Division.

National Center for Education Statistics. 1996. The condition of education: Public and private schools: How do they differ? NCES 97-983. U.S. Department of Education. Office of Educational Research and Improvement.

National Council for Urban Economic Development. 1993. Survey of public economic development agencies. Washington, DC.

National Drug Intelligence Center. 2001. California central district drug threat assessment. Doc. ID: 2001-S0387CCA-001. U.S. Department of Justice.

National Geographic. 2006. *The world's most dangerous drug*. National Geographic Channel. Margate, Florida.

National Institute on Drug Abuse. 1997. *Preventing drug use among children and adolescents: A research-based guide*. NIH Publication No. 97-4212.

National Institute on Drug Abuse. 1983. *Population projections. Based on the National Survey on Drug Abuse, 1982*. DHHS Publication Number (ADM) 83-1303. Washington, D.C.: Supt. Of Docs., U.S. Government Printing Office.

National Institute on Drug Abuse. 2003. Drug use among racial/ethnic minorities. Bethesda, Maryland. National Institute on Drug Abuse, U.S. Department of Health and Human Services.

National Institute on Drug Abuse, National Institutes of Health, U. S. Department of Health and Human Services. 2009. *Principles of drug addiction treatment: A research-based guide*. Publication Number 09-4180. National Institutes of Health, Bethesda, Maryland.

National Institute on Drug Abuse. 2010a. Methamphetamine. http://www.drugabuse.gov/drugs-abuse/methamphetamine

National Institute on Drug Abuse. 2010b. Amphetamine. http://www.drugabuse.gov/drugs-abuse/amphetamine

National Institute on Drug Abuse. 2010c. Research Report: Cocaine: Abuse and addiction. www.drugabuse/gove/publications/research-reports/cocaine-abuse-addiction/what-cocaine

National Institute on Drug Abuse. 2010d. DrugFacts: Cocaine. www.drugabuse.gov/publications/drugfacts/cocaine.

National Institute on Drug Abuse. 2010e. DrugFacts: Heroin. www.drugabuse.gov/publications/drugfacts/heroin

National Institute on Drug Abuse. 2010f. Research reports: Heroin: Abuse and addiction. www.drugabuse.gov/publications/research-reports/heroin-abuse-addiction/what-heroin

National Institute on Drug Abuse. 2011. Identifying and monitoring emerging drug use problems: A retrospective analysis of drug abuse data/information, www.drugabuse.gov/about/organization/cewg/Retro.html.

National Institute on Drug Abuse. 2011. NIDA InfoFacts: Treatment Approaches for Drug Addiction. www.nida.nih.gov/Infofacts/TreatMeth.html.

Neale, J., Bloor, M., & Weir, C. 2005. Problem drug users and assault. *International Journal of Drug Policy*, 16:393-402.

Nemes, S., Wish, E., & Messina, N. 1999. Comparing the impact of standard and abbreviated treatment in a therapeutic community. *Journal of Substance Abuse Treatment*, 17:339-347.

Newcomb, M., Huba, G. J. & Bentler, P. M. 1983. Mother's influence on the drug-use of their children: Confirmatory tests of direct modeling and meditational theories. *Developmental Psychology*, 19:714-726.

Newcomb, M. D. & Earleywine, M. 1996. Intrapersonal contributors to drug use: The willing host. American Behavioral Scientist, 39:823-837.

Nicosia, N., Pacula, R. L., Kilmer, B., Lundberg, R., & Chiesa, J. 2009. *The economic cost of methamphetamine use in the United States, 2005*. RAND Drug Policy Research. RAND Corporation.

Nordahl, T. E., Salo, R. & Leamon, M. 2003. Neuropsychological effects of chronic methamphetamine use on neurotransmitters and cognition: A review. *The Journal of Neuropsychiatry and Clinical Neurosciences,* 15:317-325.

Nurco, D. N., Kinlock, T. W., & Hanlon, T. E. 2004. The drugs-crime connection. In J. A. Inciardi & K. McEnrath (Eds.), *The American Drug Scene: An Anthology*. Los Angeles: Roxbury.

Nye, C. L., Zucker, R. A., & Fitzgerald, H. E. 1995. Early intervention in the path to alcohol problems through conduct problems: Treatment involvement and child behavior change. *Journal of Consulting and Clinical Psychology,* 63:831-840.

Obot, I. S., Hubbard, S. & Anthony, J. C. 1999. Level of education and injecting drug use among African Americans. *Drug and Alcohol Dependence*, 55:177-182.

Odgers, C. L., Caspi, A., Nagin, D.S., Piquero, A. R., Sluthske, W. S., Mine, B. J., Dickson, N., Poultaon, R. & Moffitt, T. E. 2008. *Psychological Science*, 19:1037-1044.

Oetting, E. R. & Beauvais, F. 1986. Peer cluster theory: drugs and the adolescent. *Journal of Counseling and Development*, 65:17-22.

Oetting, E. R. & Beauvais, F. 1987. Peer cluster theory, socialization, characterization, and adolescent drug use: A path analysis. *Journal of Consulting and Clinical Psychology*, 34:205-213.

Office of National Drug Control Policy (ONDCP). 2004. The economic costs of drug abuse in the United States, 1992-2002. Washington, DC: Executive Office of the President (Publication No. 207303).

