Substance Use Prevalence in Criminal Justice Settings

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Abstract

Since the mid-1970s, research studies in the United States have focused on the drug-crime connection. Federal drug abuse efforts in the early 1980s targeted controlling the supply of drugs, determinate sentencing for drug offenders, and long prison terms. With the growing number of substance users involved in the criminal justice system, this chapter overviews recent prevalence studies on substance use among individuals involved in differing levels of the criminal justice system from prison and jail to community corrections, including a discussion of special populations of offenders. This chapter also overviews the theoretical underpinnings of the relationship between drug use and crime as it relates to the development of treatment approaches for this population. Finally, the chapter concludes with an overview of evidence-based interventions and promising approaches for substance abuse for the criminal justice population and future directions.

Keywords

Drug offenders • Jail inmates • Prison inmates • Community supervision

Many of those with the underlying disease of addiction commit crimes and thus, frequently come into contact with the criminal justice system. We can no longer afford to simply incarcerate them, while leaving their addiction untreated and their problems unaddressed. Gil Kerlikowske, Director Office of National Drug Control Policy Statement from the 2009 World Drug Report, June 24, 2009

Introduction

Since the mid-1970s, research studies in the United States have focused on the drug-crime connection. Federal drug abuse efforts in the early 1980s targeted controlling the supply of

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drugs, determinate sentencing for drug offenders, and long prison terms. As expected, these efforts were followed by rapid increases in the number of incarcerated drug abusers and drug abusers with criminal justice system referrals in community treatment. For example, US drug abuse treatment admission data in the late 1990s indicated that over one-third (37%) of client admissions are directly referred from the criminal justice system (Substance Abuse and Mental Health Services Administration [SAMHSA], 2001). By 2004, 59% of referrals to community substance abuse treatment were from the criminal justice system (McLellan, 2009).

With this shift in federal drug abuse efforts in the 1980s, trends in national statistics demonstrated an increase in the number of incarcerated drug abusers. This increase was substantiated by a special report from the Bureau of Justice Statistics (Scalia, 2001) showing that the number of defendants charged with drug offenses in federal courts increased 147% between 1984 and 1999. This report noted that 62% of convicted drug defendants were subject to minimum prison terms. In addition, two-thirds of defendants with drug offenses in US District Courts had prior arrests. Of this group, 44% had been arrested more than five times.

Further demonstrating the drug/crime nexus, a survey of both state and federal inmates found that 83.2% of state and 78.7% of federal prisoners reported lifetime use of an illicit substance (Mumola & Karberg, 2006). These data are consistent with an early report stating that 83% of state inmates had been drug-involved before incarceration, but reflect a considerable increase from the 52% of federal inmates that were drug-involved during the late 1990s (Mumola, 1999). In addition, arrestee data from the Arrestee Drug Abuse Monitoring (ADAM) system indicated that about two-thirds of arrestees in 10 major US urban cities test positive for drugs at the time of their arrest (Office of National Drug Control Policy [ONDCP], 2009), which has remained fairly consistent over the last decade.

With the growing number of substance users involved in the criminal justice system, this chapter overviews recent studies on substance use among individuals involved in differing levels of the criminal justice system from prison and jail to community corrections, including a discussion of special populations of offenders. Since substance use is typically measured at admission or intake into a criminal justice setting and is considered illegal while under correctional and community supervision, this chapter focuses more on the prevalence of substance use rather than the incidence or number of newly occurring cases. This chapter also overviews the theoretical underpinnings of the relationship between drug use and crime as it relates to the development of treatment approaches for this population. Finally, the chapter concludes with an overview of evidence-based interventions and promising approaches for substance abuse for the criminal justice population and future directions.

Substance Use Among Prison Inmates

The most highly cited resource for prevalence data among correctional populations is the Bureau of Justice Statistics (BJS). Starting in 1926, Congress mandated statistical data collection on all prisoners at midyear and yearend through the National Prisoner Statistics (NPS) program (West & Sabol, 2009). The Bureau of Justice Statistics compiles the data through semi-annual and annual reports, as well as special topics on the offender population such as drug use and mental health issues. A recent BJS report indicated that more than 1.6 million individuals in the United States are currently serving time in a state or federal prison (West & Sabol, 2009), and an estimated one out of five of these individuals in state prisons and one of two inmates in federal prisons are currently serving time for a drug-related offense (Mumola & Karberg, 2006), which does not account for the number of individuals who committed other crimes (like property offenses) while under the influence of drugs.

Prevalence data from the BJS on prison inmates includes the number of individuals who reported using substances in their lifetime, regular use, use in the month before their offense, and use at the time of their offense. In addition,

the most recent special report from BJS on substance use and dependence also includes those who are incarcerated that meet the criteria for drug and alcohol abuse and dependence as outlined by the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) (American Psychiatric Association, 1994). This report compared trends in the data over a 7-year period from 1997 to 2004 to find that rates of substance use are high and largely consistent over time. As shown in Table 6.1, approximately 80% of state (83.2%) and federal prisoners (78.7%) reported lifetime use of an illicit substance. About two-thirds reported regular use, more than half reported use in the month before their offense, and more than a quarter reported being under the influence at the time of their current offense (Mumola & Karberg, 2006).

These findings are consistent with previous survey findings about the prevalence of substance use among US prisoners which indicated that 80% of state and 70% of federal prisoners reported prior illicit drug use (Mumola, 1999). In examining trends in use over the past 7 years, with the exception of methamphetamine use, trends in use of marijuana, cocaine/crack, and heroin and other opiates remained fairly consistent between 1997 and 2004 (Mumola & Karberg, 2006). This report did indicate that reported use of methamphetamine increased from 19% in 1997 to 23% in 2004.

In addition to the rates of lifetime use of illicit substances, the most recent BJS survey on drug and alcohol abuse included measures to estimate the number of inmates meeting the abuse and dependence criteria based on the DSM-IV. Findings indicated that about half of state (53%) and federal (45%) prisoners met DSM-IV criteria for drug dependence or abuse (Mumola & Karberg, 2006). Thus, not only is the prevalence of lifetime substance use considerable, the number of individuals using substances to the level of abuse or dependence is five times higher than identified in the general population (SAMHSA, 2008).

