Effects of Alcohol and Other Drugs on Children
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Abstract: Children are affected by alcohol and other drug use along three primary paths: in utero through the mother's use, environmentally through both family and community influences, and through their own use. Children who are prenatally exposed are at risk both through physiological insults and through caregiving deficits in their immediate family. The number of cases of Fetal Alcohol Syndrome (FAS) in the western world has been estimated at 0.33 cases per 1,000 live births; 200 babies are born with FAS per year in California. The National Institute on Drug Abuse (NIDA) estimates that 7.62 million babies (18.6%) were exposed to alcohol during gestation. Current prevalence estimates show about 28.6 million children of alcoholics in the United States, while in California it is estimated that about 17.6% of children lived with a parent who used illegal substances during the past year. Although all the prenatal effects of alcohol are not known, it is clear that there is no safe amount of alcohol to be consumed during pregnancy. There is little consensus, however, on long-term effects from in utero exposure alone because of the influence of adverse environmental factors; prenatal exposure is usually not the final influence, but is reinforced by years of neglect, deprivation, negative behavioral models, and other adverse conditions. And although society places most emphasis upon the negative effects of illicit substances, use of alcohol is strongly associated with crime and family violence. The consequences of use of alcohol and tobacco are more costly to society in terms of health care, accidents, days of work lost, and other social costs.

Keywords: alcohol, child abuse, child neglect, children, drugs, parents

As demonstrated in the prevalence statistics in the introductory article to this theme issue, there is a wide continuum of use, abuse, and dependence upon alcohol and other drugs among the American adult population. Not all parents who use alcohol and other drugs meet established criteria as an alcohol and other drug abuser, nor are they necessarily alcohol- and other drug-dependent. Certainly not all parents who use alcohol and other drugs abuse or neglect their children. In fact, the prevalence rates of alcohol use would suggest that the vast majority of parents who use alcohol do so without violating the social norms of providing for the health and safety of their children. One might view the effects on children of parental substance use, abuse, and dependence along a similar continuum. This continuum would suggest that effects range from a child experiencing no adverse consequences resulting from his/her parent's use to the most severe effect, resulting in a child's death. However, this is clearly not a linear relationship, and, in fact, a causal relationship between substance use and child abuse and/or neglect has not been established. The majority of children who grow up in alcohol- and other drug-using families will have no profound long-term developmental or emotional sequelae. At the same time, it is important to note that recent trends in child protective services do indicate that alcohol and other drug use plays a role in the majority of child protection cases, which still affects only a small, but significant minority of alcohol- and other drug-using families.

Although children raised in families in which one or both parents abuse alcohol and other drugs have increased risks for deleterious effects, children who have been prenatally exposed to alcohol and other drugs represent a special category of "high-risk" children (i.e., children with a greater probability of maladaptive development). An ecological perspective of child development asserts that the interplay of both biology and environment are key influences on the child's ability to adapt and mature. That is, the child develops as a result of
both nature (innate characteristics) and nurture (the way society treats the child) (Garbarino 1990). Sameroff and Fiese (1990) have conceptualized child development as the product of continuous dynamic interactions of the child and her/his social environment. They suggest that child and environmental inputs, and their interactions, should be equally emphasized in outcome assessments.

The impact of psychoactive substances—legal and illegal—on children can be assessed along three primary paths: in utero, environmental (both family and community influences), and their own personal consumption. In consideration of these multiple inputs, the model shown in Figure 1 depicts the ways in which children can be exposed to substances. This model of the three perspectives can also be used to view policy orientations toward drug use; traditionally, policies and programs have been focused on the right side of this model personal use of substances by adolescents. By the late 1980s, with the increased concern ensuing from the numerous media stories about "crack babies," increased attention was being directed toward in utero exposure. The middle section of this model, however family and community influences' has been largely ignored in the major social policies designed to address the effects of substance exposure on children.

In Los Angeles County, for example, from August 1992 through July 1993 there was an average of 243 referrals (3.5% of all reports) to the Department of Children's Services for prenatal drug exposure (Los Angeles County Department of Children's Services 1993). However, there were another 3,800 to 5,200 children who came from alcohol- and other drug-abusing families whose cases were accepted for investigation (this total is derived from the Ramirez and Sosa estimate that 60% to 80% of the Department's cases are from families with AOD-related problems, see Ramirez & Sosa 1991); these were 56% to 76% of the total number of cases (Los Angeles County Department of Children's Services 1993). Yet, no specialized programming or policy targets this dramatically larger number of children who are entering the child welfare system from alcohol- and other drug-impacted families. Indeed, policies that focus only on prenatal drug exposure address only a fraction of the number of children who are affected by substance abuse.

Children who have been prenatally exposed to alcohol and other drugs may experience risk factors in both physiological insults that affect the individual child and caregiving deficits in the immediate family, which may also affect the child's development. Among immediate problems for newborns are complications resulting from prematurity and/or low birth weight, neurobehavioral deficits, withdrawal symptoms in children exposed to heroin and methadone, and physical abnormalities associated with vascular constriction resulting from drug use (Feig 1990).

Postnatal risk factors for prenatally exposed children include a parent who may still be involved in a chaotic lifestyle of alcohol- and other drug-seeking behavior, and a lack of adult interpersonal support systems for the parents (Howard 1994; Feig 1990). Bradley and colleagues (1989) suggest that these environmental factors are both status and process variables. Status variables are those that affect a whole class of families (e.g., socioeconomic status) and have an indirect influence in the child's life. Process variables are those that affect a child more directly and include the child's interactions with its primary caregiver. The process variables seem to influence the child's development more than do the status variables. Although the majority of children whose families are investigated for child abuse and/or neglect are not removed from their homes (Barth 1994), when those postnatal factors become so severe that children must be removed from their families, they may also be subjected to various risk factors associated with multiple out-of-home placements or inconsistent caregiving environments. It should also be noted that a substantial portion of removed children who have been placed with relatives are still potentially involved in environments that may also be negatively affected by
alcohol and other drugs. Relatives as caregivers for prenatally exposed children are of concern because many experts have noted that the postnatal environment, including the quality of the home environment, is the key predictor of the child's long-term wellbeing (Massinga 1994).

**PREVALENCE OF THE PROBLEM**

To understand the significance of the many risk factors, the following section highlights the estimated number of children who are exposed to alcohol and other drugs along the various paths in utero, familial and community use, and personal use. Some of these data are available only at the national level, but California-specific data will be presented when possible.

Prevalence of Children Prenatally Exposed to Alcohol

The Center for Disease Control estimated one to three cases of Fetal Alcohol Syndrome (FAS) occurred per 1,000 births. Based on that estimate, approximately 3,600 to 10,000 children are born with FAS in the United States each year (Abel & Sokol 1987). Abel and Sokol (1991) have more recently revised the previous estimate based on prospective data. They estimate that the overall rate of FAS in the western world is 0.33 cases per 1,000 live births. Based on the number of births in California and extrapolating from this prevalence estimate, there are around 200 babies born with FAS in California each year.

In addition to cases of the full FAS syndrome, there are three to five children per 1,000 births who will exhibit less severe effects termed alcohol-related birth defects (ARBD) (Abel & Sokol 1987). This estimate translates to an additional 10,000 to 18,000 American children who suffer ARBDs. Finally, a recent report indicates that there are more subtle central nervous system (CNS) effects with a variety of behavioral and developmental outcomes for the children (Streissguth, Barr & Sampson 1990). However, estimates of the number of children displaying CNS problems due to alcohol exposure are not available. Based on the recent National Pregnancy and Health Survey conducted by the National Institute on Drug Abuse (NIDA), an estimated 7.62 million of infants (18.6%) were exposed to alcohol during gestation. White women used alcohol at the highest rate (22.7%) compared with 19.8% of African-American women and 8.7% of Hispanic women (National Institute on Drug Abuse 1994).

Prevalence of Children Prenatally Exposed to Illicit Drugs

Similar to alcohol-exposed children, there is a subgroup of children living in environments influenced by illegal drug use who have been prenatally exposed. National estimates of the number of prenatally exposed children are not available at this time. Based on the number of women with children under the age of one who admitted to use of drugs in the past year in the National Household Survey of Drug Use data from 1990, 4.5% of children were exposed to cocaine, 17.4% exposed to marijuana, and 37.6% were exposed to tobacco (National Institute on Drug Abuse 1991).

