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Review

Substance use during pregnancy: time for policy to catch up with research

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Abstract

The phenomenon of substance abuse during pregnancy has fostered much controversy, specifically regarding treatment vs. punishment. Should the pregnant mother who engages in substance abuse be viewed as a criminal or as someone suffering from an illness requiring appropriate treatment? As it happens, there is a noticeably wide range of responses to this matter in the various states of the United States, ranging from a strictly criminal perspective to one that does emphasize the importance of the mother's treatment. This diversity of dramatically different responses illustrates the failure to establish a uniform policy for the management of this phenomenon. Just as there is lack of consensus among those who favor punishment, the same lack of consensus characterizes those states espousing treatment. Several general policy recommendations are offered here addressing the critical issues. It is hoped that by focusing on these fundamental issues and ultimately detailing statistics, policymakers throughout the United States will consider the course of action that views both pregnant mother and fetus/child as humanely as possible.

Overview and nature of the problem

Introduction

The purpose of this review is to summarize policy research findings in the area of maternal prenatal substance abuse to (1) inform and advance this field, (2) identify future research needs, (3) inform policy making and (4) identify implications for policy. As a review, this is a systematic analysis of existing data (findings) on maternal drug use during pregnancy for determining the best policy among the alternatives for dealing with drug using mothers and their children. We will address issues of efficacy (which policies work?), economics (how much does it cost?) and politics (who is it for or against?). For new policies we will also consider how they fit with existing policies or laws, the social impact, ethical issues and the feasibility of implementation and administration.

The issue of substance abuse is one that has perpetually plagued society. The complexities surrounding addiction are not easily overcome. These complexities are even more defined in cases of substance abuse by pregnant women, an issue that has been pushed to the forefront of the public consciousness over the course of the past 20 years. Maternal prenatal substance abuse is defined as chronic use of alcohol and/or other drugs [1]. The acronym AOD is often used to describe the generic problem of alcohol and other drugs. However, AOD is not specific to mothers and includes both prenatal and postnatal use as well as use by men. This review will encompass the three main types of addictive substances used during pregnancy: alcohol, tobacco and illegal drugs (ATID). Maternal Alcohol, Tobacco and Illegal Drugs (MATID) will be used to describe maternal use of these substances during pregnancy that threatens the well being of the child.

Rising cocaine use and the emergence of crack cocaine use in the 1980s created a public outcry and redress and served to shine the spotlight on this issue. One of the goals of this review is to see how what we learned from the cocaine controversy can be applied to issues arising from abuse of other (legal and illegal) drugs. The review will address policies on several levels including federal, state, and local public policies. Legal and ethical issues will also be considered. As this article goes to press, the U.S. Supreme Court has declined to hear the case of a South Carolina woman convicted of murder homicide by child abuse after her stillborn baby was found with cocaine in its system. This case could have major policy implications for the treatment of drug using mothers and for the interpretation of child abuse charges.

Background

The sensationalistic coverage of the "crack epidemic" in the mid-1980s focused national attention on the relationship between drug use, and the social and economic conditions that plagued our society. These include poverty, violent crime, overcrowded prisons, hospital emergency rooms overcrowded with drug related violence and illness, homelessness and sexually transmitted diseases [2]. About 11 percent of the adult population of the United States suffers from a substance abuse problem (AOD) during the course of a year [3]. That figure increases to 28% if we include substance abuse or mental health disorders, which are often inseparable [3]. Of the 10 leading causes of disability worldwide in 1990, five were psychiatric conditions including AOD [3]. The cost to society of drug use including crime, health care and reduced work productivity was estimated at over 300 billion dollars annually [4]. In 1997, the total expenditure for treatment of substance abuse was $11.9 billion in contrast to the social costs of $294 billion estimated for that year [3]. In addition, substance abuse is a contributing factor in child abuse and neglect cases for 40% or more of the 1.2 million annual confirmed cases of child maltreatment [5] and in 40–80% of families involved with the child welfare system [6]. The presence of substance use disorders in parents increases the risk of child maltreatment threefold or more [7,8]. These children are also at substantial risk of placement in out-of-home care [9].

