

Prenatal Substance Exposure

In the United States, a risk factor for poor behavioral and developmental outcomes among children is prenatal exposure to substance use (Coles & Black, 2006). Public concern for children in general has made prenatal exposure a fundamental topic for research. Outcome studies of drug use among pregnant women continue to grow as an awareness of the consequences increase and drug epidemics spread (Coles & Black, 2006). Existent studies have found that a number of factors contribute to substance use among pregnant women including environmental and familial triggers, which consequently have an effect on the development of a child (National Abandoned Infants Assistance Resource Center, 2006). What follows is a discussion about the contributing factors of substance use among pregnant women, its consequences, and possible paths to address the problem.

INCIDENCE OF SUBSTANCE USE AMONG PREGNANT WOMEN

The most recent National Survey on Drug Abuse and Health (Substance Abuse and Mental Health Services Administration [SAMHSA], 2007a) compares data on drug use among pregnant and non-pregnant women. In general, the survey found that pregnant women have a lower prevalence of illicit drug, alcohol, and tobacco use than non-pregnant women of the same age (15 to 44 years of age). The survey found 4% of pregnant women reported using illicit drugs in a given month based on combined 2005-2006 data, compared to 10% of non-pregnant women. In addition, an estimated 11.8% of pregnant women reported current alcohol use, 2.9% reported binge drinking, and 0.7% reported heavy drinking based on 2005-2006 combined data. These rates were significantly lower than the rates for non-pregnant women in the same age group (53%, 23.6%, and 5.4%, respectively). In addition, binge drinking during the first trimester of pregnancy fell from 10.6% in combined 2003-2004 data to 4.6% in combined 2005-2006 data. In this same age group, combined data for 2005-2006 indicated that the rate of past month cigarette use was 16.5% among those who were pregnant compared to 29.5% among those who were not pregnant (SAMHSA, 2007a).

Despite overall lower rates of illicit drug, alcohol, and tobacco use among pregnant women compared to non-pregnant women, substance use among pregnant women varies with age. Combined 2005-2006 data show that rates of past month cigarette smoking were lower for pregnant women than non-pregnant women among those aged 26 to 44 (10.3% vs. 29.1%) and among those aged 18 to 25 (25.6% vs. 35.6%). However, among women aged 15 to 17, the rate of cigarette smoking for pregnant women was higher than for non-pregnant women (23.1% vs. 17.1%). In addition, differences were found when considering ethnicity among substance using pregnant and non-pregnant women. Data showed that 8% of Black pregnant women reported using an illicit drug in the past month, compared with 4.4% of Whites and 3% of Hispanics (SAMSHA, 2005).

Although the overall percentages are relatively low, women's use of substances during pregnancy affects a large number of children and families. Using prevalence data from SAMHSA's National Survey on Drug Use and Health combined with live birth data from National Vital Statistics, out of the 4.1 million births in 2004, 160,370 pregnancies involved illicit drugs. A similar extrapolation further suggests close to 500,000 women used some alcohol during pregnancy. In addition, based on smoking status as recorded on birth certificates, 10.2% of women—or almost 420,000 births—reported tobacco use at some point during the pregnancy (Martin, Hamilton, Sutton, Ventura, Menacker, & Kirmeyer, 2006; SAMHSA, 2006).

SOCIAL AND PSYCHOLOGICAL ISSUES

Available research suggests that female substance users have socioeconomic, emotional, and psychological disadvantages when compared to non-using women, which in turn can affect children's growth and development (Flavin, 2002). Poverty and unemployment have both been associated with substance abuse (Uziel-Miller & Dresner, 2003), and one study found that 82% of substance abusing women had household incomes less than \$14,000 per year (12% refused to report income) (Boyd & Holmes, 2002).

Mental illness and histories of emotional, physical, and sexual abuse are common among female substance abusers. Lifetime affective disorders (e.g., major depression) were found to be the most common psychiatric diagnoses among a sample of pregnant substance abusers in drug treatment (Kissin, Svikis, Morgan, & Huang, 2001). Additionally, social phobia and other anxiety disorders commonly afflict substance using women, and almost half also report histories of emotional abuse (Kissin et al., 2001).

Numerous studies have shown past and/or current incidences of abuse to be common in the lives of female substance users. One community-based study found that over 60% of women drug users reported childhood sexual abuse, and over 55% reported childhood physical abuse (Medrano, Zule, Hatch, & Desmond, 1999). Martin, Kilgallen, Dee, Dawson, and Campbell (1998) reported that 42% of women enrolled in a substance abuse/prenatal care treatment program had been previous victims of both sexual and physical abuse. Moreover, pregnant women experiencing domestic violence report higher proportions of substance use compared to women not reporting current domestic violence (Datner, Wiebe, Brensinger, & Nelson, 2007). Separate studies have also found that 40-60% of married or cohabiting partners in treatment for substance abuse reported episodes of recent domestic violence (Fals-Stewart & Kennedy, 2005).

Literature suggests that these social and psychological problems common to women substance abusers also impact the child's development after birth. Carta et al. (2001) and Bauer and Barnett (2001) maintain that the home environment after birth has a greater effect on growth and development than in-utero exposure to drugs. Similarly, research shows that parental substance abuse can play a greater role in a child's development past infancy than low birth weight or gestational age (Berger & Waldfogel, 2000; Boardman, Powers, Padilla & Hummer, 2002). For example, inconsistent care from an addicted parent can have detrimental effects on a child. Notably, the attachment process, or the emotional bond between the mother and her infant, may be disrupted by substance use. Attachment problems may include emotional withdrawal of the child, as well as maternal-child

relational difficulties, such as lack of responsiveness or engagement between the dyad (Child Health and Development Institute of Connecticut, 2006). For children who remain with their parents, the chaotic environment often associated with substance abuse might require future counseling and services for a child raised in that environment (Semidei, Radel, & Nolan, 2001). Overall, however, the research literature on the effects of prenatal illicit drug exposure on attachment patterns remains limited. Mediating factors that may account for disrupted infant-parent attachments include the temperament and/or behavioral problems of the child and the parent's self-confidence as a caregiver (Seifer et al., 2004).

BIOLOGICAL AND DEVELOPMENTAL EFFECTS OF IN-UTERO DRUG EXPOSURE ON CHILDREN

Although once thought to have uniformly catastrophic results on the development of the fetus, differences of opinion currently exist about the short- and long-term effects of prenatal drug exposure on children. The literature in this area points to a few reasons why a determination of the effects of prenatal substance use is difficult. First, many women who use drugs prenatally use multiple drugs making it difficult to isolate the effects of any one drug (Lester, Tronick, Gasse, & Seifer, 2002). Secondly, as stated above, researchers report that the environmental factors associated with substance abuse may supersede the biological effects of a substance, whether it is an opiate or cocaine (Carta, Atwater, Greenwood, McConnell, McEvoy, & Williams, 2001; Hulse, Milne, English, & Holman, 1998). Therefore, reports on the effects of various drugs on a fetus contain conflicting findings and call for a more in-depth analysis, as the discussion below demonstrates.