Data presented in this monograph show that in 1992, approximately 69,000 children in California were prenatally exposed to alcohol and other drugs in the days and hours just prior to their birth (see the article by Amanda Noble in this issue). Approximately 42,000 babies were exposed to alcohol, 31,000 infants were exposed to other drugs, and 53,000 children were exposed to nicotine as a consequence of prenatal tobacco use (Vega et al. 1993). These data may underestimate the actual prevalence of alcohol and other drug exposure because there are many limitations to detecting prenatal exposure from a single toxicology screen. Most drugs are undetectable by urinalysis within 48 to 72 hours of use; therefore, drug use more than 72 hours prior to birth may not be detected in the infant. A mother may have used alcohol or other drugs
through out her pregnancy, but a positive toxicology screen may not result unless she had drunk or used drugs within the few hours or days necessary for detection. Prenatal exposure can also be identified in meconium and hair, but these tests have not yet been used for a population-based estimate. Prenatal drug exposure will affect many more children than are currently being identified by toxicology screens. Clearly, the numbers would be much larger if it were possible to screen for periodic levels of drug exposure during pregnancy.

**Prevalence of Children Using Alcohol and Other Drugs**

California is fortunate in having excellent data on the number of adolescents who use alcohol and other drugs. Biennial surveys of substance use by children in grades seven, nine, and 11 have been supported by the Crime and Prevention Center of the Office of the Attorney General and recently, co-sponsored by the Department of Alcohol and Drug Programs. These surveys have been conducted by Skager and Austin through the Southwest Regional Laboratory. The most recent school year for which data are available (1993/94) showed disturbing evidence of an upswing in the use of any illicit drugs, including marijuana, inhalants, amphetamines, and LSD. Although cocaine use did not have a consistent trend across grade levels, it did not appear to show the rebound effect found with the other illicit drugs. Alcohol use remained unchanged from previous years and remains the most popular drug for teens (Skager & Austin 1994). These results are shown in Figure 2.

There are some gender differences in the use of alcohol and marijuana for California teens, particularly for seventh graders: boys reported significantly higher rates of use of alcohol, tobacco, and marijuana in the six months prior to the survey (see Table 1). There are also significantly higher rates of use in the 30 days prior to the survey for seventh graders. By eleventh grade, however, the gender differences disappear except for alcohol use, with a higher percentage of boys reporting use of tobacco and marijuana. There were no significant differences between boys and girls in their use of methamphetamines or other drugs that are not listed in this table. Table 1 (Skager & Austin 1994) shows the differences in percentages reporting alcohol and other drug use by gender and significance levels for each of the three grade levels.

In addition, surveys of children who are not in school have been conducted and show much higher rates of alcohol and other drug use. For example, almost 64% of out-of-school 15-to-17-year-old youths reported using marijuana or hashish, 25% reported using cocaine, and 21% used inhalants (Austin, Horowitz & Skager 1993).

**Environmental Exposure to Alcohol and Other Drugs**

Environmental alcohol and drug exposure can result from familial use (Kumpfer & DeMarsh 1986) and from neighborhood and community influences (Ards & Mincy 1994; Smith 1990). Being raised by a substance-using caregiver is a form of environmental exposure. Research on adult children of alcoholics indicates that parental alcoholism may result in psychosocial and behavioral consequences for the children (Baumrind 1985; Russell, Henderson & Blume 1985; Ackerman 1983; Black 1982; Fine et al. 1976). At present, similar research delineating characteristics in adulthood of children raised in an illicit drug-abusing family is not available.

Children of alcoholics. Estimates of the number of children of alcoholics (COAs) in the United States are based on an extrapolation from national survey data of problem drinking and census data on the proportion of children to adults (Booz-Allen & Hamilton 1974; Clark & Midanik 1982). There are several limitations to these data, which may tend to an underestimate of the incidence rate: the exclusion of certain subpopulations; variable reliability of
self-reports of problem drinking levels; the assumption of random occurrence of alcoholism in the general population; and the assumption that ratios of children in alcoholic families are consistent with those in the general population. Given these limitations, the best estimate of prevalence is that there are approximately 28.6 million children of alcoholics in the United States, of whom 13% to 25% are likely to become alcoholic. Further, 6.6 million COAs are under the age of 18 (Russell, Henderson & Blume 1985). Although an estimate of the number of California children who are COAs is not available, at least one out of eight American children live in California, which translates to approximately 3.575 million COAs of which 825,000 are under the age of 18. Although a diagnosis of alcoholism cannot be made from the National Household Survey data, recent analyses show that daily or almost daily alcohol use is reported by 4% of mothers and 14% of fathers. Similarly, binge drinking (consuming five or more drinks at one time) at least three times in the past 30 days is reported by 5.2 million parents (4% of mothers and 13.4% of fathers.)

Children of illicit substance users. A second group of children, which to some extent overlaps with the number of COAs cited above, are children of illicit substance users. Until recently, attempts to estimate the number of children living in drug-using families have been based on site-specific samples that cannot be generalized to wider populations (Deren 1986). In 1982, Cuskey and Wathey based an estimate on data extrapolations and proposed that there were at least 234,000 children of heroin addicts during the mid-1970s in the United States. A secondary analysis of the 1991 National Household Survey of Drug Use estimated the number of children living in the households of illicit drug users and the number of biological children of drug users in the nation. It was found that there were 12.884 million children (18.6%) living in the households of adults who had used an illegal substance in the past twelve months and 6.244 million children (9.0%) living with a parent who had used an illegal substance in the past thirty days. There were 12.880 million (18.8%) biological children of past-year users and 6.299 million (9.2%) biological children of past-month users (US Department of Health and Human Services 1994).

Despite higher prevalence rates of drug use in California than in the nation as a whole, there is only a small difference in the percentage of children who are living with illicit drug-using parents in California compared to the nation. Ebener, McCaffrey & Saner (1994) conducted a secondary analysis of the California-specific population surveyed in the 1991 National Household Survey and used similar methods to determine the number of children of substance users in California. They found that 17.6% of California children (1.407 million) are living with a parent who used an illicit substance in the past year, compared to 18.5% nationally. The rate for the 736,000 children in California living with a parent who used illicit drugs in the prior 30 days is very similar to the national figure.

Table 2 shows that while the overall number of children of AOD-abusing teenagers in California is quite small (18,000, representing only 1.3% of all children of substance users) the prevalence rate of past-year parental substance use is 47% for children with a teenage parent (Ebener, McCaffrey & Saner 1994)

Community influences. Environmental exposure in the neighborhood or community may be evident in all socioeconomic levels; for example, through community acceptance of media depiction of alcohol use as a cultural norm, middle-class use of cocaine in the early 1980s, wide spread teenage drinking, or athletic events sponsored by the alcohol industry. However, the children in neighborhoods and communities that are most adversely affected by use of alcohol and other drugs may be those same children who are also most adversely affected by poverty, violence, and other social problems (Smith 1990). For example, recent evidence from Los Angeles County demonstrated that the density of alcohol outlets was strongly correlated with increased incidents of assaultive violence (Scribner, MacKinnon & Dwyer 1995). We know very little about the consequences
for children who are exposed to the combination of in utero and environmental alcohol exposure. But we know even less about those children affected by the combination of in utero and environmental exposure to both alcohol use and illegal drug use.

To summarize, the prevalence of alcohol and other drug exposure along the various pathways shows that far more children are exposed to the effects of alcohol and other drugs through their families and by their own personal use of substances than are detected as having been prenatally exposed. It is critically important to appraise the effects of these other influences when assessing the long-term developmental outcomes for children who have been prenatally exposed to alcohol and other drugs.

EFFECTS ON CHILDREN FROM PRENATAL EXPOSURE TO ALCOHOL AND OTHER DRUGS

Despite recent trends that indicate a predominance of polydrug use including alcohol use (Grant & Harford 1990; Little et al. 1990), there is little longitudinal information on the interactive effects of prenatal polydrug exposure. The scientific literature on developmental outcomes for prenatally exposed children tends to be segregated by the type of substance to which the child has been exposed and the ages of the children in the study sample. Consequences to children of maternal drug use can generally be categorized as congenital abnormalities, cerebrovascular effects, impaired growth, or behavioral problems (National Institute of Child Health and Human Development 1993). This review will present information from studies of the effects on newborns and infants, as well as from studies that report effects in older children. Although various studies assessing infants and young children have produced conflicting findings, research on long-term outcomes for children exposed to specific substances generally reveals that many of the children will display some type of detrimental consequence. However, it is less clear how much of the long-term consequence can be attributed to the prenatal exposure and/or lack of prenatal care, or to the postnatal caregiving environment.