Drug use in this country is not a recent phenomenon. Legal use of opiates in America has a 200-year-old history and cocaine has been around since the 1870s. Illicit drug use by women is also not new. By the end of the 19th century, almost two thirds of the nation's opium and morphine addicts were women [2]. The issue of drug use during pregnancy garnered the national spotlight starting in the 1960's when public attention began to focus on the possible harm to the unborn child. Less than 15 years after Chuck Yaeger shattered the sound barrier, several events combined to shatter the placental barrier – the notion that the fetus was protected and even invulnerable. The placental "barrier" suddenly became quite porous. The rubella (German measles) epidemic and, in particular, the tragedies caused by two drugs, thalidomide and diethylstilbestrol (DES), amplified public sentiment about the need for protecting the fetus from risks from drug use. Thalidomide was approved for marketing in 1958 and was used primarily as a sedative and antidote for nausea in early pregnancy. By 1962, evidence showed that a rare set of deformities, mostly limb malformations, were caused by the drug and 8,000 children had been affected [10]. DES was a synthetic hormone prescribed in the 1940s and 1950s to prevent miscarriage. By the late 1960s and 1970s, the side effects of the drug became known: the daughters of women who had taken DES during pregnancy developed a rare adrenocarcinoma of the vagina. Licit and illicit drugs became suspect as possible teratogens, and the activities, diet and behaviors of pregnant women have been under close scrutiny ever since [11].

As the country was coping with these events in the early 1970's, studies in the U.S. [12-14] and in France [15] began to describe the effects of fetal alcohol syndrome (FAS) including dysmorphic features, growth retardation, central nervous system problems, long term retardation and developmental delays [16]. One response was the 1989 federal law that required warnings on all alcohol-containing beverages about the risk of birth defects. Also in the 1970s, research documented child outcome associated with opiate addiction in pregnant women including withdrawal effects in infants exposed to heroin or methadone [17,18]. There is currently a resurgence of heroin use due to the introduction of a cheap, smokeable and more pure form comparable to crack cocaine but more potent.

Maternal prenatal substance abuse became an issue for public health debate in the mid-1980s when the price of cocaine dropped, and a smokeable form, "crack" became widely available. The heightened attention came in response to the emergence of a perceived crack epidemic and their infants were labeled, "crack babies" [1]. Cocaine is a special case because it riveted our attention of the problem of drug use by pregnant women, it became a moral as well as a public health issue and has forever changed the way we think about substance use by pregnant women.

Cocaine has a long history of use in this country. It was first introduced in the 1880s as a wonder drug. Doctors hailed its ability to counteract melancholy, or depression. It was made readily available to the public as a treatment for sinusitis and hay fever. It was used in soft drinks such as Coca-Cola until 1900. Upon its first introduction it was used as a panacea for all that ailed people. However by

1910 there were numerous proposals for laws against its use because of its association with violence, paranoia, and collapsed careers [19].

By 1980, the United States had entered another period of widespread use of the drug. There are several reasons why crack was very popular at the time. These reasons include the fact that it is smoked rather than injected, it was a cheap high after the 1980s cocaine price plunge, and it was conducive to binge use [20]. In 1986 the U.S. House of Representatives, Select Committee on Narcotics Abuse and Control and Select Committee on Children, Youth, and Families defined the widespread use of cocaine as a crisis. The testimony of the Honorable Charles Rangel during the committee hearing on "The Crack Cocaine Crisis" epitomized the feelings of lawmakers of the time. According to Judge Rangel, "Cocaine is threatening the vitality of the generation of Americans we are counting on to lead us into the 21st century...The crack epidemic is part of the overall cocaine abuse problem in America. This problem will continue as long as... the Administration and State Department view the international drug problem as "business as usual." Only when we give the drug problem the foreign policy priority it deserves will we ever begin to get a handle on the cocaine crisis sweeping our nation" [21]. To this end, Congress passed the 1986 Narcotics Penalties and Enforcement Act, imposing severe penalties on any person convicted of either possessing or distributing cocaine [22].

The war(s) on dugs

There is a long history of legislative intervention and control over the use of those drugs deemed dangerous. The drug war is the name conventionally given to the efforts of the Regan and Bush administrations against the widespread availability and use of illicit drugs in the United States during the 1980's and early 1990's. It is actually the fourth such war: Sustained legislative and governmental efforts to combat drug abuse occurred in 1909–23, 1951–56 and 1971–73 [23]. The drug war has included treatment of addicts and prevention but the emphasis has been on law enforcement; control at the source, interdiction, arrest, prosecution, imprisonment and seizure of assets. Even in the 19th century the United States attempted to prevent acute poisoning by implementing regulations that called for the labeling of certain substances that might be purchased in ignorance of their lethal potential or might be too easily available for suicide. During this time, Americans bought whatever types of drugs they wanted over the counter or through mail order catalogs. Doctors regularly prescribed morphine and opium to their patients as the primary pain control drugs [22].