O'Malley, S., Adamse, M., Heaton, R. K. & Gawin, F. H. 1992. Neuropsychological impairment in chronic cocaine abusers. *The American Journal of Drug and Alcohol Abuse*, 131-144.

Oser, C. B., Palmer, J. M., Tindall, M. S., & Leukefeld, C. G. 2009. The drugs-violence nexus among rural felony probationers. *Journal of Interpersonal Violence*, 24:1285-1303.

Ousey, G. C. 2000a. Deindustrialization, female-headed families and black and white juvenile homicide rates, 1970-1990." *Sociological Inquiry,* 70:391-419.

Ousey, G. C. 2000b. Explaining regional and urban variation in crime: A review of research." In G. LaFree (Eds.), *Criminal Justice 2000, Volume 1, The nature of crime: Continuity and change* (pp. 261-308). Washington, DC: National Institute of Justice.

Ousey, G. C. & Augustine, Michelle Campbell. 2001. Young guns: examining alternative explanations of juvenile firearm homicide rates. *Criminology,* 39:933-968.

Ousey, G. C. & Lee, M. R. 2002. Examining the conditional nature of the illicit drug market-homicide relationship: A partial test of the theory of contingent causation. *Criminology,* 40:73-102.

Parker, H., Aldridge, J., & Measham, F. 1998. *Illegal leisure: The normalization of adolescent recreational drug use*. London and New York: Routledge.

Parker, R. N., & Auerhahn, K. 1998. Alcohol drugs and violence. *Annual Review of Sociology*, 23:291-311.

Parker, H. & Newcombe, R. 1987. Heroin use and acquisitive crime in an English community. *British Journal of Sociology*, XXXVII, 331-350.

Patterson, E. B. 1991. Poverty, income inequality and community crime rates. *Criminology*, 29:755:776.

Pearson, F. S., Lipton, D. S., Cleland, C. M., & Yee, D. S. 2002. The effects of behavioral/cognitive behavioral programs on recidivism. *Crime and Delinquency*, 48:476-497.

Pelissier, B. M., Camp, S. D., & Motivans, M. L. 2003. Staying in treatment: How much difference is there from prison to prison? *Psychology of Addictive Behavior*, 17:134-141.

Pelissier, B. M., Gaes, G. G., Camp, S. C., Wallace, S. B., O'Neil, J. A., & Saylor, W. 1998. Triad drug treatment evaluation project: Six-month interim report. Washington, D.C.

Pelissier, B. M., Rhodes, W., Saylor, W., Gaes, G., Camp, S. D., Vanyur, S. D., & Wallace, S. 2001. Triad drug treatment evaluation project. *Federal Probation*, 65:3-7.

Pennell, S., Ellett, J., Rienick, C., & Grimes, J. 1999. *Meth matters: Report on methamphetamine users in five western cities*. National Institute of Justice.

Pentz, M. A. 1999. Prevention in the Community. In R. T. Ammerman, P. J. Ott, & Ralph E. Tarter (Eds.), *Prevention and societal impact of drug and alcohol abuse*. Lawrence Erlbaum Associates, Inc.

Pentz, M. A. 2004. Form follows function: Designs for prevention effectiveness and dissfusion research. *Prevention Science*, 5:23-29.

Perkins, D. F. & Borden, L. M. 2003. Positive behaviors, problem behaviors, and resiliency in adolescence. In R. M. Lerner, M. A. Easterbrooks, & J. Mistry (Eds.), *Handbook of psychology: Vol. 6. Developmental psychology (pp. 373-394)*. New York: Wiley.

Perry, C., Killewn, J., Slinkard, L. A., & McAlister, A. L. 1983. Peer teaching and smoking prevention among junior high students. *Adolescence*, 9:277-281.

Pfeffermann, G. 2001. Poverty reduction in developing countries: The role of private enterprise. *Finance and Development, 38*:42-45.

Pickens, R. & Svikis, D. 1988. Biological Vulnerability to Drug Abuse. NIDA Research Monograph 89. Rockville, MD.: National Institute on Drug Abuse.

Polusny, M. A. & Follette, V. M. 1995. Long-term correlates of child sexual abuse: Theory and review of the empirical literature. *Applied and Preventive Psychology*, 4:143-166.

Pompi, K. F. 1994. Adolescents in therapeutic communities: Retention and Posttreatment Outcome. In F. M. Tims, G. De Leon, & Jainchill, N. (Eds.), *Therapeutic community: Advances in research and practice*. NIDA Research Monograph 144, DHHS Publication No. ADM 94-3633, pp. 16-53. Rockville, MD, National Institute on Drug Abuse.

Porpino, F. J., Robinson, D., Millson, B., & Weekes, J. R. 2002. An outcome evaluation of prison-based treatment programming for substance users. *Substance Use and Misuse*, 37:1047-1077.

Prendergast, M., Hall, E., & Wellisch, J. 2002. An outcome evaluation of the Forever Free substance abuse treatment program: One-year post-release outcomes. Final Report, National Institute of Justice Grant 99-RT-VX-K003. Los Angeles: UCLA Drug Abuse Research Center.

Prendergast, M., Wellisch, J., and Wong, M. 1996. Residential treatment for women parolees following prison-based drug treatment experiences, needs and services outcomes. *Prison Journal*, 76:253-274.

Prendergast, M. & Wexler, H. K. 2004. Correctional substance abuse treatment programs in California: A historical perspective. *The Prison Journal*, 84:8-35.