The conflicting findings related to prenatal effects of specific substances can be explained, in part, by the methodological issues in studying children who were prenatally exposed to alcohol and other drugs (Behnke & Eyler 1993). Assessing the effects of in utero alcohol and other drug exposure is often limited by difficulties in specifying and measuring the various dosage levels of alcohol and drugs consumed by the mother (Chasnoff 1991; Zuckerman 1991c). Examinations of prenatal exposure are further complicated by differences in chemical properties of the substances, in teratogenic potential, and in the timing of fetal development (Laengreid et al. 1989; Silverman 1989; Streissguth 1989; Bingol et al. 1987; Chasnoff et al. 1983; Abel 1980; Wilson, Desmond & Verniaud 1973).

Zuckerman (1991b) warns that there are several criteria that must be met in order to draw firm conclusions regarding the effect of a particular substance on an infant. These criteria are: consistency in the findings across studies, biological plausibility (i.e., effects which are consistent with the known action of the substance), and a dose-response relationship defined as an increase in the amount of exposure resulting in more negative outcomes. So far, research has not conclusively demonstrated that any drug other than alcohol causes congenital abnormalities (National Institute of Child Health and Human Development 1993). Despite this evidence of harm associated with alcohol use during pregnancy, the ratio of cocaine use to alcohol use among women of childbearing age is 1:15 for every woman using cocaine, 15 are using alcohol (Day & Richardson 1994).

In Utero Exposure to Alcohol
The first reporting of alcoholic mothers with babies who had a distinctive, unusual appearance was made almost a quarter of a century ago in France (Lemoine et al. 1968). Alcohol was later recognized as a teratogenic agent, and the Fetal Alcohol Syndrome (FAS) was named by a group of researchers at the University of Washington in 1973 (Jones & Smith 1973). The Washington researchers reported a constellation of physical abnormalities found in the offspring of heavy-drinking alcoholic women. Since the first reports of FAS in the medical literature, a great deal has been learned about the outcomes for children with FAS.

FAS is characterized as the most severe consequence of in utero exposure to alcohol. In addition to the well-known facial characteristics, the anomalies are accompanied by growth deficiencies and dysfunction of the CNS (Streissguth 1986). The three characteristics that must all be present for the diagnosis of the full Fetal Alcohol Syndrome to be made are prenatal or postnatal growth retardation, CNS involvement, and characteristic facial dysmorphology (Rosett 1980). Facial dysmorphology includes microcephaly (head circumference below the third percentile), micro-ophthalmia and/or short palpebral fissures (small eye openings), poorly developed philtrum (no distinct crease above the upper lip), a thin upper lip, and a flattening of the midface (Rosett 1980).

Children with FAS exhibit a range of CNS effects including mental retardation (Streissguth 1986), hyperactivity and attention deficits (Shaywitz, Cohen & Shaywitz 1980), poor impulse control, perceptual/motor problems (Streissguth 1986), expressive language delays (Streissguth 1989; Iosub et al. 1981), listening skill problems (Russell, Cowan & Crernecki 1987) and delayed motor development (Streissguth 1989). It has also been reported that children with FAS tend to have problems with higher-order thinking skills such as making generalizations and abstract thought. They also tend to have poor problem-solving skills, poor social adaptation, and problems with attention and memory (Streissguth 1989, 1986).

Three factors have been offered as possible explanations to account for differential outcomes for children: impaired placental/fetal blood flow, hormone imbalances, and the direct effects of alcohol on cellular processes during the prenatal period (Schenker et al. 1990). Despite not knowing the mechanism that causes the syndrome, it is now accepted that alcohol effects are specifically related to dose (how much alcohol is consumed) and gestational time. That is, alcohol may affect different tissues during cell development in different manners, which results in a broad spectrum of outcomes based on alcohol dose and the timing of fetal development. As yet, a safe consumption level or safe prenatal period of alcohol exposure has not been established (Schenker et al. 1990).

These differences in dose and timing of exposure may be factors in explaining differential outcomes for children who are affected by prenatal alcohol exposure but do not meet the criteria for full FAS. Recent research has documented deleterious outcomes for children prenatally exposed to doses of alcohol by mothers who would not have been diagnosed as alcohol-dependent. Streissguth, Barr, and Sampson (1990) report that learning problems and decreased IQ scores were evidenced in children who were prenatally exposed to alcohol at moderate drinking levels. They found that children prenatally exposed to levels of alcohol consumption within the parameters of social drinking (defined as an average consumption of less than two drinks per day of wine, beer, liquor, or combination) displayed significant deleterious learning and behavioral effects. However, the most consistent predictor of neurobehavioral effects was not overall drinking level, but maternal binge drinking, that is, having drunk five or more alcoholic drinks on one occasion during the specified pregnancy period. In addition, drinking prior to recognition of pregnancy, rather than after pregnancy was known, was more strongly associated with
neurobehavioral effects of perceptual-motor and memory/attention outcomes in children. The authors suggested that these findings are consistent with their previous reports which indicated that a critical gestational period for susceptibility to alcohol-related negative birth outcomes is in the first trimester of pregnancy. More recent reports from this longitudinal prospective study suggest that adolescents who were prenatally exposed to alcohol score lower on standardized tests for reading and arithmetic (Streissguth, Barr et al. 1994) and have deficits in attention and short-term memory (Streissguth, Sampson et al. 1994).

In contrast, Greene and colleagues (1991), in a sample of mothers and infants in the Cleveland area, did not find a significant relationship between a relatively heavy level of prenatal alcohol exposure and cognitive measures for children in the preschool years unless there was a diagnosis of the full Fetal Alcohol Syndrome. They suggest that their findings, which conflict with the Streissguth group's Seattle study, may be explained by: differences in test setting (the Seattle sample was tested in project offices and the Cleveland study was conducted in the home); a smaller sample size in the Cleveland study; the cutoff dosage amount of the alcohol consumed; and confounding variables associated with the inventory scale. Their study, however, suggests that maternal alcohol use has a small effect or is limited to the small number of children who are seriously affected by Fetal Alcohol Syndrome.

Other studies have documented behavioral problems and attention deficits in children prenatally exposed to alcohol. For example, a study that compared three groups of children FAS and alcohol affected, those with attention deficit disorder (ADD) diagnoses, and a normal control group found that the alcohol-affected children had significantly lower overall IQ levels than the other two groups. However, their attentional deficits and behavioral problems were similar to children with ADD diagnoses (Nanson & Hiscock 1990).

In a prospective study based in Pittsburgh, Day and colleagues (1991) found that three-year-old children who were prenatally exposed to alcohol were smaller in weight, length, and head circumference than the control group. The diminished growth findings were consistent even after controlling for nutritional and environmental factors.

Although the term 'fetal alcohol effects' (FAE) has been used to describe a second population of children who do not display the full FAS syndrome, Sokol and Clarren (1989) recommended that the more appropriate term is "alcohol-related birth defects" (ARBD). Their reasoning is based on the ambiguous definition of FAE. Some researchers and clinicians have attempted to define FAE as a "less severe form of FAS." However, Sokol and Clarren report that although researchers in the Fetal Alcohol Study Group of the Research Society on Alcoholism have held protracted discussions in attempting to accurately define FAE, they have not been successful in reaching agreement on an acceptable way to use the term. Therefore, they suggest ARBD to connote observed anatomic or functional outcomes in the offspring that are related to maternal alcohol consumption in the in utero period.

As illustrated by the conflicting findings of these studies, we have not reached consensus on the full panoply of effects of prenatal alcohol exposure, in absence of diagnosis of full FAS. It is clear, however, that there is no safe limit of alcohol to be consumed during pregnancy (Behnke & Eyler 1993; Streissguth 1990).