In response to consumer demand, Congress passed the Pure Food and Drug Act of 1906. This act mandated correct labeling. Any "patent medicine" had to reveal on the label whether it contained morphine, cocaine, cannabis, or chloral hydrate. The act simply required that consumers be informed that the drugs were present. It made no attempt to regulate the purchase of the drug or how much of the drug could be included in substances [19]. The country's drug policy changed with the 1914 passage of the Harrison Anti-Narcotic Act and with Supreme Court decisions, [24,25] which allowed new drug fighting policies. When it took effect in 1919, the law outlawed the maintenance of addicts on prescription narcotic medication. It also empowered the federal government to take nationwide action to arrest and convict health professionals who practiced maintenance of narcotic-addicted patients. A few months later in 1919, the Volstead Act widened the "no maintenance" policy to alcohol. The act made drinking alcoholic beverages illegal [22].

The emphasis on drug interdiction and policing has resulted in an increase in the national drug budget over the last 20–25 years. According to the Office of National Drug Control Policy, Federal spending on drug control has increased from 1.5 billion in 1981 to 19.2 billion in 2002 [26,27]. Since 1990 the percent of the National Drug Control Budget earmarked for prevention and treatment has remained relatively stable at approximately 33%. The funds covered by this 33% include drug abuse treatment, drug abuse prevention, and prevention research and treatment research. Approximately 10% is spent on research and approximately 1 1/2 times more is spent on drug abuse treatment than on drug abuse prevention. Treatment alone accounts for only 15% of the budget. Given that research has shown that treatment and prevention are effective, one wonders why these proportions of the National Drug Control Budget have not been increased. The drug control budget has more than doubled in the past decade, yet the proportion of the budget devoted to treatment and prevention is unchanged, despite the gains made in science.

It is also interesting to contrast Federal spending with States spending on drug abuse. A recently released study (Shoveling Up: The Impact of Substance Abuse on State Budgets), found that in 1998, states spent 81.3 billion dollars on substance abuse and addiction representing 13.1 percent of the 620 billion dollars in State spending. In contrast to the Federal budget in which 66% of the budget is spent on enforcement, the State budgets spent 38% on justice with other funds spent on education (21%), health (19.5%), child family assistance (9%) and mental health and developmental disabilities (7.5%).

Table 1: Drug Use by Pregnant and Non-Pregnant Women in the United States (1999)

Drug	Non-Pregnant	Pregnant
Any illicit drug	8.1	3.4 (134,111)
Marijuana/Hashish	5.9	2.9 (114,389)
Cocaine	.9	.2 (7,889)
Heroin	.1	*
Methamphetamine	.2	.2 (7,889)
Cigarettes	30.5	17.6 (694,223)
Alcohol	49.3	13.8 (544,334)
"Binge" alcohol	19.4	3.4 (134,111)
Heavy alcohol	4.0	.5 (19,722)

Epidemiology and prevalence rates

Numerous attempts to answer the question of the prevalence of prenatal exposure have been made reflecting a variety of definitions, sampling procedures and drug use detection procedures [11]. Settings vary and include hospitals, public health clinics and prenatal practices. Sampling includes the country as a whole, entire states as well as individual counties. Drug use is typically detected by maternal report, history or urine testing. The National Pregnancy and Health Survey (NPHS) was designed to provide a nationally representative sample of live births in the contiguous 48 states between November 1992 and August 1993 based on maternal self-report [28]. The prevalence for use of any illicit drug during pregnancy was 5.5% or approximately 221,000 pregnant women. For cocaine the estimate was 1.1% (45,000). Comparisons of self-report and urine in a subset of this sample suggested underreporting in the use of cocaine.

The National Household Survey on Drug Abuse (NHSDA) contains 1999 national estimates ages 12 years and older based on interviews with 66,706 persons. The NHSDA estimated that among women 15 to 44 years old, rates of current use of alcohol, tobacco and illicit drugs 1999 were 47.8%, 31%, and 7.9%, respectively. Table 1 compares drug use between pregnant and non-pregnant women.

Among pregnant women 15–44 years of age, 3.4% reported using illicit drugs. This was significantly lower than the rate among non-pregnant women age 15–44 years (8.1%). For example, cocaine is .2% for pregnant but .9% for non-pregnant. Methamphetamine is scary because it is the only illicit drug that does not have a lower rate for pregnant (.2%) than for non-pregnant women (.2%) [11]. For pregnant women in the 15–44 age group, 3.4%, 17.6%, and 13.8%, respectively, used illicit drugs, tobacco, and alcohol, indicating that a large number of women continued their substance use during pregnancy. In the United States in 1999, there were 3,944,450 births to women aged 15 to 44 years [11]. Using NHSDA estimates of substance use during pregnancy, the approximate numbers of births in 1999 complicated by maternal use of illicit drugs, tobacco, and alcohol were 134,110; 694,220; and 544,330, respectively [29]. Thus, from the public health perspective, the impact of substance use during pregnancy extends far beyond maternal health to that of a large number of the unborn population.