In addition to the rates of abuse and dependence in the US prison population, as shown in

Table 6.1 Prevalence of substance use among prisoners in 2004

Type of drug	Ever used?		Used regularly?		Used in month before current offense		Used at the time of the current offense	
	State (%)	Federal (%)	State (%)	Federal (%)	State (%)	Federal (%)	State (%)	Federal (%)
Any drug	83.2	78.7	69.2	64.3	56.0	50.2	32.1	26.4
Marijuana	77.6	71.2	59.0	53.0	40.3	36.2	15.4	14.0
Cocaine/crack	46.8	43.3	30.0	27.5	21.4	18.0	11.8	7.4
Heroin/opiates	23.4	17.9	13.1	9.2	8.2	5.8	4.4	3.2
Depressants	21.3	16.9	9.9	8.6	5.4	4.4	2.0	1.4
Stimulants	28.6	21.0	17.9	14.8	12.2	10.8	6.7	7.4
Hallucinogens	32.9	25.9	13.3	11.9	5.9	5.8	2.0	1.9

Source: Mumola and Karberg (2006).

Table 6.2 Prevalence of substance use among prisoners in 2004 by type of offense

Type of offense	Used in month before current offense		Used at the time of the current offense		Met DSM criteria for abuse or dependence	
	State (%)	Federal (%)	State (%)	Federal (%)	State (%)	Federal (%)
Drug offenses	71.9	57.3	43.6	32.3	63.1	51.9
Property offenses	64.0	27.7	38.5	13.6	63.2	27.3
Violent offenses	49.6	49.1	27.7	24.0	46.7	41.6
Public-order offenses	49.9	41.2	25.4	18.7	50.2	41.2

Source: Mumola and Karberg (2006).

Table 6.2 among the general prison population, about one-third (32%) of state prisoners and one-quarter (26%) of federal prisoners indicated that their current offense was committed while under the influence of drugs (Mumola & Karberg, 2006). Not surprising, among those serving time in a state prison for a drug offense, nearly three-quarters (71.9%) reported use in the past month before their offense, nearly half (43.6%) indicated that their crime was committed while under the influence of drugs, and almost two-thirds met DSM criteria for substance abuse or dependence (see Table 6.2).

As expected, rates of substance use are higher among offenders serving time for drug-related crimes. Rates of substance use are also higher among prisoners who have been identified as having a mental health problem. In a separate national report focused on state and federal prisoners, mental health problems were profiled based on the inmate identifying a recent history of mental health issues (clinical diagnosis or treatment provided by a mental health professional) or self-reported symptoms based on DSM-IV criteria (James & Glaze, 2006). Among state prisoners who were identified as having a mental health problem, about three quarters (74%) also met criteria for substance use and dependence compared to 56% of other state prisoners who did not report a mental health problem. This finding suggests that the high rates of reported substance use among state prisoners are also likely coupled with high rates of co-occurring mental health disorders.

Substance Use Among Jail Inmates

Similar to prison prevalence data, Bureau of Justice Statistics (BJS) is a widely used resource for estimating the characteristics of jail populations. In conjunction with the US Census Bureau as data collectors, BJS conducts the Annual Survey of Jails to provide a nationwide profile of inmates serving time in local jail facilities (Minton & Sabol, 2009). BJS then compiles the data through semi-annual and annual reports, as well as special topics on the offender population such as drug use and mental health issues. A recent BJS report indicated that more than 785,000 individuals in the United States are currently serving time in a local jail facility (Minton & Sabol, 2009), and more than 13 million offenders were admitted to jails between 2007 and 2008 (Office of Justice Programs, 2009). These numbers differ considerably from the prison numbers because inmates detained in jails are either there following an arrest, awaiting trial or sentencing, or completing a short sentence (i.e., usually less than 1 year).

Consistent with prevalence data reported on prison inmates, a 2005 BJS report provided the most recent estimate of substance use and dependence among jail inmates including the number of individuals who reported using substances in their lifetime, regular use, use in the month before their offense, use at the time of their offense, and prevalence of jail inmates meeting DSM-IV criteria for drug and alcohol abuse and dependence. As shown in Table 6.3, 82.2% of jail

Table 6.3 Prevalence of substance use among jail inmates in 2002

Type of drug	Ever used?	Used regularly?	Used in month before current offense[a]	Used at the time of the current offense[a]
Any drug (%)	82.2	68.7	54.6	28.8
Marijuana (%)	75.7	58.5	37.5	13.6
Cocaine/crack (%)	48.1	30.9	20.7	10.6
Heroin/opiates (%)	20.7	12.0	7.8	4.1
Depressants (%)	21.6	10.7	6.1	2.4
Stimulants (%)	27.8	17.1	11.4	5.2
Hallucinogens (%)	32.4	13.4	5.9	1.6

Source: Karberg and James (2005).
[a]Note: Data for illicit substance use in the month before the current offense and at the time of the current offense was collected from jail inmates who had a current or prior conviction only.

inmates reported lifetime use of an illicit substance. Similar to prevalence rates reported for prison inmates, about two-thirds reported regular use, more than half reported use in the month before their offense, and more than a quarter reported being under the influence at the time of their current offense (Karberg & James, 2005). In addition to the rates of lifetime use of illicit substances, 85.4% of jail inmates reported lifetime alcohol use, and two-thirds (66%) reported regular alcohol use. In addition, 40% reported binge drinking and one-third reported using alcohol at the time of their offense (Karberg & James, 2005).

The BJS survey on drug and alcohol abuse among jail inmates included measures to estimate abuse and dependence criteria based on the DSM-IV. Findings indicated that more than two-thirds (68%) of jail inmates met DSM-IV criteria for alcohol and/or drug dependence or abuse (Karberg & James, 2005). This rate is higher than that reported for state (53%) and federal (45%) prisoners (Mumola & Karberg, 2006), which may possibly be explained by incorporating *alcohol* abuse and dependence into the measurement.

Similar to prison-based studies, jail inmates serving time for drug-related charges had higher rates of both drug and alcohol use. As shown in Table 6.4, among those serving time in a local jail facility for a drug offense, nearly half (43.2%) indicated that their crime was committed while under the influence of drugs, and two-thirds met DSM criteria for substance abuse or dependence (see Table 6.4).

Similar to data reported for state prisoners, rates of substance use are higher among jail inmates who have been identified as having a mental health problem. In the same national report focused on mental health problems among prison and jail inmates, among those who were identified as having a mental health problem, slightly more than three-quarters (76%) met DSM-IV criteria for substance use and dependence compared to 53% of other jail inmates who did not report a mental health problem (James & Glaze, 2006). This finding suggests there are high rates of co-occurring substance use and mental health disorders among jail inmates.