In Utero Exposure to Opioids

As with prenatal alcohol exposure, children prenatally exposed to heroin and methadone have been studied and followed since the mid-1970s. However, the studies are limited by conceptual and methodological issues that complicate comparisons across samples and have led to differing opinions about outcomes for the child. The early work of researchers was focused on describing the neonatal
withdrawal syndrome, understanding dose responses, and managing the infant during withdrawal.

The neonatal withdrawal syndrome generally produces symptoms within 72 hours of birth. In some cases, however, the baby is not symptomatic until a few weeks after birth. The length and timing of withdrawal symptoms is determined by type of drug, the amount used, how long before labor the mother used drugs, the character of the labor including the use of anesthetics, the infant's nutritional state, and other health conditions which may affect the infant (Finnegan 1982). Duration of immediate withdrawal symptoms can extend to eight weeks and irritability can be present for several months.

Neonatal withdrawal syndrome symptoms in the newborn include restlessness, tremulousness, disturbed sleep and feeding, vomiting, diarrhea, a high-pitched cry, fever, and stuffy nose (Cook, Peterson, & Moore 1990). In addition, complications due to premature births and other health factors frequently affect babies who have been exposed to heroin. These complications include intrauterine growth retardation, hyaline membrane disease, brain hemorrhages, respiratory distress syndrome, and HIV infection. Approximately 60% to 90% of opioid-exposed infants require special handling and medical intervention treatments (Cook, Peterson, & Moore 1990).

In studies of children exposed to heroin and methadone, several researchers compared the newborn characteristics of children born to heroin-addicted, methadone-maintained, and comparison group children (Finnegan 1976; Stimmel & Adamsons 1976; Stimmel et al. 1982/83). These reports indicate that infants exposed to heroin and methadone both experience withdrawal symptoms. However, women who are carefully maintained on methadone are more likely to receive prenatal care, which is recognized as a significant factor in neonatal outcomes. At present, the preferred treatment protocol for heroin-addicted pregnant women who are unlikely to discontinue heroin use during pregnancy is managed methadone maintenance.

Kaltenbach and Finnegan (1984) reviewed five longitudinal studies of children up to the age of two who were born to methadone-maintained women. The studies revealed no long-term developmental sequelae that are directly associated with methadone exposure. In the longitudinal studies of children up to the age of four, no differences in cognitive performance between methadone-exposed children and the comparison groups were revealed, but both groups' scores were in the low range. The authors suggest that a main effects model, predominantly used in the comparisons, may be inappropriate to determine developmental outcomes for the children. They propose that confounding variables, including infant characteristics and the caretaking environment, either attenuate or potentiate developmental status and that refined data collection taking those environmental factors into account needs to be done.

Early studies by Wilson and colleagues (1979) reported on school-age children who had been prenatally exposed to opioids and found that there were important environmental issues that may have affected the children's long-term outcomes. In particular, there were frequent reports of children having been removed from their mothers' custody. In a population of children prenatally exposed to both heroin and methadone, a follow-up study of children up to the age of ten revealed that only 25% of the children were physically, mentally, and behaviorally normal. Approximately 56% were reported to show signs of hyperactivity, lack of concentration, aggressiveness and lack of social inhibition. However, the average number of shifts in family caregivers was six, with an upper range of 30. Forty-three percent of the children had been removed from their parents; the average number of out-of-home placements was five, with an upper range of 11. Again, these environmental conditions are contributing factors in the children's outcome status (Olofsson et al. 1983).

Although research findings have not been consistent across study samples, according to Householder and colleagues (1982) there is ample evidence that
children born to opioid-addicted mothers display significant perinatal medical problems, impaired ability to regulate their state control behavior and interactions with caregivers, and delays in development. In addition, long-term studies have shown disturbances in activity levels, attention span, sleep patterns, and socialization. Wilson (1992), however, states that in her review of the studies of heroin-exposed children, the long-term detrimental consequences were associated with the lifestyle of the mother. She concluded that the heroin use in itself was not associated with major developmental disability or specific behavioral problems; rather, the biological and environmental factors associated with use appeared to affect the child's behavior and cognition. However, she also concluded that there is sufficient evidence that heroin use is linked to subtle central nervous system effects on motor coordination and test scores of high activity inattention.

In Utero Exposure to Cocaine

Comparatively little research had been conducted on the effects of cocaine on children of users until the crack cocaine epidemic of the mid-1980s, which led to a number of studies on its effect on newborns. One factor that may explain the attention that has been focused on cocaine exposure is that when cocaine is ingested by smoking its concentrated crack form, it can lead to premature labor. Medical advances in neonatal care of premature infants have come with enormous costs attendant on care for children born prematurely due to prenatal crack use. The illegal status of cocaine and its increased stigmatization are other factors leading to the national attention paid to children prenatally exposed to crack.

Neonatal outcomes for children exposed to cocaine have been documented by a variety of researchers, but of ten with conflicting findings. Chasnoff (1990) has suggested a model of pathways of infants' cocaine exposure that defines both direct and indirect effects. A fetus is affected directly by the cocaine itself and indirectly by a decrease in the mother's blood flow resulting from the cocaine use. In addition, cocaine-exposed children may also be affected by confounding variables, such as other substances that the mother may use, and environmental risk factors, such as the nutritional and health status of the mother. Zuckerman (1991a) suggests that the cumulative effects of use of multiple substances and other environmental risk factors have significant adverse effects on the newborn, perhaps more so than cocaine use in and of itself.

Direct effects of cocaine result from its action upon the brain's neurotransmitters. Since the neurotransmitters that are altered by cocaine are important in neurophysiological development, the direct exposure may affect brain development and subsequent child behavior and developmental status. In addition, cocaine's action as a vasoconstrictor is seen as an indirect effect of cocaine use; this constriction of blood vessels reduces the blood supply both from the mother to the fetus, and within the fetus to the developing infant's brain (Behnke & Eyler 1993; Zuckerman 1991b). The constricted blood flow may result in intra-uterine growth retardation (IUGR), microcephaly (small head circumference), and brain hemorrhages and cysts. Brain hemorrhages and cysts have been reported in at least one study of cocaine-exposed newborns (Dixon & Bejar 1989). However, brain hemorrhages and cysts are also evident in preterm infants and very low-birth-weight babies who have not been prenatally exposed to cocaine (Zuckerman 1991a).

At this time, research suggests that there is an association between prenatal cocaine exposure and impaired fetal growth and a smaller head size at birth. Zuckerman (1991a) reported that other long-term studies of effects from prenatal cocaine exposure have been inconsistent, have used small sample sizes, or reported anecdotal clinical impressions. He stated that there is not yet good scientific evidence to substantiate clinical reports of birth defects, preterm
birth, and neurobehavioral dysfunction. In addition, although there have been clinical reports of a higher incidence of sudden infant death syndrome (SIDS) in children prenatally exposed to cocaine, this has not been substantiated in the scientific literature (Bauchner & Zuckerman 1990).

A recent study by researchers at Emory University in Georgia (Coles et al. 1992) assessed 107 prenatally cocaine-exposed infants at two, 14, and 28 days old. The researchers controlled for other factors, either through design or statistically, such as prematurity, other medical problems, polydrug abuse, duration of exposure, timing of assessment, and examiner effects in evaluating the physical and behavioral effects of drugs on the neonates. The researchers found that cocaine had a negative impact on birth weight and head circumference, although other drugs (alcohol and nicotine) also affected growth. Infants did not have tremors, agitation, hyperactivity, hypertonicity, gastrointestinal problems, or other signs associated with narcotic withdrawal. Infant behavior was not obviously aberrant, although some effects could be noted statistically. These researchers concluded that in the absence of other medical complications, the prenatally cocaine-exposed infants' growth was affected, but they did not exhibit physical or behavioral impairment in the neonatal period. They suggested that infants who do exhibit effects from prenatal cocaine exposure be assessed for other complicating factors.

At this point in the development of research findings, it is inaccurate to refer to cocaine-addicted infants. Conclusions regarding a neonatal withdrawal syndrome, which would provide evidence of characteristics that meet the criteria of addiction, have not been documented or sufficiently researched to suggest that there are predictable withdrawal symptoms in children affected by cocaine (Zuckerman 1991a).

To document the long-term effects of cocaine exposure on children, several prospective studies are underway. Chasnoff and his colleagues at the Center for Perinatal Addiction in Chicago are following children who were prenatally exposed to cocaine and other drugs. Freier, Griffith, and Chasnoff (1991) stated that the characteristics of the child and mother, mother-infant interaction, family interaction, and the home environment are all important factors that must be addressed when intervening with children who were prenatally exposed.