Tobacco

Almost universally, it is recognized that tobacco has detrimental effects on the fetus. Tobacco is the most commonly used drug during pregnancy and is associated with adverse birth outcomes, such as miscarriage, placental abruption, placental insufficiency, and low birth weight (Wright & Walker, 2001). Additionally, babies of women who used tobacco while pregnant have reduced length, cranial, and thoracic measurements at birth (Wright & Walker, 2001). Research further suggests that children exposed to tobacco in-utero suffer more respiratory infections and asthma (Gupta, 2001).

Alcohol

Alcohol consumption during pregnancy is one of the leading preventable causes of birth defects and developmental disabilities. The effects that may result from prenatal alcohol exposure encompass Fetal Alcohol Spectrum Disorders (FASDs). While not a clinical diagnosis, FASDs include physical, mental, behavioral, and/or learning disabilities (Centers for Disease Control and Prevention (CDC), 2006a). The CDC (2006b) estimates a Fetal Alcohol Syndrome prevalence rate of between 0.2 to 1.5 cases per 1,000 live births. Prenatal exposure to alcohol, particularly in early pregnancy, has also been found to increase the likelihood of developing an alcohol disorder in adulthood (Alati et al., 2006).

Marijuana

Recent studies have highlighted the long-term impacts of marijuana use during pregnancy. Prenatal exposure to marijuana has been associated with increased levels of depression during childhood (Gray, Day, Leech, & Richardson, 2005), as well as initiation and frequency of marijuana use at age 14 (Day, Goldschmidt, & Thomas, 2006). Moreover, a study showed that prenatal marijuana use was significantly related to increased hyperactivity, impulsivity, inattention symptoms, delinquency, and externalization of problems for children of age 10 (Goldschmidt, Day, & Richardson, 2000). Another study demonstrated links between prenatal exposure to marijuana use and memory deficits (Mereu, Fà, Ferraro, Cagiano, Antonelli, Tattoli, Ghiglieri, Tanganelli, Gessa, & Cuomo, 2003).

Cocaine

The long-term effects of prenatal cocaine exposure are unclear. Studies focusing on cognitive and other developmental outcomes, as a drug-exposed child grows, have conflicting conclusions (Bandstra, Morrow, Anthony, & Churchill, 2001). A meta-analysis by Frank, Augustyn, Knight, Pell, and Zuckerman (2001) reviewed studies on cocaine-exposed children from 1984-2000. They concluded that the research does not provide evidence of a specific negative association between cocaine and physical growth, developmental test scores, or receptive and expressive language. Furthermore, what was once thought to be direct effects of cocaine exposure on child development might be the result of other drug use, such as tobacco, and/or the child's environment.

However, Singer, Arendt, Minnes, Farkas, Salvator, Kirchner, and Kliegman (2002) found that cocaine-exposed infants have twice the developmental delay during the first 2 years of life than non-exposed infants. The authors concluded that this delay might lead to learning difficulties as the children transition into school. In addition, Tronick et al. (2005) suggest that prenatal cocaine exposure adversely impacts social-emotional interactions between infants and their mothers, which may have negative long-term implications for child development.

Other studies show that children from disadvantaged backgrounds without in-utero drug exposure perform as poorly on developmental measures as children with prenatal drug exposure. For example, controlling for socioeconomic status, preschool and school-age children with and without prenatal cocaine exposure have been found to perform similarly on tests of cognition and child development (Asanbe & Lockert, 2006; Behnke et al., 2006). These results suggest that the physical and social environments of children may have a more significant impact on development than maternal drug use alone.

Heroin

In terms of prenatal drug exposure, heroin should be considered in conjunction with methadone, the drug used for the treatment of heroin addicted individuals (Meade, 2007). Infants born addicted to heroin or methadone often present with characteristics of neonatal opiate abstinence syndrome (NOAS) (Meade, 2007). According to Kandall et al. (1999), the symptoms for this syndrome vary but may include irritability, tremulousness, hypertonia, excessive crying, voracious appetite, exaggerated sucking drive, abnormal coordination between sucking and swallowing, regurgitation, pulmonary aspiration, and abstinence associated seizures. The treatment of NOAS will vary according to the

symptoms presented, but some include medication treatment to wean the infant off the drug gradually without causing health problems (Beauman, 2005).

Although, as is the case with cocaine, conclusive data relating to long-term effects of prenatal exposure to heroin and methadone is inconclusive, it is associated with premature birth and lower birth weight (Messinger et al., 2004). In this same study, the Bayley Scales of Infant Development II were administered to 1227 infants. It was found that opiate exposure was a marker for slightly depressed motor performance and a tendency toward behavioral difficulties. In addition, Meade (2007) cited a study in which school performance of older heroin-exposed children was found to be affected by early exposure to heroine and other environmental factors.

Methamphetamine

Although methamphetamine use among pregnant women is relatively low compared to other drugs, dependence nearly doubled between 1995 and 2003 (TEDS, 2005). Despite the growth of this problem, a limited number of studies focus on prenatal exposure to meth. Arria et al. in the Infant Development, Environment, and Lifestyle Study (IDEAL) recently found that 5.2% of women use meth at some point during pregnancy (2006). This study compared meth use to other substance use during pregnancy, but outcome effects of prenatal exposure to meth have yet to be studied in depth. One fundamental problem of the outcome studies is that 80% of women who use meth are also likely to use alcohol and nicotine. Therefore, the effects of meth are difficult to isolate from the effects of multi-drug use (Smith et al., 2006). However, Smith et al. was able to demonstrate that meth use during pregnancy has an impact on premature delivery and placental abruption (2006).

SOCIETAL IMPACTS OF PRENATAL SUBSTANCE EXPOSURE

Prenatal substance exposure is associated with significant societal and financial costs. For instance, neonatal hospital costs for children exposed to cocaine in-utero are estimated to be \$5,200 more than the hospital costs for non-exposed infants. Furthermore, for children who will not be discharged to their parents, the additional time in the hospital, beyond the point of medical need, but necessary while securing a foster care placement, increases the cost by an additional \$3,500 (Phibbs, Bateman, & Schwartz, 1991 as cited in Ebrahim & Gfroerer, 2003).

Some of the potential by-products of prenatal substance use that have an impact on the greater society are child neglect, displacement, and family dissolution. One recent study of foster care children found that prenatal alcohol use for the mothers of children in the sample was 3% higher than the national average and prenatal maternal drug use was more than 22% higher than the national average (Smith, Johnson, Pears, Fisher, DeGarmo, 2007). In addition, the findings showed that prenatal maternal alcohol and drug use predicted child maltreatment and postnatal exposure to substances as well as increased risk for maternal involvement with a substance abusing partner. In addition, combined prenatal maternal alcohol and drug use predicted foster care placement transitions. Finally, prenatal maternal alcohol and drug use also predicted postnatal paternal alcohol and drug use, which in turn predicted foster care placement transitions.