Substance Use Among Community Offenders

The Bureau of Justice Statistics maintains prevalence data on offenders under community supervision. Data from 2007 annual surveys of probationers and parolees indicated that more than 5.1 million adults in the United States are being supervised in the community (Glaze & Bonczar, 2008). The majority of individuals (84%) on community supervision are on probation, which means that they have been formally sentenced to a period of correctional supervision in the community for their crime rather than serving time in a correctional institution (Glaze & Bonczar, 2008). The remaining individuals on community supervision (16%) are on parole, which is a time of conditional supervised release following release from prison. It is estimated that more than 800,000 US adults are being supervised on parole and more than 4.2 million are on probation (Glaze & Bonczar, 2008).

Among individuals under community supervision, the BJS 2007 report indicates that 27% of probationers committed drug law violations and 37% of parolees served their prison sentence

Table 6.4 Prevalence of drug use among jail inmates in 2002 by type of offense

Type of offense	Used at the time of the current offense		Met DSM criteria for abuse or dependence	
	Drugs (%)	Alcohol (%)	Drugs (%)	Alcohol (%)
Drug offenses	43.2	22.4	66.6	40.1
Property offenses	32.5	28.5	61.8	48.4
Violent offenses	21.8	37.6	47.9	52.0
Public-order offenses	19.5	26.2	48.2	45.8

Source: Karberg and James (2005).

for a drug offense. The most recent BJS report released on the prevalence of substance use among community-supervised offenders focused on probationers in 1995 (Mumola & Bonczar, 1998), which is more than 10 years old at the time of chapter preparation. No recent data on the prevalence of substance use among parolees could be located, likely because they are reentering the community from prison and prevalence rates would be based on their use patterns prior to incarceration because use of illicit substances while on parole is a violation of their conditions of supervision. As shown in Table 6.5, this report indicated that 69.4% of probationers reported lifetime use of an illicit substance. In addition, nearly one-third of probationers indicated that they used drugs during the month before their offense, and about 14% reported being under the influence at the time of their current offense.

As shown in Table 6.6, probationers who committed violence offenses and public-order offenses (such as public intoxication) reported higher rates of both drug and alcohol use at the time of their offense compared to drug and property offenders. This is different from trends shown for populations of prison and jail inmates in that those serving time for drug-related offenses reported higher rates of drug and alcohol use at the time of their offense. Measures to assess drug and alcohol dependence based on DSM-IV criteria were not available in this early report. However, as shown in Table 6.6, more than a third of public-order offenders met criteria for alcohol abuse or dependence based on endorsement of three or more CAGE screening questions.

Since recent prevalence data for community offenders was not available, analyses were conducted using the 2007 National Survey on Drug Use and Health (NSDUH) to estimate substance use prevalence among community offenders. The NSDUH incorporates a stratified, multistage sampling approach to generate a random sample of noninstitutionalized persons residing in the United States. To determine criminal justice involvement, survey respondents were asked, "Were you on parole, supervised release, or other

Table 6.5 Prevalence of substance use among probationers in 1995

Type of drug	Ever used?	Used in month before current offense	Used at the time of the current offense
Any drug (%)	69.4	31.8	13.5
Marijuana (%)	66.5	25.3	9.5
Cocaine/crack (%)	31.0	9.2	3.8
Heroin/opiates (%)	8.1	1.5	0.9
Depressants/Barbiturates (%)	15.4	2.0	0.6
Stimulants (%)	25.3	4.8	1.8
Hallucinogens (%)	19.7	2.7	0.6

Source: Mumola and Bonczar (1998).

Table 6.6 Prevalence of substance use among probationers in 1995 by type of offense

Type of offense	Used at the time of the current offense			Met criteria for alcohol abuse or dependence[a] (%)
	Drugs (%)	Alcohol (%)	Alcohol or drugs (%)	
Drug offenses	31.7	16.3	38.4	15.7
Property offenses	9.8	18.5	23.0	18.3
Violent offenses	10.7	40.7	43.5	21.8
Public-order offenses	6.4	75.1	77.0	36.1

Source: Mumola and Bonczar (1998).

[a]Note: Abuse or dependence based on CAGE screening score of three or more items endorsed.

conditional release from prison at any time during the past 12 months?" If they had been on community supervision in the past 12 months, they were coded as 1 for the current analysis and if they had not, were coded as 0. This definition of community supervision excludes probationers. Lifetime and past 12-month drug use were then examined by supervision status to determine whether community residents on probation or parole were significantly more likely than those not involved in the criminal justice system to use licit and illicit drugs.

Less than 1% (0.7%) of NSDUH survey respondents reported that they had been on community supervision during the past 12 months. Those who were on criminal justice supervision were significantly more likely to be younger, African American or Hispanic, and had fewer years of education. When comparing substance use prevalence, there were no statistically significant differences in lifetime substance use among those who were and were not under criminal supervision (see Table 6.7). However, more than three-quarters of those who were on supervision reported lifetime illicit substance use compared to only half of those who were not on supervision. For both cigarettes and alcohol, there were no differences in the prevalence of lifetime use; however, for each illicit substance examined, those who had been under community supervision in the past 12 months were significantly more likely to report use than those with no recent criminal involvement. Lifetime marijuana use was most prevalent among both groups (63.4% versus 42.9%, $p<0.001$), followed by nonmedical use of prescription analgesics (39.2% versus 13.5%, $p<0.001$), and cocaine use (35.1% versus 15.6%, $p<0.001$).

The prevalence of past 12-month substance use proved similar to lifetime use, apart from past 12-month use of any substance or illicit substance (results not shown). Respondents who were recently criminally involved were significantly more likely to report any past 12-month use (85.9% versus 75.0%, $p=0.008$) and past 12-month illicit use (37.0% versus 13.4%, $p<0.001$). Among the illicit substances, marijuana use was reported by one in five respondents who were under criminal supervision and less than 10% of those who were not ($p<0.001$). In addition, nonmedical users of prescription analgesics were four times more likely to be under criminal justice supervision ($p<0.001$).

Another strategy for estimating patterns of substance use among community offenders was examined through utilization of the 2007 Treatment Episode Data Set (TEDS, 2007). Community substance abuse treatment providers that receive any state funding must collect admissions data that are submitted for inclusion in TEDS. To determine criminal justice involvement, two variables from TEDS were utilized. The first variable determined the principle source of treatment referral. If it was determined to be a criminal justice referral, another variable further delineated the source of the criminal justice referral (state/federal court, probation/parole/prison, DUI/DWI and diversionary program/other). The criminal justice variable that was created for the current analysis was based on increasing levels of criminal justice involvement. If the referral source did not include any of the criminal justice categories, the client was assigned a 0. If the client had been referred from court, DUI/DWI, or a diversion program, they were assigned a 1, and if they had been referred from parole or prison, they were assigned a 2. Within TEDS, the intake instrument asks the client to list up to three problem substances for which they are seeking treatment.