In the Chicago group's follow-up on children at two years of age who were prenatally exposed, the researchers found that there were no significant differences between cocaine-exposed children, alcohol- and marijuana-exposed children, and a nonexposed group on Bayley scales of development. However, they suggested that the Bayley's global measure may not assess the over-stimulation and difficulty with self-regulation clinically observed with cocaine-exposed children (Chasnoff et al. 1992). In a study of children at three years of age, researchers found that cocaine exposure predicted poor verbal reasoning while marijuana exposure was related to poor abstract/visual reasoning. Caregivers rated the prenatally exposed children as more aggressive than the nonexposed comparison group (Griffith et al. 1994).

In Utero Exposure to Marijuana
Marijuana has a direct effect on the fetus through increased carbon monoxide levels in the mother and reduced oxygen passing into her bloodstream. In addition, since marijuana crosses the placenta, it may have a direct effect on the developing brain of the child. To date, however, this has not been reliably substantiated in the literature (Zuckerman 1991a). There are a few studies that report conflicting findings on infant size and gestational length as birth outcomes for children who were prenatally exposed to marijuana. Some studies have documented an association between prenatal marijuana exposure and decreased length of gestation (Fried, Watkinson & Willan 1984; Gibson, Baghurst & Colley 1983), while others have found no relationship (Day et al. 1991; Zuckerman et al. 1989; Hatch & Bracken 1986; Linn et al. 1983; Hingson et al.
1982). Similarly, conflicting findings have been reported on the relationship between prenatal marijuana exposure and intrauterine growth. While Hingson and colleagues (1982) and Zuckerman and colleagues (1989) reported decreased infant size, other researchers have found no relationship (Day et al. 1991; Fried & O'Connell 1987; Linn et al. 1983). In a review of studies of the effects of marijuana on children, Day and Richardson (1991) stated that the results of studies on the relationship between prenatal marijuana exposure and outcomes at birth are equivocal. They concluded that we do not know yet if marijuana use during pregnancy has an effect on intrauterine growth retardation.

Reports of long-term outcomes for children exposed to marijuana are relatively recent contributions to the literature. In a follow-up study of four-year-old children who were prenatally exposed to marijuana, cigarettes, and alcohol, Fried and Watkinson (1990) reported that children exposed to heavy marijuana use displayed significantly lower verbal skills and memory abilities. These findings were not present in earlier testing of the children and need to be replicated before being accepted as proof of a relationship. Day and Richardson (1991) stated that studies that have followed children longitudinally have not been conclusive in their findings on the effect of prenatal marijuana exposure and child development. Dalterio and Fried (1992) suggested in their review of the clinical studies that the conflicting results between neonatal observations and longer-term follow-up may indicate that the effects from marijuana are transitory or that the effects are subtle and may not be detected until demands for cognitive performance are made as the child progresses in his/her education.

In Utero Exposure to PCP and Amphetamines

In a study of children prenatally exposed to phencyclidine (PCP), the authors found 65% of the 55 children in the study had symptoms of neonatal narcotic withdrawal syndrome; evidence of temperament problems was found in 47%, and sleep problems in 14% of the babies. At one year old, 17% of the children showed abnormal attachment behavior (Wachsman et al. 1989).

A Stockholm-based prospective study of children prenatally exposed to amphetamines examined psychosocial factors that could be used as predictive indicators for adjustment in four-year-old children. They found an inverse correlation between the child's adjustment and the length of maternal alcohol and drug abuse during pregnancy, the number of paternal criminal convictions (regardless of the amount of contact between father and child), the number of stress factors of the mother, and the number of earlier children born to the mother (Billing et al. 1988).

In Utero Exposure to Nicotine via Tobacco Smoking

Exposure to nicotine is the most studied of the more than 2,000 substances contained in tobacco cigarettes. The two primary actions of cigarettes' effect are considered indirect. As with marijuana exposure, tobacco use increases carbon monoxide and decreases the placental blood flow to the infant. It has been well documented that tobacco smoking decreases birth weight by an average of 200 grams compared to the babies of nonsmokers, and that there is a dose-response effect the more a mother smokes, the larger the decrease in infant birth weight (Martin 1992).

There are many studies of older children who were prenatally exposed to nicotine. In a review of over 30 studies, Rush and Callahan (1989) stated that there is a regular and consistent pattern of lower IQ and cognitive ability, and lower verbal, reading, and mathematical skills associated with maternal smoking during pregnancy. Although other maternal, family, and environmental factors may affect these results, in studies that have controlled for these factors, nicotine/tobacco still has a significant effect on the child's outcome (Kronstadt 1991).
In Utero Polydrug Exposure

A descriptive study of the developmental status of children ages three to five who were prenatally exposed to multiple drugs and participated in an early-intervention preschool program for prenatally exposed children has been reported by Young, Wallace, and Garcia (1992). The children had been prenatally exposed to multiple substances including cocaine, marijuana, alcohol, heroin, nicotine, and PCP. They found that the two most frequently occurring developmental sequelae for the children in their study sample were significant developmental delays in fine motor skills in 81% of the children and expressive language delays in 62% of children. Significant delay was defined as a 25% discrepancy between the children's age and their developmental level. In addition, they stated that there was not a typical "profile" of children who were prenatally exposed; rather, each child displayed his/her own unique characteristics that may have resulted from prenatal exposure, as well as from environmental factors, such as the number of out-of-home placements of the child.

In the follow-up study of the children who had participated in this program, children were assessed at a mean age of 72 months using educational performance measures and a social and behavioral rating instrument. There were not significant differences between the prenatally exposed children and their classmates in any academic or social and behavioral domain. The pattern of scores was noteworthy, however; the prenatally exposed children's mean scores in all academic areas except handwriting and written composition were higher than those of their classmates. But the social and behavior mean scores for the study group of children were below those of their classmates in every domain except dependability. The author suggested that the prenatally exposed children (who had received intensive preschool intervention) were academically comparable to their classmates. Yet, the two areas in which their academic scores were marginally lower suggests a relationship with fine motor or visual-perceptual-motor factors (Young 1993).

This evidence suggests that the postnatal environment plays a key role in the child's long term developmental outcome. This information is the justification for intensive interventions for pregnant and parenting women so that they can effectively address their children's needs and a foundation for society to maximize the potential of these children.

EFFECTS ON CHILDREN FROM POSTNATAL EXPOSURE TO USE OF ALCOHOL AND OTHER DRUGS

Effects of Parental Substance Use on Children

There are few empirical studies of the effects of parental use of alcohol and other drugs on children. According to a review of the literature on children of alcoholics by Russell, Henderson, and Blume (1985), methodological issues, such as small sample sizes, vague definitions of parental alcoholism, and reliance on self-reported data, make interpreting the studies very difficult. Much of the available research on families of substance users has been generated in the prevention field. There is great interest in understanding family genetics and socialization characteristics to prevent substance abuse in adolescents and children. Most researchers agree that both genetics and socialization play a role in the transmission of alcoholism, although at this time, it is not understood what those roles are.

It has been established, however, that there are higher rates of alcoholism in family members of alcoholics, and a high correlation between parental substance use and adolescent use. For example, Goodwin (1985) has studied twins who were children of alcoholics and adopted into nonalcoholic homes. He estimated that an adopted child of an alcoholic is four to five times more likely to become alcoholic than children with nonalcoholic parents. Young
and West (1985) reviewed the literature on adolescent substance abuse and concluded that the family is the most significant factor in substance use and abuse. Family influences were correlated with alcohol abuse in 52% of the articles reviewed, in 46% of articles on marijuana use, in 80% of articles dealing with other illicit drugs, and in 59% of articles dealing with general substance abuse. However, some of the more recent studies suggest that peer influences greatly affect adolescent use of alcohol and other drugs (Dielman et al. 1993; Williams & Smith 1993; Zastowny et al. 1993; Downs & Robertson 1987-88).