It is clear that providing foster care services to children prenatally exposed to substances burdens the social service system with additional court hearings, case management demands, and child welfare services (Semidei, Radel, & Nolan, 2001). However, the extent to which prenatal substance abuse leads to the involvement of the social service system may vary by region. For example, a survey of child welfare professionals conducted by the National Center on Addiction and Substance Abuse at Columbia University (1999) revealed that nearly 80% of respondents believed that parental substance abuse contributed to over half of the cases of child maltreatment. In contrast, a recent study found that prenatal cocaine exposure was not significantly related to substantiated reports of child maltreatment or placement in foster care. After controlling for maternal use of alcohol during pregnancy, the relationship between prenatal cocaine use and negative child welfare outcomes was non-significant (Doris, Meguid, Thomas, Blatt, & Eckenrode, 2006). This finding emphasizes how substance use cannot be viewed in isolation from associated social stressors and risk factors.

LEGISLATION AND POLICY

Many state laws and policies have been established in an attempt to prevent and/or address prenatal substance use. Existent laws address the testing, reporting, prosecution, and receipt of welfare benefits for pregnant women who use drugs.

Screening, Testing and Reporting

According to the American College of Obstetricians and Gynecologists (2006), all women regardless of social status, educational attainment, race, or ethnicity should be screened for psychosocial risk factors, including substance use, at each prenatal care visit. This recommendation aims to increase the likelihood of identifying problems and complications with the end goal of reducing poor birth outcomes. Advocacy for psychosocial screening is based on the rationale that stressors that present risks during pregnancy may likely affect the health and well-being of the newborn.

Drug testing of newborn infants, based on a suspicion of maternal drug use often leads to reporting a family to child protective services for investigation (U.S. Department of Health and Human Services, 2001). However, concern has been voiced that some women are tested for drug use largely due to their race and socioeconomic status, leading some researchers to argue for universal testing (Ondersma, Simpson, Brestan, & Ward, 2000; Barth, 2001).

Historically, substance abuse testing and reporting laws differ among states. The Guttmacher Institute published in February 2008 that four states (IA, KY, MN, ND) require health care professionals to test for prenatal drug exposure when prenatal drug abuse is suspected, while 14 states (AK, AZ, IL, IA, LA, MA, MI, MN, MT, ND, OK, RI, UT, VA) require reporting women to child protective services (CPS) for prenatal substance use (Guttmacher, 2008). However, a recent federal law (Public Law No: 108-36) attempts to create a uniform state response to prenatal substance abuse. The 2003 reauthorization of the federal Child Abuse Prevention and Treatment Act (CAPTA) requires states receiving CAPTA grants to develop a plan for medical workers to notify CPS of infants identified at birth as affected by prenatal drug exposure. The law states that this referral, in and of itself, is not grounds for a child abuse and/or neglect determination and cannot be used for criminal prosecution. Rather, it is intended to

provide a safety screening and to link the mother to voluntary community services. The law also requires that CPS develop a safe plan for infants in this situation (Public Law No: 108-36).

Substance Use Prevention and Treatment

The issue of preventing infant abandonment and placement into out-of-home care, which has been a cornerstone in the policy and practice surrounding prenatal drug use, has led to attempts to prevent and/or treat substance use during pregnancy (Weibley, 2002). Those who view substance abuse as a medical, rather than a criminal, issue call for policy to reflect treatment and the provision of services to the child of a substance-using mother, rather than the prosecution of pregnant women. In fact, much of the scientific research surrounding prenatal substance use is focused on treatment as an intervention and seeks to explore the effectiveness of various types of drug abuse treatment and how those interventions can be tailored to pregnant women. Currently, seven states give substance using pregnant women priority access to drug treatment (AZ, GA, KS, MO, OK, TX, WI) and 19 states have created or funded treatment programs specifically for pregnant women (AR, CA, CO, CT, FL, IL, KY, LA, MD, MN, MO, NE, NY, NC, OH, OR, PA, VA, WA) (Guttmacher Institute, 2008). Even so, according to a 2006 Drug and Alcohol Services Information System Report, data from 2005 shows that 13% of public and private drug treatment facilities nationwide stated that they did not accept women into their programs (Office of Applied Studies, 2006). Of those facilities that accepted women, 41% offered programs or groups specific to women, with only 17% offering services for pregnant women.

Prosecution of Pregnant Substance Users

Varying nationwide opinions regarding the rights of the fetus versus the rights of the mother have complicated prosecution (Harris & Paltrow, 2003). Women who are charged criminally for their prenatal behavior have generally been charged with either child endangerment/abuse, illegal drug delivery to a minor, or fetal murder/manslaughter. Only South Carolina has criminalized substance use during pregnancy. However, in 2001, the U.S. Supreme Court invalidated an arrangement between hospitals and the police in South Carolina to use positive drug test results for the prosecution of women refusing to participate in drug treatment. The Court ruled that a conviction of a pregnant South Carolina woman based on a positive drug test, which was administered without her consent during prenatal care at a public hospital, violated the woman's fourth amendment right against unreasonable search and seizure (Gostin, 2001). Currently, 16 states (AK, CO, FL, IL, IN, IA, LA, MD, MN, NV, RI, SC, SD, TX, VA, WA) consider substance abuse during pregnancy to be child abuse, and can provide grounds for termination of parental rights. In addition, three states (MN, SD, WI) authorize civil commitment of prenatal drug users and mandate inpatient drug treatment during pregnancy (Guttmacher Institute, 2008).

Loss of Benefits

Currently, many substance using women receive welfare assistance. A study profiling pregnant substance abusers reported that 70% had received income from local departments of social services during the past month (Kissin et al., 2001). In fact, illicit drug use in the months before pregnancy has been associated with greater likelihood of welfare reliance one year later (Leher, Crittenden, & Norr, 2002). Overall, however, the percentage of low-income substance using mothers who receive Temporary Assistance for Needy Families (TANF) benefits has declined from 54% in 1996 to 38% in 2001 (Pollack & Reuter, 2006).

The concern for whether substance users should receive public aid is widely debated. According to the Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA; P. L. 104-193), states are allowed to perform drug testing of welfare recipients, and are permitted to deny receipt of benefits to adults convicted of drug felonies. Michigan was the only state to respond to the PRWORA authorizations, and in 1999, Michigan enacted a law that mandated drug testing as a condition of continued welfare assistance. The program, however, ended in 2003 following a ruling by the federal court of appeals that the program was unconstitutional (American Civil Liberties Union, 2003).

SUBSTANCE ABUSE TREATMENT

In 2007, the National Survey on Drug Use and Health published data from 2006 showing that 7.4 million women, age 18 and older, needed treatment for a substance use problem (SAMHSA, 2007b) but only 822,000 (11.2%) received treatment. For women of childbearing age (18 to 49 years old), combined data from 2004-2006 indicated that an annual average of 9.4% of women (6.3 million) needed treatment for a substance use problem. Of the women aged 18 to 49 who needed treatment in the past year, 5.5% felt they needed treatment but did not receive it, and 84.2% neither received treatment nor perceived a need for it. There were 345,000 women aged 18 to 49 who needed and felt the need for substance use treatment in the past year, but did not receive it. Of these women, 36.1% indicated they did not receive it because they were not ready to stop using alcohol or illicit drugs, 34.4% could not afford treatment and 28.9% said they did not receive treatment because of social stigma. Overall, the data suggests that a significant number of women who needed treatment failed to receive it.