Price, K. L., DeSantis, S. M., Simpson, A. N., Tolliver, B. K., McRae-Clark, A. L., Saladin, M. E., Baker, N. L., Wagner, M. T., Brady, K. T. 2011. The impact of clinical and demographic variables on cognitive performance in methamphetamine-dependent individuals in rural South Carolina. *American Journal on Addictions,* 20:447-455.

Pruitt, L. R. 2009. The forgotten fifth: Rural youth and substance abuse. SelectWorks. University of California, Davis.

Raphael, S. & Winter-Ebmer, R., 2001. Identifying the effect of unemployment on crime. *Journal of Law and Economics* 44:259-83.

Rasmussen, S. 2000. *Addiction treatment: Theory and practice*. Sage Publication. Thousand Oaks, California.

Ravallion, M. 2001. Growth, inequality, and poverty: Looking beyond averages. *World Development, 29*:1803-1815.

Reese, L. A. 1994. The role of counties in local economic development. *Economic Development Quarterly*, 8:28-42.

Reese, L. A. & Rosenfeld, R. A. 2004. Local economic development in the United States and Canada: Institutionalizing policy approaches. *American Review of Public Administration*, 34:277-292.

Rehm, J., Baliunas, D., Brochu, S., Fischer, B., Gnam, W., Patra, J., Popova, S., Sarnocinska-Hart, A., & Taylor, B. 2006. In collaboration E. Adlaf, M. Recel, & E. Single, The costs of substance abuse in Canada 2002. Ottawa: Canadian Centre on Substance Abuse.

Reiss, A. J. & Roth, J. A. 1993. Understanding and prevention violence. Washington, DC: National Academy Press.

Rettig, R. A. & Yarmolinski, A. 1995. Federal regulation of methadone treatment. Committee on Federal Regulations of Methadone Treatment, Institute of Medicine, National Academy of Sciences. Washington, DC: National Academy Press.

Reuter, P. 2009. Systemic violence in drug markets. *Crime Law Social Change*, 52:275-284.

Resignato, A. J. 2000. Violent crime: A function of drug use or drug enforcement? *Applied Economics*, 32:681-688.

Rhatigan, D. L., Moore, T. M., & Street, A. E. 2005. Reflections on partner violence: 20 years of research and beyond. *Journal of Interpersonal Violence*, 20:82-88.

Rhodes, J. E.., Contreras, J. M., & Mangelsdorf, S. C. 1994. Natural mentor relationships among Latino adolescent mothers: Psychological adjustment, moderating processes, and the role of early parental acceptance. *American Journal of Community Psychology*, 22:211-227.

Rhodes, W. & Gross, M. 1997. Case management reduces drug use and criminality among drug-involved arrestees: an experimental study of an HIV prevention intervention. A final summary report presented to the National Institute of Justice and the National Institute on Drug Abuse.

Rice, D. P., Kelman, S., & Miller, L. S. Economic costs of drug abuse. 1991a. Estimates of economic costs of alcohol and drug abuse and mental illness, 1985 and 1988. *Publish Health Rep,* 106:280-291.

Rice, D. P., Kelman, S., & Miller, L. S. 1991b. Economic costs of drug abuse. In W. Cartwright, Ph.D. & J. M. Kaple, Ph.D. (Eds.), *Economic costs, cost-effectiveness, financing, and community-based drug treatment*. NIDA Research Monograph Series, No. 113. Rockville, MD: National Institute on Drug Abuse.

Rice, D. P., Kelman, S., Miller, L. S., & Dunmeyer, S. 1990. The economic costs of alcohol and drug abuse and mental illness: 1985. Report submitted to the Office of Financing and Coverage Policy of the Alcohol, Drug Abuse, and Mental Health Administration, U.S. Department of Health and Human Services. DHHS Pub. No. (ADM) 90-1694. University of California, San Francisco; Institute for Health and Aging. Alcohol, Drug Abuse, and Mental Health Administration, Rockville, MD.

Richmond Times Dispatch. 2010. Northern Virginia richest, Southwest Virginia poorest. December 15.

Ringwalt, C., Ennett, S., & Holt, K. 1990. An outcome evaluation of Project D.A.R.E. *Health Education Research*, 6:327-337.

Robinson, J. E., Heaton, R. K. & O'Malley, S. S. 1995. Neuropsychological functioning in cocaine abusers with and without alcohol dependence. *Journal of the International Neuropsychological Society*, 5:10-19.

Robinson, J. E., Heaton, R. K. & O'Malley, S. S. 1995. Neuropsychological functioning in cocaine abusers with and without alcohol dependence. *Journal of the International Neuropsychological Society*, 5:10-19.

Rojewski, J. W. 1999. Career-related predictors of work-bound and college-bound status of adolescents in rural and nonrural areas. Journal of Research in Rural Education, 15:141-156.

Rosenbaum, D. P. & Hanson, G. S. 1998. Assessing the effects of school-based drug education: A six-year multilevel analysis of Project D.A.R.E. *Journal of Research in Crime and Delinquency*, 35:381-412.

Roth, J. A. 1994. *Psychoactive substances and violence*. National Institute of Justice, Office of Justice Programs, Washington, D. C.

Rouse, C. E. 2005. The labor market consequences of an inadequate education. . In H. M. Lewin, *Symposium on the social costs of inadequate education conducted at Teachers College*. New York: Columbia University.