Characteristics of Substance-Abusing Families

The majority of studies that have explored the characteristics of polydrug-abusing families have selected their samples from drug-abusing youth rather than from substance-abusing parents. Additional recent studies suggest that the family and parenting are predictors of adolescent substance abuse. For example, Barnes and colleagues (1994) found that lack of parental support, monitoring, and parent-adolescent communication were the most important predictors of adolescent substance abuse for both African-Americans and Whites. Peterson and colleagues (1994) found that parental drinking when the child was 12 to 13 years old was a predictor of alcohol use at age 14 to 15 for both African-American and White youth. Both studies found protective factors in the African-American families, including religion, higher norms against alcohol use, and less parental alcohol use. In addition, Hyphantis and colleagues (1991) found that parental alcoholism was a strong predictor for adolescent AOD use. However, Velleman (1992) found that parental discord was more deleterious for the developing child than was parental problem drinking.

Dawson and colleagues (1992) investigated the likelihood of past-year alcohol dependence based on family history of alcoholism, adjusting for age, race, gender, and poverty. They found a 45% increased likelihood of alcohol dependence in persons with a positive family history of alcoholism in second- or third-degree relatives. The odds increased to 86% in those subjects with alcoholism in first-degree relatives, and by 167% for those who had first-, second-, and third-degree relatives with alcoholism. Velleman (1992) conducted a comprehensive review of studies on the intergenerational transmission of alcoholism and other problems to the children of problem drinkers in an attempt to discern the mechanism of transmitting detrimental effects. He concluded that most researchers support a "general environment" model that attributes ill effects to disturbed family relationships rather than to the effect of alcohol or alcohol-induced behavior.

From reviewing the available studies, Kumpfer and DeMarsh (1986) proposed eight major family dynamic factors that affect the risk status of a child. These are:

1. age of the child when the parent becomes involved with substance abuse;
2. degree of involvement in substance abuse and ability of the parent to fulfill his/her parental role;
3. severity of emotional, physical, educational, and spiritual neglect or abuse;
4. the child's temperament and the role the child assumes in the family;
5. the degree of social isolation of the child and the family;
6. degree of family stress due to inconsistencies in rules, rituals, and discipline;
7. degree of family conflict; and
8. degree of open modeling of drug or alcohol abuse by the parents and siblings.

There have been a few studies that selected substance-abusing parents and attempted to discern familial and child characteristics. A study by Sowder and
Burt (1986) selected their sample from adult-aged heroin addicts who sought treatment and who were caring for at least one child. The researchers randomly selected subjects from treatment programs in five major cities, (Dayton, Detroit, Houston, New Orleans, and Salt Lake City) who had children and who maintained responsibility for at least one child aged three to seven in one site, and ages eight to 18 in four sites. A comparison group was selected from children attending the same schools and living in the same neighborhoods as the children of the heroin addicts (Sowder & Burt 1986). Extensive data were collected on demographics, arrest records, drug use, child rearing and family interaction, and family structure. The study revealed significant differences between groups in only two areas: scores on intelligence tests for three- to seven-year-olds as measured by the vocabulary subtest of the Stanford-Binet Intelligence Scale, and school adjustment and behavioral problems among eight- to 18-year-olds. Sixty-one percent of children of addicts scored below the average based on established age norms compared to 32 percent of comparison children.

In the older children (eight- to 18-year-olds), school adjustment and behavioral problems were significantly different for the two groups. In the group of children of addicts, 71% were reported by the teacher as needing discipline, as opposed to 45% of comparison children. In addition, 35% of children of addicts received tutoring or special education, compared to 23% of the comparison children. There were no significant differences in child-rearing practices, children's attitudes about school and parents, reports of child abuse and neglect, and the use of alcohol and tobacco (Sowder & Burt 1986).

In general, children of heroin addicts live in multi-problem families and they need services frequently not available in traditional drug treatment programs. In addition, the authors found that the treatment programs didn't offer the comprehensive array of the services most frequently needed by the families, and that early intervention with the children to prevent school and behavioral problems was not available (Sowder & Burt 1986).

A study by Colton (1980) compared 170 women in methadone treatment with 175 non drug-using women. The women did not differ in expectations about their children or descriptions of their relationships with their children. However, there were differences in that women in the treatment group were more likely to feel that they were inadequate parents and to use more verbal chastisement than physical punishment, and they expressed a greater concern about their children's futures (Colton 1980).

In another study of parenting in methadone-maintained women, Marcus and associates (1984) found the mothers in treatment functioned more poorly than comparisons. They reacted less often to their infants' communicative behavior and were less encouraging of their infants' social communications. Only 47% of mothers in treatment received average communication scores, compared to 70% of comparison mothers.

Kumpfer and DeMarsh (1986) studied 60 families with drug-dependent parents who participated in a family-based prevention program and compared them to 60 families who were randomly selected from a stratified cluster sample of families in an urban Utah county. The researchers used a variety of standardized scales and instruments to measure family environment, marital adjustment, parental attitude, depression, family life events, and child behavior. They organized the domains of parental influence into four areas: environmental, affective, cognitive, and behavioral. The family environment in the sample was considerably stressed, and measured in the high range on the Family Inventory of Life Events (McCubbin, Patterson & Wilson 1980). Kumpfer and DeMarsh (1986) suggest that the strains on the family result both from the actual life events and from poor life skills and poor family management techniques. The researchers also found that the families are often socially isolated and receive less help and support with family problems.
The children in the drug-using homes studied by Kumpfer and DeMarsh (1986) were unusually isolated and lonely. They had fewer opportunities to interact with other children, had fewer friends they could tell secrets to, and brought friends home less often. The children reported that they wanted to make more friends but that they lacked the ability to do so. Ames (1985) suggested that alcoholic parents attempt to control their children's social contacts in an effort to maintain protective boundaries. In addition, the children from chemically dependent families are "hampered in social development due to constraints on sharing "family secrets" without betraying the family" (Kumpfer & DeMarsh 1986: 71). Yet the drug-using parents complained that the children were too dependent on them (Kumpfer & DeMarsh 1986).

In the domain of affective/emotional characteristics, the chemically dependent families were significantly less cohesive on the Moos Family Environment Scale (Moos 1974) and on the Olson, Portner, and Bell FACES-II tests (Olson, Portner & Bell 1982). However, the parental dyads were significantly more cohesive or enmeshed compared to the comparison families on the Spanier (1976) Marital Adjustment Scale. Thus, the parents seemed to disengage from the children's needs and to reinforce each other's personal needs. The authors offer by way of explanation the fact that children tend to take more than they give to the parents, and that the drug-using parents may not have been capable of meeting the children's needs and thus disengaged (Kumpfer & DeMarsh 1986).

The number of family activities that the chemically dependent parents participated in with their children was significantly less than the comparison families in all types of activities that were measured. These included planned and structured activities (e.g., scouts, league sports, clubs); planned and unstructured activities (e.g., parties, picnics, and hikes); unplanned and structured activities (e.g., watching television, playing cards and games); and finally, unplanned and unstructured activities (e.g., informal talks and visits) (Kumpfer & DeMarsh 1986).

The family environment was also characterized by a very high degree of conflict on the Moos Family Environment Scale. This was manifested primarily in verbal abuse and negative communication patterns, but also in occasional reports of physical and sexual abuse. In addition, the chemically dependent families were significantly more depressed on the Beck Depression Inventory (Beck 1978) than comparison families. This study found that children from the chemically dependent families had increased academic and behavioral problems in school. The children attended school less, were late for school more often, and received less help from their parents on their homework. The researchers also found that the children from the chemically dependent families had significantly fewer rules to follow, were significantly more disobedient at home, and were less helpful with housework. The drug-involved parents often abdicated their responsibilities, which forced the children into responsibilities and roles far beyond age-appropriate behaviors (Kumpfer & DeMarsh 1986).