Gender Specific Treatment

Historically, drug treatment programs were designed for men, but recent research on the relatedness of gender differences and substance abuse spawned gender-specific treatment programs. While women-only treatment is not necessarily more effective than mixed-gender treatment, some greater effectiveness has been demonstrated by treatments that address problems more common to substance-abusing women (Greenfield, Brooks, Gordon, Green, Kropp, McHugh, Lincoln, Hien, & Miele, 2007). One finding suggests that substance-using pregnant women have a familial history of broken relationships and abuse. Thus, learning how to develop healthy and trusting relationships has become part of a comprehensive approach for families affected by substance use (Price & Simmel, 2002). A recent survey showed that substance abuse treatment facilities with special programs for women generally offer individual, group, and family counseling; discharge planning; social services assistance; and other services such as child care, domestic violence services and accommodation for children (Office of Applied Studies, 2006).

A new study compared substance abuse treatment services for pregnant women in women-only programs and mixed-gender programs (Hser & Niv, 2006). Pregnant women treated in the women-only programs demonstrated greater severity in drug use, legal problems, psychiatric problems, homelessness, and unemployment than those treated in the mixed gender programs. The women-only programs were more likely to offer child care, children's psychological services, and HIV testing. The

finding that pregnant women in women-only programs had more severe problems implies that these specialized services are filling a need in addiction services. It was, however, found that further expansion is necessary in psychiatric, legal, and employment services.

Claus et al. (2007) found that specialized services for mothers in long-term residential substance abuse treatment promoted continuity in care. Women in specialized, women's only treatment programs (37%) were more likely than those in standard mixed-gender treatment programs (14%) to continue care. On the other hand, another recent study looked at specialized substance abuse treatment programs and found that they failed to provide services to women who were not currently parenting (Uziel-Miller & Lyons, 2000). This population is in need of comprehensive services to address their bio-psycho-social needs. Although they are not currently parenting, many of these women have children who are no longer in their custody. These women would benefit from comprehensive services, but seem to be left out of these specialized treatment programs.

Treatment for Co-occurring Disorders

Many women who abuse alcohol and/or drugs have co-occurring disorders that add to the complexity of treatment requirements. SAMHSA's Women, Co-Occurring Disorders, and Violence Study (WCDVS; 2004) was conducted in an effort to gain understanding about effective methods to treat women with histories of trauma, substance abuse and mental illness (Clark & Power, 2005). Findings suggest that integrating substance abuse, mental health, and trauma issues in counseling may be necessary to effectively improve treatment outcomes in women. The sum combination of mental health, substance use, and trauma are particularly important to address since it impairs maternal functioning, which in turn increases the risk of child behavior problems (i.e., aggression, anxiety/depression, inattention/hyperactivity) (Whitaker, Orzol, & Kahn, 2006).

Another study concluded that it is significant to differentiate race and ethnicity among women with co-occurring disorder. It was found that Blacks and Hispanic women showed heightened social vulnerability due to socioeconomic disadvantages. This finding is clinically significant for treatment of this population. It highlights the importance of providing job training, educational and job placement components to treatment. In addition, this population is more vulnerable to criminal justice involvement and the child welfare system, and thus, would benefit from the provision of legal services and advocacy in treatment (Amaro et al., 2005; McAlpine, Marshall & Doran, 2001). Similarly, a study highlighted that age, employment status, and legal involvement were significantly associated with the likelihood of completing substance abuse treatment for parents involved in the child welfare system. The sample included 871 caregivers enrolled in the Illinois Alcohol and Other Drug Abuse waiver demonstration (Choi & Ryan, 2006).

Ries (1992) outlines three models used to treat women with co-occurring substance abuse disorders. In the *serial model*, the substance abuse issue is addressed first, after which the client receives traditional psychotherapy. This model might be ineffective given the high substance abuse relapse rate among addicts; also, those with severe psychiatric disorders might not benefit. In the *parallel model*, treatment for psychological problems and addiction occur at the same time, but in different milieus. This method necessitates close collaboration between agencies. However, for clients with acute mental disorders, this model may not be coordinated enough. The third model, and the one

recommended for clients with severe psychological illness, is the *integrated model*. This treatment model brings together addiction therapy and psychological therapy for an intensely integrated treatment plan (Price & Simmel, 2002).

Treatment During Pregnancy

Women with high-risk pregnancies, such as those involving drug exposure, have been shown to adapt to pregnancy and motherhood differently and less easily than women with low-risk pregnancies, and require specialized services to create a nurturing and caring environment for both themselves and their child (Dulude, Belanger, Wright, & Sabourin, 2003). Pregnancy-specific treatment programs have been developed to guide the practice of treating substance using mothers and/or mothers-to-be by addressing concerns specific to a woman who is pregnant (e.g., health and nutrition during pregnancy) and by providing support with the pregnancy that other, more traditional programs might not offer. This type of treatment can occur in either an inpatient or outpatient setting, and can range in location from a hospital to a community center. Research indicates that women in pregnancy-specific programs may be more likely to complete treatment compared to those in traditional treatment groups (Weisdorf, Parran, Graham, & Snyder, 1999).

Preventing substance use during pregnancy is an effective way of reducing harm to the unborn fetus and reducing hospital costs associated with drug-exposed births (Behnke, Eyler, Conlon, Casanova & Woods, 1997; Carta et al., 2001). A study by Svikis et al. (1997) examined the cost effectiveness of drug treatment programs for pregnant women. The study found that the pregnant women in the treatment group had better delivery outcomes, infants with higher birth weights, and longer gestational ages compared to pregnant women who did not receive substance abuse treatment. The women in the treatment group also had fewer infants in the Neonatal Intensive Care Unit (NICU) and those who were there stayed for a shorter amount of time than the non-treatment group. Moreover, the costs of the treatment program were approximately \$4,644 less per mother/infant pair than the costs of the NICU for the non-treatment group.

Educational Initiatives

In addition to formal treatment programs, outreach efforts aimed at informing women of the dangers of substance use during pregnancy have been successful in curbing use. Research shows that enlisting family and friends, medical staff, and the media to inform women about overall health issues, as well as the dangers of prenatal substance use, can be a successful tool in preventing or reducing substance use during pregnancy. Brief interventions and motivational interviews given in medical offices before, during, and after pregnancy have been shown to help reduce alcohol consumption among pregnant women. Researchers also suggest that the substance abuse intervention should be approached through the broader subject of health and well-being, and that family members' interventions and media campaigns promoting abstinence from alcohol during pregnancy can be effective prevention measures (Handmaker & Wilbourne, 2001). Also emphasized in the literature concerning prenatal substance abuse is the importance of creating a safe prenatal clinic atmosphere. Many women claim that drug dealers have approached them upon leaving the clinic, and that treatment centers can be home to drugs and drug dealers, as well (Pursley-Crotteau, 2001).