There is also overlap between licit and illicit drugs. Approximately 32% of women who use illicit drugs during pregnancy also use alcohol and cigarettes [30]. From these estimates it has been suggested that approximately 1 million children each year are exposed to legal or illegal substances (i.e. MATID) during gestation [31]. It is also important to point out that the NHSDA is based on self-report of drug use and therefore likely to underestimate the extent of prenatal drug exposure. Just as with other drugs, it is very difficult to isolate the true prevalence of prenatal cocaine use among pregnant women because prevalence rates are often dependent on self-reporting by the women. In a study by Vega and colleagues in the early 1990s, it was discovered that 1.1 percent of California expectant mothers used cocaine within 12 to 72 hours of labor and delivery [32]. The lack of true prevalence rates can also be attributed to the lack of focus on those groups that are considered to be "low-risk" for drug use, e.g. middle class, non-minority populations.

There are groups considered high risk based upon patterns of use. Cocaine use is especially concentrated among poor women of color. In the Vega et al. [32] study, it was found that 7.8 percent of African Americans compared with 0.55 percent of Hispanics and 0.60 percent of Caucasians tested positive for cocaine use. This figure became even more pronounced when looking at subgroups of poor women. Nearly 1/3 of unmarried pregnant African American Medicaid recipients in their mid-thirties tested positive for cocaine [33].

Methods of identification of drug using women

The accurate identification of prenatal drug exposure is important not only to understand the nature and magnitude of the problem, but also to determine appropriate medical and psychosocial intervention. The prevalence of prenatal drug exposure is very difficult to estimate because of flaws in all methods of identification. Methods vary and include interview, self-administered questionnaires, intake history, urine testing of mother and infant, testing of infant hair and meconium (first stool of the newborn). Maternal self-report of drug use is problematic because of the fear of the consequences of admitting to the use of drugs such as Child Protective Services (CPS) involvement and the threat of child removal, or because it is socially unacceptable. Self-report is also unreliable because of the inaccuracy of recall, especially when questions such as "when", "how often" and "how much" are asked. Underreporting of drug use by pregnant women has been reported in several studies [34-37]. In a sample in which 43% of mothers were positive for illegal drugs during pregnancy, only 11% admitted illegal drug use [35]. Frank found that self-report misclassified 24% of cocaine users identified by urine toxicology, and in Lester et al, [34] 38% of mothers denied cocaine or opiate use during pregnancy but the infant's meconium was positive.

Infant biomarkers of in-utero exposure to illegal and legal drugs including cocaine, opiates, amphetamines, marijuana and nicotine, are available from different specimens. Although urine has been the widely used specimen, increasing evidence suggests that meconium is preferable [35,38-44]. For example, cocaine metabolites are measurable in urine for only 96–120 hours after the last cocaine use in contrast to meconium, which can detect cocaine use throughout the second half of pregnancy. The primary metabolite of nicotine is cotinine and can be measured in urine and meconium. Cotinine is also readily passed from mother to infant, with fetal cotinine concentrations in pregnant smokers reaching approximately 90% of maternal values during pregnancy [45]. A recent assay has been developed for detecting alcohol in meconium using fatty acid ethyl esters [46]. Hair analysis can also be used to detect drugs, and like meconium has the advantage of reflecting more than recent use [47].

In addition to the choice of specimen, the accurate detection of prenatal drug exposure is influenced by the choice of initial screening test and use of a confirmation procedure. Moore et al. [48] found a 43% false positive rate for cocaine when screens were used without confirmation. Gas chromatography/mass spectrometry (GC/MS) is the forensic standard for confirmation of presumptive positive screens. Lester et al. [34] confirmed 75% of presumptive positive screens for cocaine using GC/MS in a sample of over 8,500. However, that still leaves 25% of mothers that would have incorrectly identified had we relied on a screen alone. Choice of metabolites can also affect accuracy of identification. We [34] used four metabolites for cocaine, and one of them, HBE, was the only metabolite found in 235 of the cases. Finally, some drugs are more difficult to detect than others. Even with GC/MS we were only able to confirm 36% of the presumptive positives for marijuana.