More than 1.8 million records were contained in the TEDS dataset. However, once those under 18 years of age and those with missing data for referral source were removed from the data, a little under 1 million (987,006) data points were available for analysis. Almost three-quarters of those initiating substance abuse treatment in 2007 were referred from noncriminal justice sources, whereas 13.2% of clients were referred from court, DUI/DWI, or diversion programs, and 12.7% from probation/parole/prison. Those who were referred from the criminal justice system were significantly more likely to be male, younger, African American or Hispanic, and had fewer years of education.

Table 6.7 Substance use prevalence among offenders on community criminal justice supervision compared to general population

	Under criminal justice supervision (%)	Non-criminal justice supervision (%)	*p*-value
Any lifetime substance use	93.3	91.2	0.467
Any past 12-month substance use	85.9	75.0	0.008
Any lifetime illicit substance use*	75.8	47.9	<0.001
Any past 12-month illicit substance use*	37.0	13.4	<0.001
Lifetime cigarette use	73.6	69.9	0.484
Past 12-month cigarette use	59.2	29.5	<0.001
Lifetime alcohol use	88.1	87.3	0.826
Past 12-month alcohol use	64.7	68.8	0.326
Lifetime marijuana use	63.4	42.9	<0.001
Past 12-month marijuana use	21.7	9.6	<0.001
Lifetime cocaine use	35.1	15.6	<0.001
Past 12-month cocaine use	6.6	2.2	<0.001
Lifetime crack use	18.1	3.6	<0.001
Past 12-month crack use	6.7	0.5	<0.001
Lifetime methamphetamine use	7.6	1.6	<0.001
Past 12-month methamphetamine use	3.0	0.4	<0.001
Lifetime heroin use	7.6	1.6	<0.001
Past 12-month heroin use	0.6	0.1	0.002
Lifetime hallucinogen use	29.6	14.8	<0.001
Past 12-month hallucinogen use	5.3	1.3	<0.001
Lifetime inhalant use	16.3	9.0	0.004
Past 12-month inhalant use	1.9	0.4	0.002
Lifetime nonmedical analgesic use	39.2	13.5	<0.001
Past 12-month nonmedical analgesic use	16.6	4.6	<0.001
Lifetime nonmedical sedative use	11.4	3.5	<0.001
Past 12-month nonmedical sedative use	3.0	0.3	<0.001
Lifetime nonmedical stimulant use	20.5	8.9	<0.001
Past 12-month nonmedical stimulant use	3.8	1.0	<0.001
Lifetime nonmedical tranquilizer use	26.2	8.6	<0.001
Past 12-month nonmedical tranquilizer use	6.8	2.0	0.003

Source: National Survey on Drug Use and Health (2007).
*Does not include cigarettes or alcohol.

As shown in Table 6.8, there were statistically significant differences between the criminal justice groups for all of the primary, secondary, and tertiary problematic substances reported, which may be attributed to the large sample size. However, those who were criminally involved did not report greater problematic use on all substances. Not surprisingly, for alcohol, the highest proportion of those reporting problematic use were in the group referred from DUI/DWI, whereas for marijuana, the highest problematic use rates were in the prison/parole-referred group. For cocaine, nonmedical methadone, heroin, prescription opiates, benzodiazepines, other sedatives/hypnotics, and tranquilizers, those referred to treatment from a noncriminal source were significantly more likely to report problematic use compared to the criminally referred groups. For methamphetamine, hallucinogens, and prescription stimulants, the

Table 6.8 Problematic drug use among TEDS clients referred from criminal and noncriminal sources

Type of drug mentioned as either primary, secondary or tertiary drug of abuse	Noncriminal treatment referral (%)	Criminal justice treatment referral (%)	Prison or parole treatment referral (%)	*p*-value
Alcohol	61.1	71.6	62.5	<0.001
Marijuana	27.9	43.7	53.8	<0.001
Cocaine	42.1	28.6	32.7	<0.001
Nonmedical methadone	1.1	0.4	0.3	<0.001
Methamphetamine	3.5	5.3	6.3	<0.001
Amphetamines	0.7	1.2	1.2	<0.001
Heroin	26.7	9.1	11.1	<0.001
Hallucinogens	0.4	0.5	0.6	<0.001
Inhalants	0.08	0.1	0.08	<0.001
Other opiates (Rx)	11.7	5.4	5.2	<0.001
Benzodiazepines	4.4	2.4	1.8	<0.001
Other sedatives/ hypnotics	0.7	0.6	0.4	<0.001
Stimulants	0.2	0.2	0.3	<0.001
Tranquilizers	0.1	0.09	0.06	<0.001

Source: Treatment Episode Dataset (TEDS, 2007).

prison/parole group had the greatest rates of problematic use; and for amphetamines, a similar proportion of both of the criminal justice referral and prison/parole referral groups (1.2% each) indicated problematic use. Finally, among those referred to substance abuse treatment from non-prison/parole criminal justice sources, these clients reported significantly greater problematic use for inhalants. Given that illicit drug use is a criminal offense, we would hypothesize that those referred from criminal justice sources would report greater use of illicit substances, which was not the case. However, the sample used for this analysis is also biased by those who enter community treatment. It is possible that despite significant patterns of use and indicators of serious addictions, substance users in the criminal justice system may be less likely to enter community treatment when it is not mandated or required. Therefore, it is possible that the group of criminal justice offenders represented in this analysis are more representative of those who are mandated into treatment than those who voluntarily enter and complete treatment, thus explaining possible differences in the direction of drug use findings.

Substance Use Among Special Populations of Offenders

This section overviews prevalence data on two special populations of offenders who are disproportionately impacted by the consequences of substance use – women offenders and African-American offenders.

Women

Women represent the fastest growing segment of the criminal justice system increasing 757% between 1977 and 2004, a rate nearly twice the percent increase in the male offender population (Frost, Greene, & Pranis, 2006). The number of women involved in the US criminal justice system has doubled since 1990, compared to a 27% increase in the number of men (Beck, 2000). Nearly 100,000 women were incarcerated

in 2002, with an estimated one in every 109 US women involved in some way with the criminal justice system (Harrison & Beck, 2003). During 2002, the rate of women under the jurisdiction of state or federal prison authorities increased 4.9% compared to 2.4% for men.