Harm Reduction

Harm reduction is gaining acceptance and popularity as a model for treating drug use during pregnancy. An assumption exists in some quarters that women who use drugs while pregnant do not care about the harm they may be causing the fetus. However, Flavin (2002) argues that this is not the case and that many pregnant, drug addicted women practice harm reduction in an attempt to promote the health of their pregnancy. Flavin suggests that instead of a zero tolerance policy surrounding prenatal drug use, policy should reflect the attempts made by pregnant women to limit their drug use, even if they are unable to abstain completely. Flavin introduces a continuum of risk, which labels frequent cocaine use as very risky, but acknowledges that cutting down on use is a positive attempt to ensure a healthy pregnancy. The harm reduction model also recognizes that a woman is able to take positive steps during her pregnancy, such as eating well or receiving prenatal care, even if she is engaging in negative behaviors, such as drug use. Flavin sees the acknowledgement of these healthy behaviors as an important component in substance abuse treatment.

Treatment Interventions for Neonates and Their Families

If prevention has been non-existent or unsuccessful, intervention must also be offered to the child who has been exposed to substances in-utero. In FY 1993 and FY 1995, the federal government awarded 27 five-year grants to support 35 residential treatment centers for pregnant and post-partum women and their children (Clark, 2001). The results from the programs have been encouraging in the areas of infant mortality, treatment retention and completion, and behavioral changes. Retention rates exceeded that of traditional treatment centers in part because the mothers were not separated from their children and children were involved in the treatment process. The children in the program also benefited from this model because the program staff worked closely with child welfare agencies.

Programs teaching parenting skills for substance using parents have attempted to bring stability into the lives of children who are at risk (Moore & Finkelstein, 2001). Some programs target parental behaviors that have been shown to lead to better birth outcomes and increase a child's development as they grow, such as social support, increased socio-economic status, and coping abilities (Yali & Lobel, 2002). The Abandoned Infants Assistance Act of 1988 was created to secure the safety of children at risk due to the problems associated with families affected by substance abuse and/or HIV/AIDS. It funds programs that address the human service needs of those families, who have a diverse background of cultures, policy conditions and communities (National Abandoned Infants Assistance Resource Center, 2006).

Much of the research on treatment for prenatal substance use includes elements of both family treatment and a comprehensive approach to substance use (Clark, 2001). Rowe and Liddle (2003) discuss the importance of family-based treatment for substance abuse. In part, this is due to the detrimental effects that family and relationship stressors, such as negative communication patterns, can have on a user's ability to stay clean. Research on factors affecting mother-child visitation, after a child has been placed in foster care due to parental substance abuse, shows that mother's drug use, the support she has from others, and transportation availability all have the ability to promote or deter the mother-child relationship (Kovalesky, 2001).

Early intervention and case management are other strategies used to ensure that the family's needs are met and that the infant receives proper care. One study found that caregivers of cocaine-exposed children who received early case management services demonstrated more positive affect while interacting with their children compared to caregivers who did not receive the intervention (Kilbride, Castor, & Fuger, 2006). While early intervention has been shown to improve child development at 6 months, environmental factors seem to play a more important role in the infant's development at 36 months (Kilbride, Castor, Hoffman & Fuger, 2000). Similarly, case management had no positive developmental effect on school-aged cocaine-exposed children (Kilbride, Castor, & Fuger, 2006). Home-based interventions have demonstrated success with this population. Studies have shown that drug-exposed infants receiving intervention in their homes had significantly less behavioral and emotional problems, and better developmental outcomes than infants who did not (Butz, Pulsifer, Marano, Belcher, Lears & Royall, 2001; Schuler, Nair & Kettinger, 2003).

Another important component of treating drug-exposed children and families is to address how the cycle of addiction is to be broken. Children of substance-using parents are one of the highest risk groups for adult substance abuse (Kumpfer, 1999). If parents have used substances to cope with life, it is likely that their children will as well (Kaplow, Curran & Dodge, 2002). Interventions to prevent future drug use among this group of youth are varied and include child-only prevention approaches and also family-based strategies, such as The Strengthening Families Program (Kumpfer, Alvarado, & Whiteside, 2003).

Obstacles to Treatment

Although several types of treatment interventions exist, the problem of women accessing and completing the appropriate treatment remains an issue. Low self-esteem, fearfulness of the stigma associated with prenatal drug use, family and work obligations, lack of access to health insurance, and substance using or violent partners are potential treatment barriers for pregnant women using drugs (Price & Simmel, 2002).

The prospect of motherhood and addiction simultaneously can make recovery difficult for women. Scott-Lennox, Rose, Bohlig, and Lennox (2000) studied family status and demographic descriptors in an attempt to explain the high dropout rate (i.e., nearly 60%) for women in substance abuse treatment. The authors found that the women most likely not to complete treatment were African American, pregnant, had custody of minor children, or were under the age of 21.

As mentioned briefly, one major obstacle for a substance using mother or mother-to-be is the societal stigma that exists concerning pregnant drug users. These judgments can arise from society at-large, as well as from health professionals and social workers assigned to these cases. They have the potential to interfere with prenatal care due to a medical provider's beliefs or attitudes concerning prenatal substance use, as well as the mother's aversion to the indignity. Many times stigmatization, along with a fear of prosecution, prevents women from obtaining prenatal care, especially in the case of low-income women attending state sponsored health clinics (Murphy & Sales, 2001). Fortunately, some hospitals have begun sensitivity training concerning pregnancy and drug use to address the problem (Carter, 2002; Bland, Oppenheimer, Brisson-Carroll, Morel, Holmes & Gruslin, 2001).

Moreover, AIA programs have also become aware of how frequently families experience failure with human service agencies, and therefore, are committed to building a trusting, long-term, and non-judgmental relationship with their clients. They grant importance to initial and ongoing engagement for a successful intervention (AIA Best Practices, 2003).

CONCLUSION

Drug use during pregnancy presents continuing costs at the personal, familial, and societal level. Although disagreements surround the extent to which, and ways in which, in-utero drug exposure harms children, the consensus is that substance use during pregnancy presents risks. More research is required to develop a clear understanding of the short- and long-term effects of in-utero drug exposure on children.

Women who abuse substances face multiple stressors, including poverty, mental illness, and past and present physical, emotional, and sexual abuse. In turn, their children must cope with the consequences of living in a home environment where their developmental needs may not be met, and where they are at risk of out-of-home placement. A variety of laws, policies, and service programs have been developed to address the problems of prenatal drug exposure. However, numerous barriers thwart attempts to successfully address the multiplicity of issues faced by these families. The effectiveness of interventions to assist pregnant substance abusers, and, postpartum, mothers and children needs to be established through solid program evaluation, research, and continued governmental support and commitment.