Kumpfer and DeMarsh (1986) found that, in general, children from families in which the mother is the drug user appear to be more affected than children of fathers who are drug users. They believe this is due to the traditional caregiver role of the mother, which would be compromised by drug use, resulting in less care available for the children. A recent examination of women in AOD treatment compared their scores on a measure rating aspects of their family of origin (Hovestadt et al. 1985) to a group of psychotherapy patients and to adults who were not in treatment. In each of the domains clarity, responsibility, respect, openness, acceptance, range, mood, conflict, resolution, and empathy perinatal treatment clients had significantly worse perceptions of their family's functioning than did the comparison group of nontreatment adults. Compared to patients in psychotherapy, perinatal clients scored better on openness and conflict resolution and had no significant differences in the other domains (Ingersoll, Dawson & Haller 1996).
Johnson (1991) stated that there are at least four ways in which children of parents addicted to illicit drugs and children of alcoholics (COAs) are different. First, the inherent risks involved with illegal activity and the secrecy that surrounds the use of illicit drugs, as well as the paraphernalia unique to illicit drugs, has an additional effect on the child that is not seen in COAs. Second, the amount of public support that is offered to the child of an addict is much less than support found in student-assistance programs for COAs. In addition, national organizations for COAs have been formed that specifically attempt to address the psychological needs of COAs and to change public perceptions regarding COAs. No such organization exists for children of addicts. Third, children of addicts face the threat of HIV and AIDS, as well as an increased risk of becoming orphaned due to AIDS. Finally, parents involved with illegal activity create a home environment that condones antisocial behavior and may provide antisocial role models for the child. In addition, there is increased risk that the parent may be imprisoned during some portion of the child's life.

Levoy and colleagues (1991) proposed that children of chemically dependent parents suffer from "chronic trauma disorder of childhood." They described the direct effects of impaired parent-child relationships, physical and sexual abuse, and neglect. In addition, they suggested that there are indirect effects for the child such as socioeconomic deprivation, parental health problems, marital discord, loss of extended family supports, disrupted family rituals, and constricted roles of family members.

RELATIONSHIPS BETWEEN ALCOHOL AND OTHER DRUG ABUSE AND CHILD ABUSE OR NEGLECT

There are only a few research studies that have looked at the relationship between alcohol abuse and child abuse or neglect cases. Even fewer studies have examined drug abuse and child abuse or neglect (National Research Council 1993). At this time, no study has established a causal relationship between AOD use and child abuse or neglect. Part of the difficulty in this is that the abuse of alcohol and other drugs is usually associated with many other factors that place the family at "high risk" of child abuse and/or neglect. For example, unemployment, poverty, single-parent homes, personality characteristics, etc., may all play a role in an increased risk of child abuse. Separation of these factors in a research study has not yet been done (Deren 1986). However, as previously stated, it is clear from the data on the prevalence of AOD use that the majority of parents who use alcohol and other drugs do not abuse or neglect their children nor violate our societal norms for caring for children.

Several studies have contended, however, that AOD abuse and child abuse/neglect are correlated. Bays (1990) stated that there is an increased risk for child abuse and neglect cases in alcohol- and other drug-abusing families, and discussed the risk in terms of parental and child risk factors. Parental risk factors include the diversion of resources, including both financial resources and the parents' time being shifted away from the children's needs and concentrated on the procurement of drugs. Criminal activities are also included as a parental risk factor. These activities can include stealing, selling drugs, and prostituting themselves and their children in order to obtain illicit drugs.

Bays (1990) also stated that up to 90% of drug abusers have mental, emotional, or personality disorders that can compromise their ability to care for their children. These disorders can influence the poor parenting skills that are also cited as a factor in a drug-abusing family. Often the parents were victims of child abuse or neglect and lacked appropriate role models for parenting (Black & Mayer 1980).

Another contributing factor to the increased risk of abusing a child are the side effects of the drugs. For example, intoxicated adults can be violent, paranoid, anxious, and undergoing hallucinations as a direct result of the
chemical properties of a specific substance, which may place the child at risk. Child risk factors, according to Bays (1990), may also arise out of prenatal exposure to alcohol and drugs. Children who have been prenatally exposed often exhibit characteristics that may interfere with bonding and attachment, and place them at greater risk of being abused. The final parental risk factor cited by Bays is family violence.

Pernanen (1976) stated that several factors relate directly to increased risk of violence against a spouse or child in alcoholic families. These include alcohol-caused organic brain damage, hypoglycemia, rapid-eye movement sleep deprivation, and societal subcultures in which violence is condoned or expected, or is necessary for self-protection.

Amaro and colleagues (1990) followed 1,243 pregnant women; 7% (n=92) of the women reported physical or sexual violence during their pregnancy. When controlling for race, age, marital status, education, and history of violence in the three months prior to pregnancy, the risk of being a victim of violence was still associated with a woman's alcohol use during pregnancy and with drug use by her partner.

Leonard and Jacob (1988) reviewed the earlier literature on the relationship between alcoholism and child abuse. They stated that there is a paucity of literature examining this issue. The studies that are available often use different definitions of substance abuse, lack control groups, and do not use appropriate statistical techniques to control for common risk factors in order to separate causal relationships from coincidence. However, of the five studies between 1968 and 1979 that they reviewed, there was a relationship suggested between alcoholism and child abuse. The most extensive of these reports is a 1971 review and factor analysis of 13,000 child abuse reports during 1967 and 1968. The factors that related to alcohol intoxication at the time of the abuse were: the occurrence of both sexual and physical abuse, a male perpetrator, an absent mother, and the precipitating event of a quarrel between caretakers.

Mayer and Black (1977) studied the nature of child care and the frequency and types of child abuse and neglect associated with alcoholism and opioid addiction. Their study included 78 families in which at least one parent was alcoholic or addicted to opioids. They found child abuse was determined for at least one child in 13% of the study families. Significant potential for abuse was found in 31% of study families. This was defined as a parent's self-reported loss of control. Finally, 63% of families were identified as "at risk" of having severe child-rearing problems as measured on their survey instrument. They concluded: "It is clear that not all addicts or alcoholics physically abuse their children and that some abuse does occur" (p. 95). A more recent report on the interrelationship of women's alcohol use and their childhood experiences found striking differences between alcoholic women in alcohol treatment, women in drinking-driving programs, and women from a community sample. Two-thirds of alcoholic women in treatment for alcoholism had experienced some form of childhood sexual abuse (with more than one-half having experienced sexual penetration) compared to one-fifth of drinking-driving women and one-third of the household sample who had experienced some form of sexual abuse (Miller, Downs & Testa 1993). Further, the study's measure of fathers' violence showed that alcoholic women in treatment were significantly more likely to have experienced verbal aggression and severe violence than the comparison groups. There was no difference between the alcoholic women and drinking-driving women on the measure of "moderate" violence from their father. Alcoholic women were also more likely to experience verbal aggression and severe violence from their mother than the other groups. These differences remained significant even after controlling for demographics, family background, and severity of the parent's alcohol problems (Miller, Downs & Testa 1993).
Of children who are placed in out-of-home care, one study found that children of addicts in foster care tend to be younger, to have more changes in their placements, and to be visited by their parent less frequently (Fanshel 1975). Child welfare agencies and other researchers have just begun to collect data on the number of cases affected by alcohol and/or other drug abuse; however, most information is still sporadic and anecdotal reporting.

Although exact figures are not available, a recent report by the Child Welfare League of America (CWLA) stated: "parental alcohol and drug abuse have contributed to a dramatic increase in the numbers of children requiring out-of-home care. Between 1988 and 1990 there was a 31% increase in the number of child abuse reports" (CWLA 1992). It is estimated that there were approximately 275,000 children in out-of-home care in 1983 and that there will be 550,000 children placed outside the home by 1995 (U.S. House of Representatives Select Committee on Children, Youth and Families 1989).

The fastest-growing population in foster care is children under five years of age. In the mid-to-late 1980s, however, as the epidemic of crack cocaine spread through inner cities, children who were identified as prenatally exposed to cocaine were routinely removed from the custody of their mothers and placed in out-of-home care. Many of these children were placed with relative caregivers, primarily grandmothers, creating intergenerational effects that may add to the family factors influencing these caregiving settings. A recent General Accounting Office report found that 78% of young children entering the foster care system are from families affected by alcohol and other drugs (U.S. General Accounting Office 1994).

Children in Out-of-Home Placement

Understanding risk factors for children removed from parents' custody is based on theories of attachment and separation. A child develops in a social environment, and infants are dependent on adults for basic survival. This dependence is evidenced as caregivers influence the cognitive, linguistic, social, and emotional competencies of the child through the emotions they express and the content and timing of their interactions with the child (Beckwith 1990).

For young children, it is commonly recognized and has been supported by several studies that early attachments are critical for later personality development. Attachment is the most explored concept to explain parent-infant relationships. As proposed by Bowlby, attachment theory posits that the affectional tie between infant and parent develops out of species-specific response patterns that are preprogrammed to ensure that infants will be protected from predators and will be nurtured so that the species will survive (Beckwith 1990: 59).