The increasing number of women offenders in state custody has implications for reentry planning and service initiatives because the majority of female offenders in prison will be returning to the community. Estimates show that 95% of state inmates will be released, and about 80% of those will be released to state parole. Female offenders represent 23% of individuals on community supervision, which is an increase of 21% from 1995 (Glaze & Bonczar, 2006). With the increasing number of women offenders who are incarcerated and subsequently released to the community, there is increasing need to develop services which enhance community reentry. A major gap exists at community reentry because a number of women offenders face obstacles to accessing services including availability of treatment, transportation, family and caretaking responsibilities, and financial constraints (O'Brien, 2001).

Studies have shown that being able to access substance abuse services is a primary concern for women offenders reentering the community (O'Brien, 2001; Parsons & Warner-Robbins, 2002; Staton-Tindall, Duvall, Leukefeld, & Oser, 2007). Substance use and abuse have been consistently reported as major contributing factors in the increasing population of women offenders (e.g., Greenfeld & Snell, 1999; Henderson, 1998). In fact, a large number of women offenders, reported as high as 98%, have a history of substance abuse, and nearly half of incarcerated women indicate that they were under the influence of alcohol or drugs at the time of their offense (Brewer, Marquart, Mullings, & Crouch, 1998; Cotton-Oldenburg, Jordan, Martin, & Kupper, 1999; Greenfeld & Snell, 1999). A survey of male and female offenders indicated that a higher percentage of females reported drug use (including ever used, using regularly, and using at the time of the offense) compared to male offenders (Greenfeld & Snell, 1999). In this survey, one-third of female offenders self-reported that they committed their crime in order to obtain drugs or money to buy drugs.

Substance abuse can have deleterious consequences for women compared to men. For example, one study showed that women are more susceptible than men to the adverse effects of alcohol due to a decreased level of the metabolizing enzyme, gastric alcohol dehydrogenase (Lieber, 1993). The physical health consequences of alcohol and drug use are often more severe for women than for men. Frequently cited health concerns among substance-using women are HIV, hepatitis, severe headaches, dental problems, hypertension, emphysema, and asthma (Ingram-Fogel, 1991; Ross & Lawrence, 1998). Other studies indicate that women in drug treatment programs tend to report co-occurring mental health issues including high levels of psychological distress, increased incidence of trauma and abuse, and a propensity for diagnosable disorders, including post-traumatic stress disorder (PTSD) (Hall, 1998; Sacks, 2004). Given the severity of these health and mental health issues, there is a critical need for establishing community reentry substance abuse treatment services for women offenders.

African Americans

At midyear 2008, there were 4,777 African-American male inmates per 100,000 African-American males held in state and federal prisons and local jails, compared to 727 white male inmates per 100,000 white males (Sabol & Couture, 2008). According to the recent PEW Center on the States 2008 report, while 1 in 30 men between the ages of 20 and 34 is behind bars, the figure is one in nine among African-American males in that age group. The Bureau of Justice Statistics (BJS) (Sabol & Couture, 2008) reports that in 2007, African-American males ages 30–34 had the highest custody incarceration rate of any race, age, or gender group and while African-American men represent 14% of the population of young men in the United States, they represent over 40% of the prison population (Harrison & Beck, 2005).

This rise in incarceration, especially among African-American males, has been well documented in the literature with drug-related offenses as significant contributors to the increase due to more punitive US drug policies (Blankenship, Smoyer, Bray, & Mattocks, 2005). The number of sentenced inmates in federal prisons for drug offenses increased an overwhelming 64.8% between 1995 and 2003 (Harrison & Beck, 2005). With regard to ethnicity, about 33% of African-American males between the ages of 18 and 40 are involved in the criminal justice system (Mayer, 1999). It is imperative to examine African-American male offenders because rates of drug use have not necessarily been shown to be different between whites and African Americans, although data shows arrests for drug charges to be proportionally higher among African Americans (Uniform Crime Reports [UCR], 2002). Reasons for the higher arrest rate among African Americans has been examined and may include that African Americans are more likely than whites to purchase drugs in the open outdoors, more likely to buy from a stranger, and more likely to buy drugs away from their homes (Ramchand, Pacula, & Iguchi, 2006). In addition, some researchers indicate that African Americans have been stigmatized by the United States Constitution, and have been subjected to racial profiling in policing and punitive policies that mandate minimum sentencing – all of which might be factors in the disproportionate arrests and incarceration rates for African Americans (Brockett, 2000; Ramchand et al., 2006). For example, there is an irrefutable link between the increase in the number of African Americans incarcerated in the United States and the emergence of crack cocaine use in the 1980s (Belenko, Shedlin, & Chaple, 2005; Chitwood, Rivers, & Inciardi, 1996; De La Rosa, Lambert, & Gropper, 1990). US policies that increased the incidence of arrest and incarceration include mandatory minimum sentencing, penalty enhancements for the use or sale of drugs in drug-free zones, inequality in penalties associated with crack (versus powder cocaine), and limitations on the availability of syringes (Smoyer & Blankenship, 2004).

Underlying Theories and Research

The Relationship Between Drug Use and Crime

Prevalence data on substance use across criminal justice settings demonstrates that there is a strong association between drug use and the consequences of crime. The association of chronic drug abuse and crime has been the focus of a number of research studies in the United States (see Leukefeld, Tims, & Farabee, 2002). For example, heavy drug users are more likely to engage in more diverse criminal activity (Farabee, Joshi, & Anglin, 2001). Drug use usually leads to involvement in the criminal justice system through one or more of the following avenues: (1) possession or sales of an illicit substance, (2) illegal activity (such as stealing) to support a drug addiction, or (3) illegal activity associated with the drug-using lifestyle (National Institute on Drug Abuse [NIDA], 2006).

Research shows that there is a strong correlation between the *type* of crime committed and the type of drug used. For example, in their meta-analysis of 30 studies, Bennett, Holloway, and Farrington (2008) found that the odds of committing a crime were highest among crack users (6 times greater); second highest among heroin users (about 3 times greater), and third highest among cocaine users (about 2.5 times greater). Additionally, the relationship between drug use and property crime tends to be much stronger than the relationship between drug use and violent crime (De Li, Priu, & MacKenzie, 2000). However, drug dealers tend to be engaged more heavily in violent crime than do drug users alone. In an early study, Inciardi (1979) reported that a cohort of 239 male heroin addicts from Miami committed 80,644 criminal acts during the 12 months prior to being interviewed. Ball, Lawrence, Flueck, and Nurco (1982) found that over an 11-year period a Baltimore cohort of 243 heroin addicts committed 248 crime days per year while addicted. When not addicted, the same cohort committed only 40.8 crime days per year. Theft followed by drug sales was the most

frequent type of crime committed. While drug use and drug dealing are not mutually exclusive phenomena, it is important to be able to compare their drug use and criminal behavior trends (De Li et al., 2000).