REFERENCES

- Alati, R., Al Mamun, A., Williams, G. M., O'Callaghan, M., Najman, J. M., & Bor, W. (2006). In-utero alcohol exposure and prediction of alcohol disorders in early adulthood: A birth cohort study. *Archives of General Psychiatry*, 63(9), 1009-1016.
- Amaro, H., Larson, M. J., Gampel, J., Richardson, E., Savage, A., & Wagler, D. (2005). Racial/ethnic differences in social vulnerability among women with co-occurring mental health and substance abuse disorders: Implications for treatment services. *Journal of Community Psychology*, 33(4), 495-511.
- American Civil Liberties Union. (2003). *Welfare drug testing*. Retrieved March 11, 2008 from <http://www.aclu.org/drug-policy/testing/10757res20030415.html>
- American College of Obstetricians and Gynecologists. (2006). Psychosocial risk factors: Perinatal screening and intervention. ACOG committee opinion No. 343. *Obstetrics and Gynecology*, 108(2), 469-477.
- Arria, A. M., Derauf, C., LaGasse, L. L., Grant, P., Shah, R., Smith, L., Haning, W., Huestis, M., Strauss, A., Della Grotta, S., Liu, J., & Lester, B. (2006). Methamphetamine and other substance use during pregnancy: Preliminary estimates from the Infant Development, Environment and Lifestyles (IDEAL) Study. *Maternal and Child Health Journal*, 10(3), 293-302.
- Asanbe, C. B., & Lockert, E. (2006). Cognitive abilities of African American children with prenatal cocaine/polydrug exposure. *Journal of Health Care for the Poor and Underserved*, 17(2), 400-412.
- Bandstra, E., Morrow, C., Anthony, J., & Churchill, S. (2001). Intrauterine growth of full-term infants: Impact of prenatal cocaine exposure. *Pediatrics*, 108(6), 1309-1319.
- Barth, R. (2001). Research outcomes of prenatal substance exposure and the need to review policies and procedures regarding child abuse reporting. *Child Welfare*, 80(2), 275-296.
- Bauer, A., & Barnett, D. (2001). Infants at risk: Marker variables related to the early lives of children. *Journal of Children and Poverty*, 7(2), 121-134.

- Beauman, S. (2005). Identification and Management of Neonatal Abstinence Syndrome. *Journal of Infusion Nursing*, 28(3), 159-167.
- Behnke, M., Fonda, E., Conlon, M., Casanova, O. & Woods, N. (1997). How fetal cocaine exposure increases neonatal hospital costs. *Pediatrics*, 99(2), 204-208.
- Behnke, M., Eyler, F. D., Warner, T. D., Garvan, C. W., Hou, W., & Wobie, K. (2006). Outcome from a prospective longitudinal study of prenatal cocaine use: Preschool development at 3 years of age. *Journal of Pediatric Psychology*, 31(1), 41-49.
- Berger, L., & Waldfogel, J. (2000). Prenatal cocaine exposure: Long-run effects and policy implications. *The Social Science Review*, 74(1), 28-54.
- Bland, E., Oppenheimer, L., Brisson-Carroll, G., Morel, C., Holmes, P., & Gruslin, A. (2001). Influence of an educational program on medical students' attitudes to substance use disorders in pregnancy. *American Journal of Drug and Alcohol Abuse*, 27(3), 483-490.
- Boardman, J., Powers, D., Padilla, Y., & Hummer, R. (2002). Low birth weight, social factors, and the development outcomes among children in the United States. *Demography*, 39(2), 353-373.
- Boyd, C., & Holmes, C. (2002). Women who smoke crack and their family substance abuse problems. *Health Care for Women International*, 23, 576-586.
- Butz, A., Pulsifer, M., Marano, N., Belcher, H., Lears, M., & Royall, R. (2001). Effectiveness of a home intervention for perceived child behavioral problems and parenting stress in children with in-utero drug exposure. *Archives of Pediatric and Adolescent Medicine*, 155, 1029-1037.
- Carta, J., Atwater, J., Greenwood, C., McConnell, S., McEvoy, M., & Williams, R. (2001). Effects of cumulative prenatal substance exposure and environmental risks on children's developmental trajectories. *Journal of Clinical Child Psychology*, 30(3), 327-337.
- Carter, C. (2002). Perinatal care for women who are addicted: Implications for empowerment. *Health and Social Work*, 27(3), 166-174.
- Centers for Disease Control and Prevention. (2006a). *Fetal Alcohol Spectrum Disorders*. Retrieved March 11, 2008, from <http://www.cdc.gov/ncbddd/fas/fasask.htm>
- Centers for Disease Control and Prevention. (2006b). *Tracking Fetal Alcohol Syndrome*. Retrieved March 11, 2008, from <http://www.cdc.gov/ncbddd/fas/fassurv.htm>
- Child Abuse Prevention and Treatment Act. (2003). Public Law No: 108-36.
- Child Health and Development Institute of Connecticut. (2006, April). *Caring for a child who has been affected by substance abuse*. [Fact Sheet]. Retrieved on March 11, 2008 from http://www.chdi.org/files/4192006_16856_2286951_pdf.pdf
- Choi, S., & Ryan, J. P. (2006). Completing substance abuse treatment in child welfare: The role of co-occurring problems and primary drug of choice. *Child Maltreatment*, 11(4), 313-325.
- Clark, H. (2001). Residential substance abuse treatment for pregnant and postpartum women and their children: Treatment and policy implications. *Child Welfare*, 80(2), 179-198.
- Clark, H. W., & Power, A. K. (2005). Women, co-occurring disorders, and violence study: A case for trauma-informed care. *Journal of Substance Abuse Treatment*, 28(2), 145-146.
- Claus, R. E., Orwin, R. G., Kissin, W., Krupski, A., Campbell, K., & Stark, K. (2007). Does gender-specific substance abuse treatment for women promote continuity of care? *Journal of Substance Abuse Treatment*, 32(1), 27-39.
- Coles, C. D., & Black, M. M. (2006). Introduction to the special issue: Impact of prenatal substance exposure on children's health, development, school performance and risk behavior. *Journal of Pediatric Psychology*, 31(1), 1-4.
- Datner, E. M., Wieber, D. J., Brensinger, C. M., & Nelson, D. B. (2007). Identifying pregnant women experiencing domestic violence in an urban emergency department. *Journal of Interpersonal Violence*, 22(1), 124-135.
- Day, N. L., Goldschmidt, L., & Thomas, C. A. (2006). Prenatal marijuana exposure contributes to the prediction of marijuana use at age 14. *Addiction*, 101(9), 1313-1322.
- Doris, J. L., Meguid, V., Thomas, M., Blatt, S., & Eckenrode, J. (2006). Prenatal cocaine exposure and child welfare outcomes. *Child Maltreatment*, 11(4), 326-337.
- Dulude, D., Belanger, C., Wright, J., & Sabourin, S. (2003). High-risk pregnancies, psychological distress, and dyadic adjustment. *Journal of Reproductive and Infant Psychology*, 20(2), 101-123.
- Ebrahim, S., & Groerer, J. (2003). Pregnancy-related substance use in the United States during 1996-1998. *Obstetrics and Gynecology*, 101(2), 374-379.