The advantage of using both drug toxicology and maternal self-report has been shown in several studies [34,35,37,49,50]. It is also important to distinguish between maternal reports based on a structured questionnaire and information collected about the mother from medical record review as the latter is less reliable, and may not be appropriate for comparison with toxicology results. The importance of using both a biomarker (preferably meconium) and maternal self-report is to identify mothers who deny use but did use as evidence by positive GC/MS confirmation. It is generally assumed that mothers will not report that they used drugs if they did not. Finally, it would not be wise to rely only on meconium, as this assay is only valid for the second half of pregnancy. Agreement between positive maternal report and positive toxicology has been reported at 66% [34,51]. This is to be expected because infants of mothers who report that they used cocaine, but not in the second half of pregnancy, will have a negative meconium for appropriate reasons.

Research on prenatal MATID exposure and child outcome

MATID use during pregnancy is a major public health issue and a social policy concern because of the possible adverse effect or harm to the developing child caused by the chemical effect of the drug, i.e., the drug as a toxin. The best documentation of this effect is for alcohol. The teratogenic effects of alcohol are well established. The brain is particularly vulnerable with documented sites of damage including the cerebellum, hippocampus, basal ganglia and corpus collosum [52-54]. One study estimated that approximately 2.6 million women of 4 million who give birth each year use alcohol at some point during their pregnancy [3]. Another suggested that nearly 22,000 school age children per year experience adverse affects caused by their mother's alcohol use [55]. One of the most widely chronicled problems attributed to alcohol use is fetal alcohol syndrome (FAS). FAS was first described in the published medical literature in 1968 and refers to a constellation of physical abnormalities. FAS produces slow growth, damage to the nervous system, facial abnormalities and mental retardation. It is most obvious in the features of the face and in the reduced size of the newborn, and in problems of behavior and cognition in children born to mothers who drank heavily during pregnancy. Rates of FAS range from .5 to 3 cases per 1,000 births or 2000 – 12,000 per year in the U.S.

FAS is caused by prenatal exposure to high levels of alcohol; however, the definition of "high" is not specific. For example, the Institute of Medicine (IOM) definition includes terms such as "substantial, regular intake or heavy episodic drinking" as well as associated alcohol related effects, behaviors and problems but these terms are not defined. Heavy drinking by pregnant women has been estimated at less than 1%. (IOM).

In addition to FAS, there are children who do not show the facial dysmorphology of FAS but who do show deficits on a wide variety of neurobehavioral measures. Different labels have been used to describe this heterogeneous group including fetal alcohol effects (FAE) and alcohol-related neuro-developmental disabilities (ARND). ARND/FAE may reflect more moderate levels of alcohol exposure as well as some degree of uncertainly about whether alcohol or other factors was the causal agent (IOM). Alcohol has the potential to produce milder problems such as mental and behavioral problems as well [56] and these may also be due to FAE/ARND.

The IOM report concludes that FAS is arguably the most common known non-genetic cause of mental retardation. They also conclude that FAS and ARND are a completely preventable set of birth defects and neurodevelopmental abnormalities. We would argue that the latter is true for the consequences of tobacco and illegal drugs as well.

Tobacco is another legal drug that can have adverse effects on fetuses. Cigarette smoking is the largest single risk factor for premature death among adults in developed countries, causing over 500,000 deaths per year, or one in every 5 deaths. Currently, there are 57 million cigarette smokers in the United States – roughly one quarter of the adult population. The majority of smokers fall between 18 – 25 years of age; 37% of people in this age range are smokers [57,58]. Cigarette smoking is correlated with low socioeconomic status, reduced educational achievement, and disadvantaged neighborhood environment, as well as younger age [58].

Approximately 12.3% of all mothers report cigarette smoking while pregnant [59]. Cigarette smoke is a complex mixture of chemicals [60] with approximately 4000 compounds, [61] including carbon monoxide, that may also affect the fetus. Maternal smoking during pregnancy produces adverse effects for the fetus through several pathways. First, cigarette smoke interferes with normal placental function. As metabolites of cigarette smoke pass through the placenta from mother to fetus, they act as vasoconstrictors to reduce uterine blood flow by up to 38% [62]. The fetus is deprived of nutrients and oxygen, resulting in episodic fetal hypoxia-ischemia and malnutrition [63]. This is the basis for the fetal intrauterine growth retardation seen in many infants born to smoking mothers. Studies have shown that smoking is responsible for 20–30% of all infants of low birthweight, and that infants born to smoking mothers weigh an average 150–250 grams less than infants born to nonsmoking mothers [64].