Among both male and female prisoners, it has been consistently shown that drug use intensifies criminal involvement (Leukefeld et al., 2002). While there seems to be some discrepancy in the literature about the causal relationships between drug use and crime, studies have demonstrated that an early onset of substance use likely precedes increased criminal involvement (van Kammen & Loeber, 1994), and more intense involvement in the criminal lifestyle among adolescents is often characterized by drug dealing and trading drugs (Inciardi & Pottieger, 1991).

Missing from theoretical discussions around drug use and crime is an explanation for high rates of use across criminal justice setting. Given the understanding that there is a robust, positive relationship between drug use and increased criminal activity, it would seem likely that those who report the most harmful levels of use or are in more severe stages of addiction also face more serious legal consequences. This can possibly be observed from trends in this chapter with community offenders reporting less use overall than inmates in jail and prison. However, the distinction between offenders in jail and inmates in prison with regard to substance use is minimal. This raises the question whether – despite the well-documented link between drug use and crime – the relationship is robust enough to sustain other factors that may influence someone's criminal justice status (i.e., SES and poverty; race, etc.). The answer to this question may have important implications for understanding the role of substance use as a contributing factor to criminal justice involvement.

The Development of Interventions

Much of the theoretical models on drug use and crime have wrestled with the question of which came first – a person's drug use which led to the engagement in criminal behaviors, or a person's lifestyle of illegal activity that involved the use of substances (Inciardi, 1981). These questions can lead to divergence in the theoretical models which guide intervention development. If you adhere to the medical model which suggests that addiction is a disease of the brain and body, you likely support the development of treatment approaches to target substance use as the primary factor contributing to deleterious consequences such as criminal involvement. If you adhere to the public safety model which suggests that addiction is an unfortunate consequence of a criminal lifestyle, you likely support the development of increased sanctioning efforts to promote a safe society by removing criminals from the street. This debate is less pronounced in the theoretical underpinnings of traditional substance abuse treatment because, when substance-using criminals are involved, there may be more perceived risk to society if interventions are not effective. However, treatment interventions designed for substance-using offenders in the criminal justice system have shown promise. In addition to cost savings, substance abuse treatment in criminal justice settings can help reduce crime as well as the spread of HIV/AIDS, hepatitis, and other infectious diseases (NIDA, 2006), as well as improving the housing, employment, and family situations of offenders with prior substance abuse addictions.

The next section overviews the guiding principles of effective treatment of substance-using offenders, as well as treatment modalities and interventions which have been used with success with substance-using offenders. The section concludes with an overview of emerging interventions which show promising results for the future.

Interventions That Work

The financial impact of substance abuse has been reported to be in excess of $467 billion state and federal government spending – more than 95% of which was in dealing with the consequences of drug and alcohol addiction rather than in treatment programs (Center on Addiction and

Substance Abuse [CASA], 2009). The National Institute on Drug Abuse has estimated that for every dollar spent on drug and alcohol treatment, there is a $4–$7 reduction in the cost of drug-related crimes (NIDA, 1999). Therefore, the question is not *IF* we should invest resources into the development of effective interventions for substance-using offenders; the question is *HOW* do we develop and tailor the most effective interventions for this population?

Guiding Principles of Substance Abuse Treatment with Offenders

In 2006, the National Institute on Drug Abuse published *Principles of Drug Abuse Treatment for Criminal Justice Populations*. This publication was based on the latest state of knowledge in effective treatment approaches for substance-using offenders involved in the criminal justice system. The following 13 principles (Table 6.9) were developed based on what we know "works" with this population, and should be integrated into treatment for criminal justice-involved substance users, regardless of the specific modality of treatment or treatment intervention.

Therapeutic Communities

One of the most widely researched modalities of treatment for incarcerated substance users is the therapeutic community. Therapeutic communities began in the mid 1940s to treat returning WWII veterans struggling with former combat experiences (Lipton, 1998). The modality expanded in the 1950s in psychiatric hospitals (DeLeon, 2000), and was first used in a US prison setting in 1969 in a federal prison in Marion, IL (Lipton, 1998). Therapeutic communities (or TCs) operate on the philosophy that drug use is one behavior that is part of a holistic behavior disorder, and that behavioral change depends on the learning and adoption of prosocial behaviors (Deitsch, Carlton, Koutsenok, & Marsolais, 2002). TCs depend on the community – or peers, role models – as the change agent (DeLeon, 2000; Lipton, 1998).

Research on the effectiveness of corrections-based therapeutic communities (TCs) has consistently shown reductions in new arrests and recidivism following prison release. For example, graduates from a TC program in Texas were less likely than dropouts to be rearrested at 6 months (Knight, Simpson, Chatham, & Camacho, 1997).

Table 6.9 NIDA principles of drug treatment for criminal justice populations

1	Drug addiction is a brain disease that affects behaviour
2	Recovery from drug addiction requires effective treatment, followed by management of the problem over time
3	Treatment must last long enough to produce stable behavioral changes
4	Assessment is the first step in treatment
5	Tailoring services to fit the needs of the individual is an important part of effective drug abuse treatment for criminal justice populations
6	Drug use during treatment should be carefully monitored
7	Treatment should target factors that are associated with criminal behaviour
8	Criminal justice supervision should incorporate treatment planning for drug-abusing offenders, and treatment providers should be aware of correctional supervision requirements
9	Continuity of care is essential for drug abusers reentering the community
10	A balance of rewards and sanctions encourages prosocial behavior and treatment participation
11	Offenders with co-occurring drug abuse and mental health problems often require an integrated treatment approach
12	Medications are an important part of treatment for many drug-abusing offenders
13	Treatment planning for drug-abusing offenders who are living in or reentering the community should include strategies to prevent and treat serious, chronic medical conditions, such as HIV/AIDS, hepatitis B and C, and tuberculosis

Source: NIDA (2006).