- Fals-Stewart, W., & Kennedy, C. (2005). Addressing intimate partner violence in substance-abuse treatment. *Journal of Substance Abuse Treatment*, 29(1), 5-17.
- Flavin, J. (2002). A glass half full? Harm reduction among pregnant women who use cocaine. *Journal of Drug Issues*, 32(3), 973-998.
- Frank, D., Augustyn, M., Knight, W., Pell, T., & Zuckerman, B. (2001). Growth, development and behavior in early childhood following prenatal cocaine exposure: A systematic review. *JAMA*, 285, 1613-1625.
- Goldschmidt, L., Day, N. L. & Richardson, G. A. (2000). Effects of prenatal marijuana exposure on child behavior problems at age 10. *Neurotoxicology and Teratology*, 22(3), 325-336.
- Gostin, L. (2001). The rights of pregnant women: The Supreme Court and Drug Testing. *The Hastings Center Report*, 31(5), 8-9.
- Gray, K. A., Day, N. L., Leech, S., & Richardson, G. A. (2005). Prenatal marijuana exposure: Effect on child depressive symptoms at ten years of age. *Neurotoxicology and Teratology*, 27(3), 439-448.
- Greenfield, S. F., Brooks, A. J., Gordon, S. M., Green, C. A., Kropp, F., McHugh, R. K., Lincoln, M., Hien, D., & Miele, G. M. (2007). Substance abuse treatment entry, retention, and outcome in women: A review of the literature. *Drug and Alcohol Dependence* 86(5), 1-21.
- Gupta, P. (2001). The public health impact of tobacco. *Current Science*, 81(5), 475-481.
- Guttmacher Institute. (2008, February) *State Policies in Brief: Substance Abuse during Pregnancy*. [Fact Sheet]. New York: The Alan Guttmacher Institute.
- Handmaker, N., & Wilbourne, P. (2001). Motivational interventions in prenatal clinics. *Alcohol Research and Health*, 25(3), 219-229.
- Harris, L., & Paltrow, L. (2003). The status of pregnant women and fetuses in U.S. criminal law. *JAMA*, 289, 1697-1699.
- Hulse, G., Milne, E., English, D., & Holman, C. (1998). Assessing the relationship between maternal opiate use and neonatal mortality. *Addiction*, 93(7), 1033-1042.
- Hser, Y. I., & Niv, N. (2006). Pregnant women in women-only and mixed-gender substance abuse treatment programs: a comparison of client characteristics and program services. *The Journal of Behavioral Health Services and Research*, 33(4), 431-442.
- Kandall SR, Doberczak TM, Jantunen M, Stein J. (1999). The methadone-maintained pregnancy. *Clinical Perinatology*, 26(1), 173-183.
- Kaplow, J., Curran, P., & Dodge, K. (2002). Child, parent and peer predictors of early-onset substance use: A multi-site longitudinal study. *Journal of Abnormal Child Psychology*, 30(3), 199-216.
- Kilbride, H., Castor, C., Hoffman, E., & Fuger, K. (2000). Thirty-six month outcome of prenatal cocaine exposure for term or near-term infants: Impact of early case management. *Journal of Developmental and Behavioral Pediatrics*, 21(1), 19-26.
- Kilbride, H. W., Castor, C. A., & Fuger, K. L. (2006). School-age outcome of children with prenatal cocaine exposure following early case management. *Journal of Developmental and Behavioral Pediatrics*, 27(3), 181-187.
- Kissin, W., Svikis, D., Morgan, G., & Haung, N. (2001). Characterizing drug dependant women and their children. *Journal of Substance Abuse Treatment*, 21(1), 27-34.
- Kovalesky, A. (2001). Factors affecting mother-child visiting identified by women with histories of substance abuse and child custody loss. *Child Welfare*, 80(6), 749-768.
- Kumpfer, K. (1999). Outcome measures of interventions in the study of children of substance-abusing parents. *Pediatrics*, 103(5), 1128-1144.
- Kumpfer, K. L., Alvarado, R., & Whiteside, H. O. (2003). Family-based interventions for substance use and misuse prevention. *Substance Use & Misuse*, 38(11-13), 1759-1787.
- Leher, E., Crittenden, K., & Norr, K. (2002). Illicit drug use and reliance on welfare. *Journal of Drug Issues*, 32(1), 179-207.
- Lester, B., Tronick, E., Gasse, L., & Seifer, R. (2002). The maternal lifestyle study: Effects of substance exposure during pregnancy on neurodevelopmental outcomes in 1-month-old infants. *Pediatrics*, 110(6), 1182-1192.
- Martin, S., Kilgallen, B., Dee, D., Dawson, S., & Campbell, J. (1998). Women in a prenatal care/substance abuse treatment program: Links between domestic violence and mental health. *Maternal and Child Health Journal*, 2(2), 85-94.
- Martin, J. A., Hamilton, B. E., Sutton, P. D., Ventura, S. J., Menacker, F., & Kirmeyer, S. (2006). Births: Final data for 2004. *National Vital Statistics Reports*, 55(1). Hyattsville, MD: National Center for Health Statistics.
- McAlpine, C., Marshall, C., & Doran, N. (2001). Combining child welfare and substance abuse services: A blended model of intervention. *Child Welfare*, 80(2), 129-149.