Sanders, C. E., Field, T. M. & Diego, M. A. 2001. Adolescents' academic expectations and achievement. *Adolescence*, 36:795-802.

Sanders, M. R., Turner, K. M. T., & Markie-Dadds, C. 2002. The development and dissemination of the Triple P-positive parenting program: A multilevel, evidence-based system of parenting and family support. *Prevention Science*, 3:173-189.

Sandler, I., Ostrom, A., Bitner, M., Ayers, T. S., Wolchik, S., & Smith-Dainels, V. 2005. Developing effective prevention service for the real world: A prevention service development model. *American Journal of Community Psychology*. 35:127-142.

Scal, P., Ireland, M. & Wagman Borowsky, I. 2003. Smoking among American adolescents: A risk and protective factor analysis. *Journal of Community Health*, 28:79-97.

Scheer, S. D., Borden, L. M. & Donnermeyer, J. F. 2000. The relationship between family factors and adolescent substance use in rural, suburban, and urban settings. *Journal of Child and Family Studies*, 9:105-115.

Scheier, L. M. & Newcomb, M. D. 1991. Differentiation of early adolescent predictors of drug use versus abuse: A developmental risk factor model. *Journal of Substance Abuse*, 3:277-299.

Schober, S. & Schade, C. 1991. Introduction. In: Schober, S. & Schade, C. (Eds.), *The Epidemiology of Cocaine Use and Abuse*. Research Monograph 111. Rockville, Maryland. National Institute on Drug Abuse, DHHS Publication No., (ADM) 91-1787.

Schuster, C., O'Malley, P. M., Bachman, J.G., Johnston, L. D. & Schulenberg, J. 2001. Adolescent marijuana use and adult occupational attainment: A Longitudinal study from age 18-28. *Substance Use and Misuse*, 36:997-1014.

Scott, J. C., Woods, S. P., Matt, G. E., Meyer, R. A., Heaton, R. K., Atkinson, J. H., Grant, I. 2007. Neurocognitive effects of methamphetamine: A critical review of meta-analysis. *Neuropsychology Review*, 17:275-297.

Scott, M. S. & Dedel, K. 2006. Clandestine methamphetamine labs, 2nd edition. U. S. Problem-Oriented Guides for Police Services, Problem-Specific Guide Series No. 16. Department of Justice, Office of Community Oriented Policing Services.

Serrano-Garcia, I. & Bond, M. 1994. Empowering the silent ranks: Introduction. *American Journal of Community Psychology*, 22:433-445.

Sexton, R. L., Carlson, R. G., Leukefeld, C. G., & Booth, B. M. 2006. Patterns of illicit methamphetamine production ("cooking") and associated risks in the rural south: An ethnographic exploration. *Journal of Drug Issues*, 36:853-876.

Sexton, R. L., Carlson, R. G., Leukefeld, C. G., & Booth, B. M. 2009. An ethnographic exploration of self-reported violence among rural methamphetamine users. *Journal of Ethnicity in Substance Abuse*, 8:35-53.

Sexton, R. L., Carlson, R. G., Siegal, H., Falck, R. G., Leukefeld, C. G., & Booth, B. M. 2005. Barriers and pathways to diffusion of methamphetamine use among African Americans in the rural south: Preliminary ethnographic findings. *Journal of Ethnicity in Substance Abuse*, 4:77-102.

Shaffer, D. F. & Wright, D. J. 2010. A new paradigm for economic development. How higher education institutions are working to revitalize their regional and state economies. The Nelson A. Rockefeller Institute of Government. University at Albany. Statue University of New York.

Shedler, J. & Block, J. 1990. Adolescent drug use and psychological health: A longitudinal inquiry. *American Psychologist*, 45:612-630.

Sheley, J. F., McGee, Z. T. & Wright J. D. 1992. Gun-related violence in and around inner city schools. *American Journal of Diseases of Children*, 146:677-682.

Shull, J. C. & Berkowitz, B. 2005. Community building with technology: The development of collaborative community technology initiatives in a mid-size city. *Journal of Prevention and Intervention in the Community*, 29:29-41.

Simon, S. L., Domier, C. P., Sim, T., Richardson, K., Rawson, R. A. & Ling, W. 2002. Cognitive performance of current methamphetamine and cocaine abusers. *Journal of Addictive Diseases,* 21:61-74.

Simpson, D. 1993. Drug treatment evaluation in the United States. *Psychology of Addictive Behaviors*, 7:120-128.

Simpson, D., Joe, G., & Brown, B. 1997. Treatment retention and follow-up outcomes in the Drug Abuse Treatment Outcome Study (DATOS). *Psychology of Addictive Behaviors*, 11:294-307.

Single, E. 2009. Why we should still estimate the costs of substance abuse even if we needn't pay undue attention to the bottom line. *Drug and Alcohol Review*, 28:117-121.

Single, E., Robson, L., Xie, X., & Rehm, J. 1996. *The costs of substance abuse in Canada*. Ottawa, Ontario, Canada: Canadian Centre on Substance Abuse.

Sinha, R., Easton, C. & Kemp, K. 2003. Substance abuse treatment characteristics of probation-referred young adults in a community-based outpatient program. *The American Journal of Drug and Alcohol Abuse*, 29:585-597.