Second, the nicotine in cigarette smoke acts as a neuroteratogen that interferes with fetal development, specifically the developing nervous system [65]. *In utero*, nicotine targets nicotinic acetylcholine receptors in the fetal brain to change the pattern of cell proliferation and differentiation. Fetal nicotine exposure up-regulates nicotinic cholinergic receptor binding sites, causing abnormalities in the development of synaptic activity [66]. The end result is cell loss and ultimately, neuronal damage. Furthermore, because concentrations of nicotine on the fetal side of the placenta generally reach levels 15% higher than maternal levels, even low levels of cigarette smoking may expose the fetus to harmful amounts of nicotine [67,68]. As preclinical studies have shown, fetal doses of nicotine that do not result in low birthweight still produce deficits in fetal brain development [65]. Cigarettes contain many hazardous toxic chemicals, including nicotine, hydrogen cyanide, and carbon monoxide. Ingestion of these harmful toxins into the fetal blood supply can cause problems in newborns such as low birth weight, pre-term delivery, slow fetal development, and infant mortality [69-71]. Although the effects of cigarette smoking on fetal growth retardation have been known for many years, more recent work has linked prenatal nicotine exposure to sudden infant death syndrome as well as short and longer term behavioral and cognitive problems [72-77] including effects on IQ [78]. In a recent study, we [79] found a dose response relationship between cotinine (the major metabolite of nicotine) in the mothers saliva at delivery and the neurobehavior of the newborn suggesting possible withdrawal effects from cigarette smoking during pregnancy. In addition, the effects were observed at less than 7 cigarettes per day, which is below the threshold of 10 cigarettes per day typically reported for the effects on birth weight. In another study, maternal genotype was found to alter the effect of smoking on infant birthweight [80]. This could suggest that genetic influences may also explain why some nicotine exposed infants show neurobehavioral deficits while others do not.

In addition to these prenatal mechanisms there are postnatal mechanisms through which smoking can affect the child. These include research on the transmission of nicotine through breast milk and its harmful effects, and the consequences of second-hand smoke exposure on children [46,81,82]. The toxic effects of tobacco are illustrated by a study in which infants of nonsmoking mothers who

had environmental exposure to tobacco smoke showed measurable ill effects [83].

It is positive to note that tobacco use during pregnancy is on the decline. In 1990 18.4% of pregnant women smoked (that would result in 736,000 tobacco-exposed infants); that percent was 13.6% (or 544,000 tobacco exposed infants) in 1996. Women who do still smoke are smoking fewer cigarettes than they did in 1990 [84]. These trends underscore the importance of smoking cessation programs, particularly for women of childbearing age. At this opportune time in which the harmful effects of cigarette smoke have been subjected to increasing scrutiny, efforts aimed at smoking cessation and addiction treatment, as well as studies directed at understanding the effects of prenatal exposure to nicotine on infants have definitive relevance in advancing the health and development of children.

Illicit drugs are the most often targeted drugs in the fight against maternal substance abuse, because they are perceived to produce the most harmful side effects in both the mothers and the children. Whether this is true or not is a topic that is certainly up for debate. As mentioned earlier, it is hard to pinpoint the exact prevalence of illegal drug use among pregnant women because figures are derived from self-reporting by the women or reporting by a physician. Figures on the frequency of illegal drug use among pregnant women range from 221,000 to 739,006 [85,86]. There are numerous birth complications attributed to illegal drug use, including pre-term delivery, low birth weight, smaller-than-normal head size, miscarriages, genital and urinary tract deformities, and nervous system damage [87].

For cocaine, we now know that early scientific reports were exaggerated, and portrayed children who were exposed to cocaine *in utero* as irreparably doomed and damaged [29,88-90]. Published studies on cocaine-exposed children suggest a pattern of small deficits in intelligence and moderate deficits in language [91]. Further, cocaine-exposed children at 6 years show deficits in academic skills including poor sustained attention, more disorganization, and less abstract thinking [92-94].

Research on prenatal marijuana exposure started slightly before the explosion of cocaine research in the 1980s. Developmental effects on executive function have been reported in a study of 9–12 year olds [78]. However, despite the fact that marijuana is the most frequently abused illegal drug, it has not received the attention, as have other drugs, and there are calls for legalization and approval for medicinal use. Finally, it has been only recently that amphetamine/methamphetamine use during pregnancy has drawn attention. Longitudinal studies of development in methamphetamine-exposed children are just beginning [95].