A Service of the
Children's Bureau

- Meade, Colleen. (2007). The Effects of Substance Abuse on the Development of Children: Educational Implications Retrieved on April 8, 2008 from <http://www.teach-nology.com/tutorials/teaching/abuse/print.htm>
- Medrano, M. A., Zule, W. A., Hatch, J., & Desmond, D. P. (1999). Prevalence of childhood trauma in a community sample of substance-abusing women. *American Journal of Drug and Alcohol Abuse*, 25(3), 449-462.
- Mereu, G., Fà, M., Ferraro, L., Cagiano, R., Antonelli, T., Tattoli, M., Ghiglieri, V., Tanganelli, S., Gessa, G. L., & Cuomo, V. (2003). Prenatal exposure to a cannabinoid agonist produces memory deficits linked to dysfunction in hippocampal long-term potentiation and glutamate release. *Proceedings of the National Academy of Sciences*, 100(8), 4915-4920.
- Messinger, D. S., Bauer, C. R., Das, A., Seifer, R., Lester, B. M., Lagasse, L. L., Wright, L. L., Shankaran, S., Bada, H. S., Smeriglio, V. L., Langer, J. C., Beeghly, M., and Poole, W. K. (2004). The Maternal Lifestyle Study: Cognitive, Motor, and Behavioral Outcomes of Cocaine-Exposed and Opiate-Exposed Infants Through Three Years of Age. *Pediatrics*, 113(6), 1677-1685.
- Moore, J., & Finkelstein, N. (2001). Parenting services for families affected by substance abuse. *Child Welfare*, 80(2), 221-238.
- Murphy, S., & Sales, P. (2001). Pregnant drug users: Scapegoats of Reagan/Bush and Clinton-era economics. *Social Justice*, 28(4), 72-95.
- National Abandoned Infants Assistance Resource Center (2006). Literature review: Effects of prenatal substance exposure on infant and early childhood outcomes. Retrieved March 11, 2008 from http://aia.berkeley.edu/media/pdf/prenatal_substance_exposure_review.pdf
- National Abandoned Infants Assistance Resource Center (2003). AIA best practices: Lessons learned from a decade of service to children and families affected by HIV and substance abuse. Retrieved March 11, 2008 from http://aia.berkeley.edu/media/pdf/best_practices_monograph.pdf
- National Center on Addiction and Substance Abuse at Columbia University. (1999). *No safe haven: Children of substance-abusing parents*. New York: CASA. Retrieved on March 11, 2008 from http://www.casacolumbia.org/Absolutenm/articlefiles/No_Safe_Haven_1_11_99.pdf
- Office of Applied Studies. (2006). *Facilities offering special programs or groups for women: 2005*. Retrieved March 11, 2008, from <http://www.oas.samhsa.gov/2k6/womenTx/womenTX.htm>
- Undersma, S., Simpson, S., Brestan, E., & Ward, M. (2000). Prenatal drug exposure and social policy: The search for an appropriate response. *Child Maltreatment*, 5(2), 93-108.
- Personal Responsibility and Work Opportunity Reconciliation Act. (1996). Public Law No: 104-193.
- Phibbs, C., Bateman, D., & Schwartz, R. (1991). The neonatal costs of maternal cocaine use. *JAMA*, 266, 1521-1526.
- Pollack, H. A., & Reuter, P. (2006). Welfare receipt and substance-abuse treatment among low-income mothers: The impact of welfare reform. *American Journal of Public Health*, 96(11), 2024-2031.
- Price, A. & Simmel, C. (2002). *Partners' influence on women's addiction and recovery: The connection between substance abuse, trauma and intimate relationships*. Berkeley, CA: National Abandoned Infants Assistance Resource Center.
- Pursley-Crotteau, S. (2001). Perinatal crack users becoming temperate: The social psychological processes. *Health Care for Women International*, 22, 49-66.
- Rowe, C., & Liddle, H. (2003). Substance Abuse. *Journal of Marriage and Family Therapy*, 29(1), 97-120.
- Schuler, M., Nair, P., & Kettinger, L. (2003). Drug-exposed infants and developmental outcome: Effects of a home intervention and ongoing maternal drug use. *Archive of Pediatric and Adolescent Medicine*, 157, 133-138.
- Scott-Lennox, J., Rose, R., Bohlrig, A., & Lennox, R. (2000). The impact of women's family status on completion of substance abuse treatment. *Journal of Behavioral Health Services and Research*, 27(4), 366-379.
- Seifer, R., LaGasse, L. L., Lester, B., Bauer, C. R., Shankaran, S., Bada, H. S., et al. (2004). Attachment status in children prenatally exposed to cocaine and other substances. *Child Development*, 75(3), 850-868.
- Semidei, J., Radel, L., & Nolan, C. (2001). Substance abuse and child welfare: Clear linkages and promising responses. *Child Welfare*, 80(2), 109-128.
- Singer, L., Arendt, R., Minnes, S., Farkas, K., Salvator, A., Kirchner, L., et al. (2002). Cognitive and motor outcomes of cocaine-exposed infants. *JAMA*, 287, 1952-1960.
- Smith, L. M., LaGasse, L. L., Derauf, C., Grant, P., Shah, R., Arria, A., et al. (2006). The infant development, environment, and lifestyle study: Effects of prenatal methamphetamine exposure, polydrug exposure, and poverty on intrauterine growth. *Pediatrics*, 118(3), 1149-1156.
- Smith, D. K., Johnson, A. B., Pears, K. C., Fisher, P. A., DeGarmo, D. S. (2007). Child Maltreatment and Foster Care: Unpacking the Effects of Prenatal and Postnatal Parental Substance Use. *Child Maltreatment*, 12(2), 150-160.



A Service of the
Children's Bureau

- Substance Abuse and Mental Health Services Administration. (2004). *Women with co-occurring serious mental illness and a substance use disorder*. Retrieved March 11, 2008, from <http://oas.samhsa.gov/2k4/femDual/femDual.htm>
- Substance Abuse and Mental Health Services Administration. (2005). *Substance use during pregnancy: 2002 and 2003 update*. Retrieved on March 11, 2008 from <http://oas.samhsa.gov/2k5/pregnancy/pregnancy.htm>
- Substance Abuse and Mental Health Services Administration. (2006). *Results from the 2005 National Survey on Drug Use and Health: National findings*. Office of Applied Studies, NSDUH Series H-30, DHHS Publication No. SMA 06-4194. Rockville, MD.
- Substance Abuse and Mental Health Services Administration. (2007a). *Results from the 2006 National Survey on Drug Use and Health: National findings*. Retrieved on March 11, 2008 from <http://www.oas.samhsa.gov/nsduh/2k6nsduh/2k6ResulKts.cfm#TOC>
- Substance Abuse and Mental Health Services Administration. (2007b). *Substance Use Treatment among Women of Childbearing Age*. Retrieved on March 11, 2008 from <http://oas.samhsa.gov/2k7/womenTX/womenTX.cfm>
- Svikis, D., Golden, A., Huggins, G., Pickens, R., McCaul, M., Velez, M., et al. (1997). Cost effectiveness of treatment for drug-abusing pregnant women. *Drug and Alcohol Dependence*, 45, 105-113.
- Treatment Episode Data Set (TEDS). Online analysis using TEDS 2003 public use file, available through the Substance Abuse and Mental Health Data Archive. Analysis conducted August 2005.
- Tronick, E. Z., Messinger, D. S., Weinberg, M. K., Lester, B. M., Lagasse, L., Seifer, R., et al. (2005). Cocaine exposure is associated with subtle compromises of infants' and mothers' social-emotional behavior and dyadic features of their interaction in the face-to-face still-face paradigm. *Developmental Psychology*, 41(5), 711-722.
- U.S. Department of Health and Human Services. (2001). *1998 National estimates of the number of boarder babies, abandoned infants and discarded infants*. Washington D.C.: U.S. Government Printing Office.
- Uziel-Miller, N. D., & Lyons, J. S. (2000). Specialized substance abuse treatment for women and their children: An analysis of program design. *Journal of Substance Abuse Treatment*, 19(4), 355-367.
- Uziel-Miller, N., & Dresner, N. (2003). Addressing substance abuse in obstetrics and gynecology. *Primary Care Update for OB/GYNS*, 9(3), 98-104.
- Weibley, S. (2002). States implement "safe surrender" laws for people who give up their babies. *SIECUS Report*, 30(3), 13-15.
- Weisdorf, T., Parran, T., Graham, A., & Snyder, C. (1999). Comparison of pregnancy-specific interventions to a traditional treatment program for cocaine-addicted pregnant women. *Journal of Substance Abuse Treatment*, 16(1), 39-45.
- Whitaker, R. C., Orzol, S. M., & Kahn, R. S. (2006). Maternal mental health, substance use, and domestic violence in the year after delivery and subsequent behavior problems in children at age 3 years. *Archives of General Psychiatry*, 63(5), 551-560.
- Wright, A., & Walker, J. (2001). Drugs of abuse in pregnancy. *Best Practice and Research in Clinical Obstetrics and Gynecology*, 15(6), 987-998.
- Yali, A., & Lobel, M. (2002). Stress-resistance resources and coping in pregnancy. *Anxiety, Stress and Coping*, 15(3), 289-309.

The publication of this fact sheet was made possible by grant #90-CB-0126 from the Children's Bureau, Administration on Children, Youth and Families, Administration for Children and Families, U.S. Department of Health and Human Services. The contents are solely the responsibility of the authors and do not represent the official views or policies of the funding agency. Publication does not in any way constitute an endorsement by the Department of Health and Human Services. Readers are encouraged to copy and share this material, but please credit the National AIA Resource Center.