Sokolov, B. P. & Cadet, J. L. 2005. Methamphetamine causes alterations in the Map kinase-related pathways in the brains of mice that display increased aggression. *Neuropsychopharmacology*, 31:956-966.

Sokolov, B. P., Schlinder, C. W. & Cadet, J. L. 2004. Chronic methamphetamine increases fighting in mice. *Pharmacology, Biochemistry and Behavior*, 77:319-326.

Solowij, N. 1995. Do cognitive impairments recover following cessation of cannabis use? *Life Sciences*, 56:2119-2126.

Sommers, I. & Baskin, D. 2006. Methamphetamine use and violence. *Journal of Drug Issues*, 36:77-96.

Sommers, I., Baskin, D., & Baskin-Sommers, A. 2006a. Methamphetamine use among young adults: Health and social consequences. *Addictive Behaviors*, 31:1469-1476.

Sommers, I., Baskin, D., & Baskin-Sommers, A. 2006b. The co-occurrence of substance use and high-risk behaviors. *Journal of Adolescent Health*, 38:609-611.

Springer, J. F., Sale, E., Hermann, J., Sambrano, S., Kasim, R., & Nistler, M. 2004. Characteristics of effective substance abuse prevention programs for high-risk youth. *Journal of Primary Prevention*, 25:171-193.

Spunt, B. J., Goldstein, P. J., Bellucci, P. A., & Miller, T. 1990. Drug related violence among methadone maintenance treatment clients. *Advances in Alcohol and Substance Abuse,* 9:81-99.

Stelle, K. R., Mauser, E., & Moberg, D. P. 1994. Recidivism to the criminal justice system of substance-abusing offenders diverted into treatment. *Crime and Delinquency*, 40:175-196.

Stevens, A., Trace, M., & Bewley-Taylor, D. 2005. Reducing drug-related crime: An overview of the global evidence (Report 5). Surrey, UK: The Beckley Foundation Drug Policy Programme, Report Five.

Stevens, S. J. & Glider, P. J. 1994. Therapeutic communities: Substance abuse treatment for women. In F. M. Tims, G. De Leon, & N. Jainchill, N. (Eds.), *Therapeutic community: Advances in research and practice* (pp.162-180). NIDA Research Monograph 144, DHHS Publication no. ADM 94-3633. Rockville, MD, National Institute on Drug Abuse.

Stice, E., Barrera, M. Jr. & Chassin, L. 1993. Relation of parental support and control to adolescents' externalizing symptomatology and substance use: A longitudinal examination of curvilinear effects. *Journal of Abnormal Child Psychology*, 21:609-629.

Stronski, S. M., Ireland, M., Michaud, P.-A., Narring, F. & Resnick, M. D. 2000. Protective correlates of stages in adolescent substance use: A Swiss national study. *Journal of Adolescent Health*, 26:420-427.

Stretesky, P. B. 2008. National case-control study of homicide offending and methamphetamine use. *Journal of Interpersonal Violence*, 24:911-924.

Substance Abuse and Mental Health Services Administration. 2011. Results from the 2010 National Survey on Drug Use and Health: Summary of National Findings, NSDUH Series H-41, HHS Publications No. (SMA) 11-4658. Rockville, Maryland: Substance Abuse and Mental Health Services Administration.

Substance Abuse and Mental Health Services Administration (SAMHSA), Treatment Episode Data Set (TEDS). 1999-2009. *National Admissions to Substance Abuse Treatment*

Services, DASIS Series: S-56, HHS Publication No. (SMA) 11-4646,Rockville, MD; Substance Abuse and Mental health Services Administration, 2011.

Substance Abuse and Mental Health Services Administration. 2000. *Summary of findings from the 1999 National Household Survey on Drug Abuse*. Rockville, MD: U.S. Department of Health and Human Services, Public Health Service.

Substance Abuse and Mental Health Services Administration. 2001. *Summary of findings from the 2000 National Household Survey on Drug Abuse*. Rockville, MD: U.S. Department of Health and Human Services, Public Health Service.

Substance Abuse and Mental Health Services Administration. 2002. *2001 National Household Survey on Drug Abuse*. Rockville, MD: U.S. Department of Health and Human Services, Public Health Service.

Substance Abuse and Mental Health Services Administration. 2003. Too smart to start Smartstats: A data book. Center for Substance Abuse Prevention (DHHS Publication No. (SMA) 03-3866). Rockville, MD: U. S. Department of Health and Human Services: Substance Abuse and Mental Health Services Administration.

Substance Abuse and Mental Health Services Administration. 2004. National survey on drug use and health. U. S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, Office of Applied Studies (Online). Retrieved January 5, 2011, from http://www.oas.samhsa.gov/nhsda.htm.

Substance Abuse and Mental Health Services Administration. 2004. *Results from the 2003 National Survey on Drug Use and Health: National Findings*. Rockville, MD: U.S. Department of Health and Human Services, Public Health Service.

Substance Abuse and Mental Health Services Administration. 2010. *Results from the 2009 National Survey on Drug Use and Health: Volume I. Summary of National Findings*. Office of Applied Studies, NSDUH Series H-38A. HSS Publication No. SMA 10-4586. Rockville, MD: U.S. Department of Health and Human Services, Public Health Service.

Sullivan, T. N. & Farrell, A. D. 1999. Identification and impact of risk and protective factors for drug use among urban African American adolescents. *Journal of Clinical Child Psychology*, 28:122-136.