Often the children of drug addicts have been placed with relative caregivers, either through formal procedures by child protective services, or through informal arrangements made when the mother's inability to care for her child because of her addiction results in abandonment of the child. At this time, there are no studies that have followed the life course of children prenatally exposed to alcohol and other drugs to discern the effects of child protective services on the children.

There are few studies that have assessed the effects on children of child abuse and/or neglect resultant from out-of-home care. There have been several descriptive reports of problem behaviors among foster children, particularly in adolescence (National Research Council 1993). However, two studies have demonstrated that the foster placement was not the primary determinant of adolescent delinquent behavior. Rather, factors associated with familial separation were hypothesized to be important variables in the youth's problem behavior (Windom 1991; Runyan & Gould 1985). In the studies that have assessed child-focused outcomes, the outcome variables are usually defined to capture the
circumstances surrounding the child's discharge from care, and success is generally defined by the return of the child to his/her family of origin. For example, Lawder, Poulin, and Andrews (1986) reported on 185 foster children five years after placement, but the variables for data collection were related to the disposition of the child and the number of foster placements while in care. There was no information on the effects of out-of-home placements on the child.

In one of the largest studies of children which did assess the child in the foster care system, Fanshel, Finch, and Grundy (1989b) summarized the experiences of 585 children who were placed with the Casey Family Program from 1966 through 1984. In their sample, roughly two-thirds of the mothers were no longer involved with the child. The researchers found that the extent of a child's hostility at entry to the foster care system was the best explanatory variable of the child's condition when he/she left foster care. Children who left foster care in "relatively good condition" did not seem to have suffered lasting effects from having been in multiple foster placements and were able to overcome the disadvantages of their backgrounds and assume adult roles.

The Casey Family Program study also found differences between minority children and White children. The most important of these findings was the age of removal. White children experienced total separation from both their mother and father at an average age of 7.4 years, but minority children were separated at 4.9 years, and minority boys at 4.3 years. The authors state that the three-year difference was substantial and suggested distinctive forms of circumstances in the minority families (Fanshel, Finch & Grundy 1989b).

The children in the Casey study most often (37.4%) left foster care through emancipation at age 18, and another 17.8% of children were emancipated at 17 years old. Only 20.2% of children were returned to their family of origin, an almost equal number (20.7%) were returned to the court holding jurisdiction or to the public social service agency, and 3.9% of children ran away from their foster homes and did not return to the program (Fanshel, Finch & Grundy 1989a).

This review of the effects of out-of-home placement and multiple placements on children reveals the lack of empirical studies in the field of child welfare practice. For children who were prenatally exposed to alcohol and other drugs and who have been subjected to multiple prenatal risk factors, the lack of information on the effects of the postnatal risks appears as a critical gap, especially as they expand in numbers in the child welfare system.

CONCLUSION

Perinatal exposure to alcohol and other drugs has significant impact on children and their families. Two important lessons are derived from this article's review of that impact:

The Prenatal Impact is only One of the Ways that Children are Affected by Alcohol and Other Drug Abuse.

Prenatal exposure to AOD most often begins the train of events that result in a child's life being negatively altered. But it is not usually the final impact, and in many cases its effects may not be as detrimental as the years of negative effects that follow these months of prenatal exposure. We should pay special attention to research that asserts that it is the lifestyle and disease process of the parents, including the full range of environmental and behavioral effects on attachment and modeled personality, that cause the widest damage to children. The full sequence of events is certainly as important to consider as the first event, prenatal exposure. Thus, our as sump tion that the birth event is the critical intervention point may need to be adjusted to include a much broader array of checkpoints at which we aggressively intervene to enhance the life chances and safety of children.
It is simply too expensive, and too many children are at risk, for policymakers to abandon the children of the parents who are substance abusers, and the children who may have given up on themselves and on a social services system that is still fragmented, incomplete, and punitive. The system is not yet adequately coordinated to enable parents to rely on it; the system must move way from its propensity for compartmentalized handling of parents' addiction problems toward comprehensive strategies that respond to AOD-related problems at each entry point to health and social services (e.g., child care, home visiting, Head Start, maternal/child health programs, etc.). No longer can one part of the system, whether oriented to the provision of health, social, or drug treatment services, ignore the wide effects of AOD and rely on another part of the system to address them. As we improve the connections among the systems whose help is needed to improve children's lives, we also need to recognize that working through multiple access points is a more effective method of responding to the full etiology of AOD than targeting only one occasion at which behaviors must be remedied to "solve" the entire problem. The need for improvement of collaboration and cooperation of systems leads to the second point.

The Prenatal Impact Begins a Set of Effects that Requires Interventions, Supports, and Sustained Caring from Both Institutions and Individuals.

From an economic vantage point, children prenatally exposed to AOD are potentially the most expensive customers of human services, including those provided by the health, education, social support, and corrections systems. From a public safety point of view, without appropriate interventions that address the effects of parental substance abuse, some of the children are potentially very costly and dangerous to society and to themselves. From a moral stance, these are children who, through no fault of their own, are brought into a family and an environment that represents an extreme risk to their immediate and future wellbeing. Which viewpoint inspires the greatest urgency among policymakers and agency personnel varies by orientation, but nobody involved can overlook the reality that children from substance-abusing families represent the caseloads of the future unless we improve the systems of today. The systems must begin by providing intensive family-focused interventions to address the full range of family needs and to take full advantage of the potential for families to recover in order to assure that children from substance-abusing families are able to achieve their fullest potential.

REFERENCES


Young, N.K. 1993. Social competence, behavior, and academic performance in preschool and primary grade children who were prenatally exposed to alcohol and other drugs. Ph.D. diss., University of Southern California.


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Figure 1
Paths of a Child's Exposure to Alcohol and Other Drugs

<table>
<thead>
<tr>
<th></th>
<th>Legal</th>
<th>Illegal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Alcohol Underage</td>
<td>Alcohol and Tobacco</td>
</tr>
<tr>
<td>Tobacco</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prescription</td>
<td></td>
<td>Drugs</td>
</tr>
<tr>
<td>Nonmedical Use</td>
<td></td>
<td>of Prescriptions</td>
</tr>
</tbody>
</table>

Paths of Exposure

In Utero Environmental Personal Ingestion Family Community Socialization Norms and Genetics and Values Mass Media Values

Table 1
Use Rates among Adolescents by Gender and School Grade Drug

<table>
<thead>
<tr>
<th>Drug</th>
<th>Grade 7</th>
<th>Grade 9</th>
<th>Grade 11</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>F</td>
<td>F*</td>
</tr>
<tr>
<td>Alcohol</td>
<td>30.9</td>
<td>26.5</td>
<td>4.51*</td>
</tr>
<tr>
<td>Tobacco</td>
<td>19.4</td>
<td>15.7</td>
<td>4.41*</td>
</tr>
<tr>
<td>Marijuana</td>
<td>13.6</td>
<td>9.9</td>
<td>6.23*</td>
</tr>
<tr>
<td>Inhalants</td>
<td>15.1</td>
<td>11.7</td>
<td>4.69*</td>
</tr>
<tr>
<td>Cocaine</td>
<td>6.7</td>
<td>5.1</td>
<td>N</td>
</tr>
<tr>
<td>Psychedelics</td>
<td>6.4</td>
<td>4.8</td>
<td>N</td>
</tr>
</tbody>
</table>

F* refers to the F-Test. Levels of significance: * < .05; # < .01; + < .001


Table 2
California Children with Past-Year Drug-Using Parents

<table>
<thead>
<tr>
<th>Age of Parent (years)</th>
<th>Number and Percentage of Children with Drug-Using Parent</th>
<th>Prevalence Rate of Parental Drug Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>12-17</td>
<td>18,195 (1.3)</td>
<td>46.7</td>
</tr>
<tr>
<td>18-25</td>
<td>233,095 (16.5)</td>
<td>27.1</td>
</tr>
<tr>
<td>26-34</td>
<td>728,362 (51.7)</td>
<td>23.5</td>
</tr>
<tr>
<td>35+</td>
<td>430,005 (30.5)</td>
<td>10.8</td>
</tr>
<tr>
<td>Total</td>
<td>1,409,660 (100.0)</td>
<td>17.6</td>
</tr>
</tbody>
</table>