A lingering puzzle, especially with the cocaine literature, is the discrepancy between preclinical (animal) and clinical (human) studies. There is substantial preclinical evidence that cocaine and other drugs of abuse are neuroteratogens that can produce serious abnormalities in brain development. More recent findings [96] suggest that the behavioral impact of such neural abnormalities that might occur in humans depends on other complex pre- and postnatal factors, which may also include genetic vulnerability. We have seen how public understanding of the impact of prenatal exposure has lurched from an initial over-reaction in which drug-exposed children were characterized as irrevocably and irreversibly damaged to a perhaps equally premature excessive "sigh of relief" that drugs such as cocaine do not have lasting effects, especially if children are raised in appropriate environments. Exaggerated statements about the benign effects of cocaine as found in Frank et al. [97] can have negative policy implications. Infants exposed to drugs *in utero* may have a milder phenotype with appropriate environment input. We need to understand combinations of biological (including genetic) predispositions and environmental conditions that result in normal development and what specific factors might promote resilience. This will require changing some of our models for studying the effects of MATID.

Developmental model

Most studies of MATID use and child developmental outcome follow the behavioral teratology model. The goal is to isolate the unique effects of the drug, typically by controlling other variables that could also explain child outcome [98,99]. This approach is based on our understanding of the mechanisms of action of ATID, as well as on preclinical and clinical studies, and enables us to study the potential pharmacological and toxic effects of the drugs per se. The limitation of this approach is that it does not lend itself to study drug exposure as part of a developmental model in which the goal is to predict child outcome with ATID as one of many contributing factors. This is because behavioral teratology research designs typically treat environmental variables as potential confounding factors rather than as a primary focus for investigation [100]. Developmental-ecological models have shown that many, if not most, child outcomes are due to multiple antecedent variables [101].

Developmental models should also take into account the effects of polydrug exposure. Adverse MATID effects are thought to be due to mechanisms by which the drugs disrupt programs for brain development associated with alterations in brain structure and neuronal function that have unique behavioral consequences. ATID freely cross

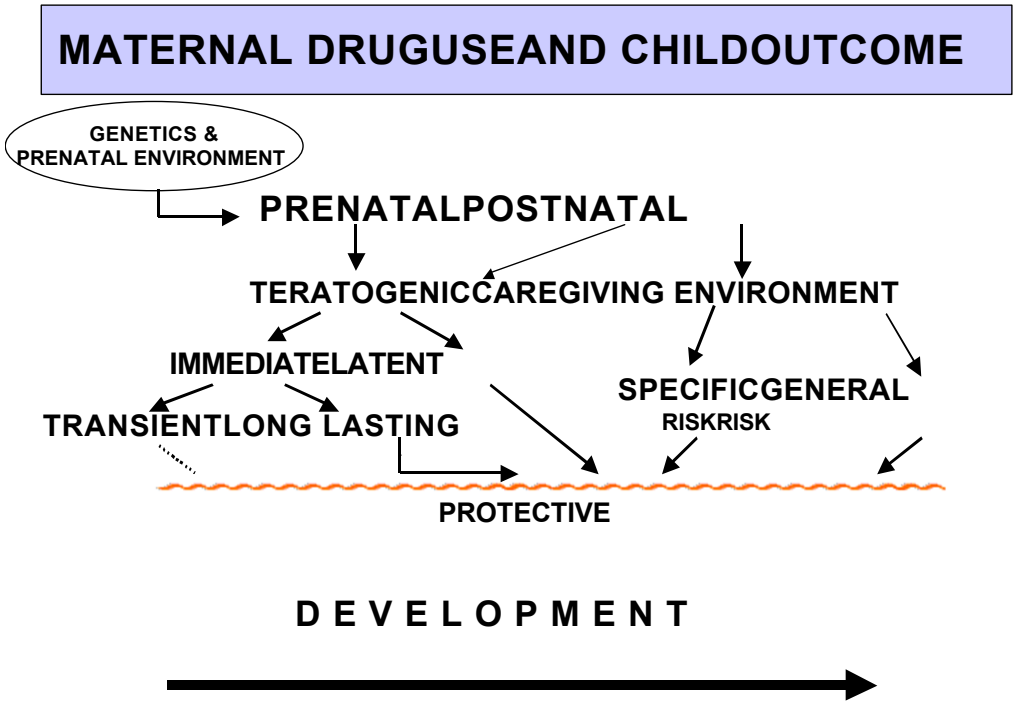

Figure 1
Developmental Model of the Effects of Maternal Alcohol, Tobacco and Illegal Drug Use (MATID) During Pregnancy on Child Outcome