These trends were also observed in a therapeutic community in Delaware, and supported the idea that while recidivism is reduced for the TC group, findings are even more positive when TC treatment is followed by community aftercare (Inciardi, Martin, Butzin, Hooper, & Harrison, 1997). In addition, in a 3-year followup study in Texas, TC graduates who also completed aftercare were the least likely to be reincarcerated (25%) compared to 64% of TC treatment/aftercare dropouts, and 42% of the control group (Knight, Simpson, & Hiller, 1999). A similar study for a TC program in California reported consistent 3-year outcome findings with 27% of TC graduates who completed aftercare being reincarcerated compared to 75% of the control group (Wexler, Melnick, Lowe, & Peters, 1999). The California study reported similar trends in their 5-year outcome study with a smaller percentage of the treatment group being reincarcerated than the control group, and among those who were reincarcerated, the treatment group spent significantly more days on the street than the control group (Prendergast, Hall, Wexler, Melnick, & Cao, 2004). These findings suggest that the effects of therapeutic community treatment are promising over time.

Therapeutic community outcome studies have also demonstrated that substance-abusing offenders who complete treatment are less likely to use drugs following release from prison. For example, a longitudinal followup of substance-abusing offenders found that participation in a therapeutic community was the largest predictor of staying drug free at followup 42 months and 60 months after release from prison (Inciardi, Martin, & Butzin, 2004). This study showed that participants in the prison-based therapeutic community program were more than four times more likely to stay drug free at 42 months post-release compared to the control group. In addition, treatment participants were more than three times more likely than the control group to stay drug free at 60 months post-release (Inciardi et al., 2004). Additional analyses in this study compared those offenders who did not participate in the TC, program dropouts, program graduates, and program graduates who also attended aftercare. Overall, when compared with the no-treatment group, those participants in the treatment groups were 15–20 times more likely to remain drug free at followup. Among these groups, those who completed treatment reported the best overall outcomes, and those who completed in-prison treatment followed by community aftercare were the least likely to have engaged in drug use (Inciardi et al., 2004).

These research findings suggest that therapeutic communities are effective modalities for reducing recidivism and relapse among substance-using offenders, particularly when combined with community aftercare treatment following release.

Cognitive Behavioral Interventions

Within treatment programs for offenders, infusion of evidence-based practices for treating substance abuse behaviors is also recommended. Cognitive behavioral approaches were recognized in the NIDA (2006) publication as an evidenced-based practice for drug users involved in the criminal justice system. Cognitive behavioral therapy (CBT) assumes that thinking and learning processes are critical in the initiation and continued use of substances, and that changing those thinking patterns to recognize, avoid, and cope with substance use triggers is therefore critical to stopping drug use (Carroll, 2000). CBT approaches have shown consistent success in reducing drug use behavior across different treatment modalities (i.e., Carroll & Onken, 2005; Maude-Griffin et al., 1998).

CBT approaches for substance-using offenders in the criminal justice system are challenged by addressing not only the relationship between "thinking" and "behavior," but also having to address criminal thinking errors common among this population. This is a unique dimension of substance abuse treatment programs that integrate CBT approaches which serve offenders, because the absence of attention and focus on criminal thinking as related to behaviors can compromise treatment success (Prendergast, 2009). Cleckley (1988) identified manipulative

characteristics used by criminals in 1941 which were described later as Criminal Thinking Errors by Yochelson and Samenow (1976). Their work described patterns and qualities of criminal thinking errors that emerged during clinical experiences with individuals being evaluated for competency to stand trial or being treated in lieu of incarceration (Yochelson & Samenow, 1976), many of which have been adapted and incorporated into the clinical literature (Gorski, 1984; Leukefeld et al., 2002; Wanberg & Milkman, 1999). These thinking errors were called "automatic perceptions of self and the world." Through this focus on the uniqueness of CBT approaches with offenders, an emergence of a number of CBT approaches has been specialized for use with substance-using offenders in the criminal justice system (Prendergast, 2009).

Motivational Enhancement Therapy

Motivational Enhancement Therapy (MET) was also recognized in the recent NIDA (2006) publication as a recommended treatment approach for drug users involved in the criminal justice system. MET is a manualized therapeutic approach grounded in key principles of motivational interviewing with the overall goal of motivating a client to draw upon her own internal resources for change (Miller, 1995). Therapists aid the participant in achieving change by utilizing an empathic therapeutic style associated with motivational interviewing and creating an environment in which resistance and argumentation are avoided and self-efficacy is supported (Carroll et al., 2006). Because the approach can be tailored to the individual needs of the client and the client's own motivation for change, MET can be used at different stages of treatment or in different stages of the criminal justice process from prison to the community.

Studies which included MET have shown positive outcomes for decreased substance use including marijuana (Stephens, Roffman, Fearer, Williams, & Burke, 2007), smoking (Huang, Svikis, & Diclemente, 2004), alcohol (Donovan, Kadden, DiClemente, & Carroll, 2002), and cocaine (Rohsenow et al., 2004). In addition, MET has shown promise to engage clients in substance abuse services and is currently being tested in three NIDA-funded Clinical Trials Network (CTN) protocols including one study to test the therapeutic usefulness of incorporating MET into the standard community drug abuse treatment entry process in order to improve treatment engagement, retention, and outcome (Carroll et al., 2002).

Interventions That Might Work

Contingency Management

Contingency management approaches were also recognized in the NIDA (2006) publication as an evidenced-based practice for drug users involved in the criminal justice system. Contingency management (CM) has historical roots in the theory of operant conditioning (Bigelow & Silverman, 1999). This approach suggests that drug use is influenced by the environmental context, and that rewards or incentives for not using drugs can override rewards or incentives to use drugs provided the appropriate context (Prendergast, Podus, Finney, Greenwell, & Roll, 2006; Roll, Prendergast, Sorensen, Prakash, & Chudzynski, 2005). Much like the CBT and MET approaches, CM has shown positive benefits for sustained abstinence, but the current state of research suggests that the positive effects of CM tend to diminish over time following treatment (Prendergast, 2009).

Research on the use of CM approaches with substance users in the criminal justice system is emerging. It has been suggested that the use of CM may be even more beneficial for substance users who are involved with the criminal justice system who enter treatment under legal pressures because positive reinforcement in the form of incentives may be more motivating than the threat of punishment, and perhaps reincarceration, for noncompliance (Prendergast, 2009). Roll et al. (2005) reported findings from two CM trials with substance users in community treatment using voucher-based incentives, one group

of substance users was involved in the criminal justice system and the other was a group not involved in the criminal justice system. Results indicated that participants in the criminal justice group found the incentives to be helpful for paying court fines and related legal charges. Outcome data on the long-term effectiveness of the model in reducing drug use was not available. Similarly, a trial conducted as part of the NIDA-funded Criminal Justice Drug Abuse Treatment Studies (CJ-DATS) focused on the use of community vouchers and incentives for parolees to stay clean during the transition from prison to the community (Friedmann, 2005). Outcome data is not yet available. In summary, building on the literature on the effectiveness of CM in treating substance use, CM is considered a promising approach given the state of long-term outcome studies on the effectiveness of CM with substance-using offenders in the criminal justice system.