Sutherland, I. & Shepherd, J. P. 2001a. Social dimensions of adolescent substance abuse. *Addiction*, 96:445-458.

Sutherland, I. & Shepherd, J. P. 2001b. The prevalence of alcohol, cigarette, and illicit drug use in a stratified sample of English adolescents. *Addiction*, 96:637-640.

Sviridoff, M. & Thompson, J. W. 1983. Links between employment and crime: A qualitative study of Rikers Island releases. *Crime and Delinquency*, 29:195-212.

Tabellini, G. 2005. The role of the state in economic development. *Kyklos, Wiley Balckwell*, 58:283-303.

Tardiff, K., Marzuk, P. M., Leon, A. C., Hirsch, C. S., Stajic, M., Portera, L., & Hartwell, N. 1994. Homicide in New York City. *JAMA*, 272:43-46.

Tardiff, K., Wallace, Z., Tracy, M., Piper, T. M., Vlahov, D., & Galea, S. 2005. Drug and alcohol use as determinants of New York City homicide trends from 1990 to 1998. *Journal of Forensic Science*, 50:1-5.

Taylor, J., Lloyd, D. A., & Warheit, G. J. 2005. Self-derogation, peer factors, and drug dependence among a multiethnic sample of young adults. *Journal of Child and Adolescent Substance Abuse*, 15:39-51.

The National Center on Addiction and Substance Abuse (CASA) at Columbia University. 1993. The cost of substance abuse to America's health care system: Report 1: Medicaid hospital costs. New York, NY: The National Center on Addiction and Substance Abuse (CASA) at Columbia University.

The National Center on Addiction and Substance Abuse (CASA) at Columbia University. 1994. The costs of substance abuse to America's health care system. Report 2: Medicare hospital costs. New York, NY: The National Center on Addiction and Substance Abuse (CASA) at Columbia University.

The National Center on Addiction and Substance Abuse (CASA) at Columbia University. 1998a. Behind bars: Substance abuse and America's prison population. New York, NY: The National Center on Addiction and Substance Abuse (CASA) at Columbia University.

The National Center on Addiction and Substance Abuse (CASA) at Columbia University. 1998b. Back to school 1998—National survey of American attitudes on substance abuse IV: Teens, teachers and principals. New York, NY: The National Center on Addiction and Substance Abuse (CASA) at Columbia University.

The National Center on Addiction and Substance Abuse (CASA) at Columbia University. 1999a. No safe haven: Children of substance-abusing parents. New York, NY: The National Center on Addiction and Substance Abuse (CASA) at Columbia University.

The National Center on Addiction and Substance Abuse (CASA) at Columbia University. 1999b. Back to school 1999—National survey of American attitudes on substance abuse V: Teens, teachers and parents. New York, NY: The National Center on Addiction and Substance Abuse (CASA) at Columbia University.

The National Center on Addiction and Substance Abuse (CASA) at Columbia University. 2000. No place to hide: Substance abuse in mid-size cities and rural America. New York, NY: The National Center on Addiction and Substance Abuse (CASA) at Columbia University.

The National Center on Addiction and Substance Abuse (CASA) at Columbia University. 2001a. Shoveling up: The impact of substance abuse on state budgets. New York, NY: The National Center on Addiction and Substance Abuse (CASA) at Columbia University.

The National Center on Addiction and Substance Abuse (CASA) at Columbia University. 2001b. Malignant neglect: Substance abuse and America's schools. New York, NY: The National Center on Addiction and Substance Abuse (CASA) at Columbia University.

The National Center on Addiction and Substance Abuse (CASA) at Columbia University. 2001c. The national survey of American attitudes on substance abuse VI: Teens. New York, NY: The National Center on Addiction and Substance Abuse (CASA) at Columbia University.

The National Center on Addiction and Substance Abuse (CASA) at Columbia University. 2005. Family matters: Substance abuse and the American family. New York, NY: The National Center on Addiction and Substance Abuse (CASA) at Columbia University.

The National Center on Addiction and Substance Abuse (CASA) at Columbia University. 2009. Shoveling up II: The impact of substance abuse on federal, state and local budgets. New York, NY: The National Center on Addiction and Substance Abuse (CASA) at Columbia University.

The National Center on Addiction and Substance Abuse (CASA) at Columbia University. 2011a. CASA analysis of the National Survey on Drug Use and Health (NSDUH), 2009. Rockville, MD: U. S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration.

The National Center on Addiction and Substance Abuse (CASA) at Columbia University. 2011b. Adolescent substance use: America's #1 public health problem. Rockville, MD: U. S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration.

Tidey, J. W. & Miczek, K. A. 1992. Heightened aggressive behavior during morphine withdrawal: Effects of d-amphetamine. *Psychopharmacology*, 107:297-302.

Tims, F. M., Jainchill, N., & De Leon, G. 1994. Therapeutic communities and treatment research. In F. M. Tims, G. De Leon, & N. Jainchill, N. (Eds.) Therapeutic community: Advances in research and practice (pp. 16-53). NIDA Research Monograph 144, DHHS Publication No. ADM 94-3633. Rockville, MD, National Institute on Drug Abuse.

Tjaden, C. D. 1990. *Economic development and crime: A cross national assessment of the criminogenic nature of modernization*. University of Colorado at Boulder.