Pharmacotherapy

Along with developing evidence on behavioral interventions for substance-using offenders, new research is emerging in the United States and internationally on the promise of pharmacological treatments for substance-using offenders (Cropsey, Villalobos, & St. Clair, 2005). Typically, pharmacological treatment is used for individuals who are addicted to opiates and commonly include treatment drugs such as methadone, buprenorphine, and naltrexone (Prendergast, 2009). One of the first pharmacotherapies is no longer used was done using Levo-alpha-acetylmethadonl (LAAM) alongside weekly drug education counseling while individuals were incarcerated, followed by community use of methadone (Kinlock, Battjes, & Schwartz, 2005). At the 9-month followup, reincarceration rates were low (29%) but rearrests were similar to the control group (33%). Further, 53% of the treatment group entered community treatment and continued treatment for at least 6 months, with 37% of the treatment group still in community treatment at the time of followup (which was not the case for any of the participants in the control group). Pharmacological treatment has been found to be effective; however due to a number of limitations in the existing clinical trials specific to retrospective reporting, sample sizes, and lack of generalizability (Cropsey et al., 2005) as well as the noted resistance to this type of treatment from the criminal justice system and treatment providers (Prendergast, 2009), continued research is needed with this population.

Interventions That Do Not Work

In 1979, a publication by Robert Martinson suggested that "Nothing Works" for substance users involved in the criminal justice system, an unsubstantiated belief at the time which became a point of media attention (Field, 2002). This sparked 2 decades of outcome studies focused on offender-based treatment interventions which complemented the emerging body of research from community substance abuse treatment during this time period. Meta-analyses on the effectiveness of corrections-based treatment have indicated that the least effective forms of treatment in reducing relapse and recidivism (usual targeted outcomes of corrections-based treatment) include boot camps and group counseling sessions (Mitchell, Wilson, & Mackenzie, 2007; Pearson & Lipton, 1999). Boot camps are intensive treatment programs modeled after military training that include physical training, hard labor, and general drug education (Mackenzie & Herbert, 1996). Group counseling sessions usually consist of 8–10 members and meet 1–2 days per week. In the traditional sense of group counseling, it is likely that these are less effective in correction facilities because the group dynamic may be tempered by the presence of a correction officer, and the inmates returning to communal living following group sessions may make confidentiality and openness difficult (Lipton, Falkin, & Wexler, 1992).

Future Directions

This chapter highlights the prevalence of substance use across criminal justice settings from prison to jail to community offenders. Data suggests that more than 80% of offenders in both state prisons and local jails reported lifetime use of illicit substances. In addition, more than two-thirds of offenders in prisons (69.2%) and jails (68.7%) reported regular use. The numbers are also strikingly similar for offenders in prisons and jails who reported use of any illicit substance in the month before the arrest (56% of prisoners and 55% of jail inmates), as well as the number who reported using during the time of their offense (32.2% of prisoners, 28.8% of jail inmates). The prevalence of substance use is slightly less among community offenders, which is largely driven by a sampling frame of probationers rather than parolees who were formerly incarcerated. Slightly more than 69.4% of community offenders reported lifetime substance use, nearly a third (31.8%) reported use during the previous month, and only 13.5% reported using at the time of their current offense.

Comparing prevalence rates across criminal justice settings may imply that the frequency and intensity of substance use may be associated with degree of criminal justice involvement: more involved substance use associated with more involved criminal careers. However, it is also possible that these prevalence rates are captured at one point in time – meaning that those who are on probation may be new to the criminal justice system – and in the absence of effective treatment interventions targeted at this population that address both their substance use and their criminal thinking and criminal careers may proceed into longer term involvement with the criminal justice system through jail and/or prison incarceration. Therefore, it is critical that the current state of knowledge on the effectiveness of substance abuse treatment and interventions be modified and tailored for use with the criminal justice population. These interventions should also be sensitive to the correctional environment and the offender's transition from stages of incarceration, community reentry, and community treatment so that the context serves to enhance treatment rather than serve as a barrier to the treatment process.

The next 10 years hold considerable promise for advancing research and treatment of substance use among individuals involved in the criminal justice system. A NIDA-funded research initiative currently underway has the potential to shape the future of substance abuse research and treatment for offenders during the transition from prison to the community. The first round of cooperative studies as part of the CJ-DATS involved 11 different research centers focused on individual-level interventions to reduce the risks for substance abuse at reentry (www.cjdats.org). CJDATS concluded in 2008, and followup studies are continuing to be released on the outcomes of new interventions. CJDATS 2 was funded in the fall of 2008 to support organizational and systems level studies to examine the processes associated with implementation of evidence-based practices and other interventions during the continuum of care from institution to community. The first round of CJDATS 2 studies is slated for implementation in fall 2009.

Another area of promise for addiction research and treatment with offenders is an increased reliance on neuroscience and neurobiology research. A growing body of research has developed in recent years to help understand the neurologic basis of addictive behavior (see summary of research findings in Chandler, Fletcher, & Volkow, 2009). While a number of these studies have targeted brain structures of adults, a number of studies about the impact of substance use on the developing brain have also emerged to suggest that substance use can have a tremendous impact because children who are prenatally exposed to substance use can have lifetime neural consequences (Cornelius, Goldschmidt, Day, & Larkby, 2002; Cornelius, Leech, & Larkby, 2007; Covington, Nordstrom-Klee, Ager, Sokol, & Delaney-Black, 2002) and that environmental stress and stimuli associated with growing up in a substance-using environment shape neurological development (Sprang et al., 2009). Thus, an increased reliance on neuroscience has three important implications for clinical and empirical

science on treating substance-using offenders: (1) A better understanding of the neurological functions affected by repeated drug and alcohol use provides avenues for expanded medication development and behavioral interventions; (2) Identifying factors associated with the biological basis of behaviors associated with addiction can change policies associated with treatment – and coerced treatment – for individuals; and (3) A recognition of the impact of substance use on neurological and biological functioning can help addicts understand their own recovery (Chandler et al., 2009). Through integration of these important elements of neuroscience research, as well as increased research involving more rigorous designs for testing promising interventions with substance-using offenders, the future looks promising for advancing treatment opportunities for this at-risk group of substance users.

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