Topalli, V., Wright, R., & Fornango, R. 2002. Drug dealers, robbery and retaliation: Vulnerability, deterrence and the contagion of violence. *British Journal of Criminology*, 42:337-351.

Torok, M., Darke, S., Kaye, S., Ross, J., & McKetin, R. 2008. *Comparative rates of violent crime amongst methamphetamine and opioid users: Victimisation and offending*. Monograph Series No. 32. National Drug Law Enforcement Research Fund (NDLERF).

Townsend, L., Flisher, A. J., & King, G. 2007. A systematic review of the relationship between high school dropout and substance use. Clinical Child and Family Psychology, 10:295-317.

Uncle Fester. 2005. *Secrets of methamphetamine manufacture* (7th ed.). Festering Publication.

United Nations Office on Drugs and Crime. 2009. Patterns and trends of amphetamine-type stimulants and other drugs in East and South-East Asia (and neighbouring regions). A report from Global SMART Programme.

U. S. Department of Health and Human Services. 2000. Healthy People 2010. 2nd Ed. With understanding and improving health and objectives for improving health. 2 vols. Washington, DC: U.S. Government Printing Office.

U. S. Department of Justice, Office of Justice Programs, Bureau of Justice Assistance. 1995. Bureau of Justice Assistance, Fact Sheet. Treatment Accountability for Safer Communities.

U. S. Department of Justice, Office of Justice Programs, Bureau of Justice Statistics. 2008. Direct expenditure by level of government, 1982-2005. Available at: http://www.ojp.usdoj.gov/bjs/glance/tables/espgovtab.htm.

U. S. Department of Justice, Federal Bureau of Investigation. 2006. Crime in the United States, 2005.

U. S. Department of Justice, Drug Enforcement Administration. *Production and trafficking*. 2010. *Available at* www.fas.org/irp/agency/doj/dea/product/meth/production.htm

U. S. Sentencing Commission. 1995. *Cocaine and crime*. Cocaine and Federal Sentencing Policy.

Valois, R. F., McKeown, R. E., Garrison,C. Z. & Vincent, M. L. 1995. Correlates of aggressive and violent behaviors among public high school adolescents. *Journal of Adolescent Health*, 16:26-34.

VanderWall, C. J., Powell, L. M., Terry-McElrath, Y. M., Bao, Y., & Flay, B. R. 2005. Community and school drug prevention strategy prevalence: Differential effects by setting and substance. *The Journal of Primary Prevention*, 26:299-320.

Vartiainen, E., Paavola, M., McAlister, A., & Puska, P. 1998. Fifteen-year follow-up smoking prevention effects in the North Karelia Youth project. *American Journal of Public Health*, 88:81-85.

Virginia Department of Behavioral Health and Developmental Services. 2009. Biennial Report on Substance Abuse Services per Code of Virginia 37.2-310 to the Governor and Members of the Virginia General Assembly.

Virginia Performs. 2011a. Personal Income. Vaperforms.virginia.gov/indicators/economy/personalincome.php

Virginia Performs. 2011b. Poverty. Vaperforms.virginia.gov/indicators/economy/personalincome.php

Vito, G. F., Wilson, D. G., & Holmes, S. T. 1993. Drug testing in community corrections: Results from a four-year program. *The Prison Journal*, 73:343-354.

von Mayrhauser, C., Brecht, M. L., & Anglin, M. D. 2002. Use ecology and drug use motivations of methamphetamine users admitted substance abuse treatment facilities in Los Angeles: An emerging profile. *Journal of Addictive Diseases*, 21:45-60.

Wahlberg, D. 2010. Little meth decline seen in rural areas. Wisonsin State Journal.

Waldfogel, J., Garfinkel, I. & Kelly,B. 2005. Public assistance programs: How much could be saved with improved education? In H. M. Lewin, *Symposium on the social costs of inadequate education conducted at Teachers College*. New York: Columbia University.

Washington/Baltimore High Intensity Drug Trafficking Area. 2004. Methamphetamine: A unique threat to law enforcement.

Washington Kids Count. 2000. Impact of peer substance use on middle school performance in Washington. Seattle, WA: University of Washington Human Services Policy Center.

Weisheit, R. A. 2008. Making methamphetamine. *Southern Rural Sociology*, 23:78-107.

Weisheit, R. A. 2009. *Methamphetamine and violence in Illinois*. Illinois Criminal Justice Information Authority.

Weisheit, R. A., Falcone, D. N. & Wells, L. E. 1994. Rural crime and rural policing. U.S. Department of Justice. Office of Justice Programs. National Institute of Justice.

Weisheit, R. A., Falcone, D. N. & Wells, L. E. 2006. *Crime and policing in rural and small-town America* (3rd ed.). Long Grove, IL: Waveland Press.

Wermuth, L. 2000. Methamphetamine use: Hazards and social influences. *Journal of Drug Education*, 30:423-433.

West, S. L. & O'Neal, K. K. 2006. Project D.A.R.E. outcome effectiveness revisited. American Journal of Public Health, 94:1027-1029.

Wexler, H. K. 1994. Progress in prison substance abuse treatment: A 5-year report. *Journal of Drug Issues*, 24:361-372.

Wexler, H. K. 1995. The success of therapeutic communities for substance abusers in American prisons. *Journal of Psychoactive Drugs*, 27:57-66.

Wexler, H. K. 1996. *The Amity prison TC evaluation: Inmate profiles and reincarceration outcomes*. Presentation for the California Department of Corrections.

Wexler, H.K., De Leon, G., Kressel, D., & Peters, J. 1999. The Amity prison TC evaluation: reincarceration outcomes, *Criminal Justice and Behavior*, 26:147-167.

Wexler, H. K., Falkin, G. P., & Lipton, D. S. 1990. Outcome evaluation of a prison therapeutic community for substance abuse treatment. *Criminal Justice and Behavior*, 17:71-92.

Wexler, H. K. & Love, C. T. 1994. Therapeutic communities in prison. In F. M. Tims, G. De Leon, & N. Jainchill (Eds.), *Therapeutic community: Advances in research and practice*

(pp. 16-53). NIDA Research Monograph 144, DHHS Publication No. ADM 94-3633. Rockville, MD. National Institute on Drug Abuse.

Wexler, H. K., Melnick, G., Lowe, L., & Peters, J. 1999. Three-year reincarceration outcomes for amity in-prison therapeutic community and aftercare in California. *The Prison Journal*, 79, 321-336.

Wexler, H. K. & Williams, R. 1986. The Stay'n Out therapeutic community: prison treatment for substance abusers, *Journal of Psychoactive Drugs*, 18:221-230.

Whelan, R., Josephson, A., & Holcomb, J. 2008. The economic costs of alcohol and drug abuse in Oregon in 2006. ECON Northwest, Portland, Oregon: Author.

White, H. R. 1990. The drug use-delinquency connection in adolescence. In R. Weisheit (Ed.), *Drugs, crime, and the criminal justice system*, pp. 215-256. Cincinnati: Anderson.

White, H. R. 1997. Alcohol, illicit drugs and violence. In D. Stoff, J. Breiling, & J. D. Maser (Eds.), *Handbook of antisocial behavior* (pp. 511-523). New York: John Wiley.

White, H. R. & Gorman, D. M. 2000. Dynamics of the drug-crime relationship. In G. LaFree (Ed.) Crime and Justice 2000, vol. 1: The nature of crime: Continuity and change. NCJ 182408, pp. 151-218. Washington, DC. U.S. Department of Justice, National Institute of Justice.

Wickizer, T. M. 2007. The economic costs of drug and alcohol abuse in Washington State, 2005. Division of Alcohol and State Abuse, Department of Social and Health Services.

Wilson, J. Q. & Cook, P. J. 1985. Unemployment and crime-What is the connection? *National Affairs*, 79.

Wilson, J. M. & Donnermeyer, J. F. 2006. Urbanity, rurality, and adolescent substance use. Criminal Justice Review, 31:337-356.

Woolf, S. H. 2007. Giving everyone the health of the educated: An examination of whether social change would save more lives than medical advances. *American Journal of Public Health*, 97:679-683.

Wright, S. & Klee, H. 2001. Violent crime, aggression and amphetamine: What are the implications for drug treatment services? *Drugs: Education and Prevention Policy*, 8:73-90.

Yanovitzky, I. 2005. Sensation seeking and adolescent drug use: The mediating role of association with deviant peers and pro-drug discussions. *Health Communications*, 17:67-89.

YMCA of the USA. 2001. After school for America's teens: A national survey of teen attitudes and behaviors in the hours after school. Available on http://www.ymca.net/pdf/executiveSummary.

Zahn, M. A. 1980. Homicide in the twentieth century United States, in J. A. Inciardi and C. E. Faupel (eds), *History and Crime*, Sage, Beverly Hills

Zapata, L. B., Forthofer, M. S., Eaton, D. K., Brown, K. M., Bryant, C. A., Reynolds, S. T. & McDermott, R. J. 2004. Cigarette use in 6th through 10th grade: The Sarasota County demonstration project. *American Journal of Health Behavior*, 28:151-165.

Zimmer, L. & Morgan, J. 1997. Marijuana myths, marijuana facts: A review of the scientific evidence. Lindesmith Center.

VITA

Charlette T. Woolridge has over 25 years of executive management experience in local and state government. Since April 2006, she has served as the county administrator for Brunswick County Government, becoming the first appointed female and African American to hold the position. In this role, she is the chief executive officer of the county, serving a five member Board of Supervisors to carry out County policies and manage the operations of the County.

Prior to joining Brunswick County, she spent 17 years working in senior-level position at the City of Richmond, providing leadership and general direction in the following capacities: Deputy Director of the Department of Fire and Emergency Services; City Manager's Chief of Staff; East District Manager and Assistant East District Manager; Citizens Assistance Officer; and Administrative Officer.

Ms. Woolridge is a member of various professional organizations including the International City/County Management Association, Rotary International-Lawrenceville Rotary Club, Delta Sigma Theta Sorority, Inc., National Forum for Black Public Administrators, National Association of Counties, Virginia Association of Counties, Virginia Municipal League and the Virginia Local Government Management Association.

Ms. Woolridge earned a Bachelor of Science degree in Business Administration from Virginia Union University; Certificate in Public Administration (Masters-level) from Virginia Commonwealth University; and a Masters in General Administration from Central Michigan University. Additionally, she completed several certificate programs for Senior Executives in state and local governments from the University of Virginia's Weldon Cooper Center for Public Service, the Grace E. Harris Leadership Institute, and the National Forum for Black Public Administrators.