the placenta and the developing fetal brain. Typically we think about the specific or individual effects of each drug, ethanol and the GABA system, nicotine effects on acetylcholine, opiates and the μ, δ, and κ receptors, and the effects of cocaine on DA, NE, 5-HT. However, in addition to these mechanisms specific to each drug, recent literature suggests a mechanism of action common to all drugs of abuse. Every drug of abuse appears to increase the levels of the neurotransmitter dopamine in the brain pathways that control pleasure. This explanation centers on activation of specific neural pathways that project from the pons and midbrain to more rostral forebrain regions, including the amygdala, medial prefrontal cortex, anterior cingulate cortex, ventral palladium, and subdivisions of the striatum, particularity the nucleus accumbens [102]. This model of a final common pathway for all drugs of abuse is critical because, as documented earlier, most prenatal drug use is polydrug use. Therefore, understanding these potential pathways will give us one model for understanding the developmental effects of polydrug use.

Theoretically, we can describe three types of consequences of MATID on child development (1) immediate drug effects (2) latent drug effects, and (3) postnatal environment effects as shown in Figure 1.

Immediate drug effects are direct teratogenic consequences of MATID exposure and emerge during the first year before postnatal environmental effects become salient. These effects may be transient, such as catch-up in physical growth or more long lasting, such as behavioral disregulation that is observed in infancy and persists through school age. Latent drug effects are also direct teratogenic effects but reflect brain function that becomes relevant later in development. There are two kinds of latent effects. First, MATID can affect brain function that

does not manifest until children are older, including cognitive processes (I.Q., language, executive function and academic skills), antisocial behavior (conduct disorder [CD], oppositional defiant disorder [ODD], delinquency, and externalizing and aggressive behavior problems), substance use onset, psychopathology (attention deficit disorder [ADD], attention deficit hyperactivity disorder [ADHD], internalizing behavior, depression, and anxiety). Second, MATID affects the brain by causing a predisposition for dependence on drugs. By "predisposition" we mean an increase in risk that requires other conditions to be met. These conditions would be activated during school age when opportunities to use drugs arise, leading to early substance use onset.

There is also evidence from the nicotine and alcohol literature for the biological basis of drug use in children, such that adolescent or childhood onset of substance use is related to prenatal exposure. Adolescents are more likely to smoke if their mothers smoked during pregnancy even after controlling for later maternal smoking [103-105]. Similar results have been reported for alcohol [106]. In two cohorts Kandel [103] found that adolescent girls are more likely to smoke if their mothers smoked during pregnancy even after controlling for postnatal maternal smoking. It was suggested that nicotine input to the dopaminergic system could predispose the brain to later addictive behavior. Therefore, prenatal exposure may be related to increased risk of substance abuse in the offspring. More recently, Weissman [107] found a 4-fold increase of prepubertal-onset CD in boys and a 5-fold increased risk of adolescent onset drug dependence in girls whose mothers smoked during pregnancy, also unrelated to postnatal maternal smoking. Maternal smoking during pregnancy has also been related to increased ADHD [108] and CD in boys [109]. In a 14-year follow-up, [106] prenatal alcohol exposure was more predictive of adolescent alcohol use and its negative consequences than was family history of alcohol problems. Moderate to heavy maternal drinking during pregnancy was related to current drinking in daughters after controlling for current maternal drinking and child rearing practices. Prenatal maternal smoking was also related to elevated rates of adolescent drinking [110]. Therefore, drug exposure *in utero* may alter the brain in ways that increase the risk for later addiction.

Postnatal environment effects include general environmental factors (socio-demographics, care giving context and style, and caregiver characteristics) that include both risk and protective factors. Environmental risk factors are well established correlates of a variety of poor child outcomes including cognitive, social, psychological, school, and health problems that occur in both drug-using and non-drug using populations. MATID is associated with general psychosocial risk factors that compromise child outcome apart from substance abuse issues including poverty, [111,112] chaotic and dangerous lifestyles, [113,114] symptoms of psychopathology, [115-119] history of childhood sexual abuse, [120,121] and involvement in difficult or abusive relationships with male partners [122,123]. Pregnant women in substance abuse treatment show a high incidence of psychopathology [124] including affective and personality disorders [125,126] and depressive symptoms [127,128]. Pregnant cocaine using women showed elevated levels of depression, general mental distress and more psychological symptoms postpartum [129]. There are also specific aspects of the caregiving environment unique to AOD using mothers analogous to the well-documented literature on "children of alcoholics" (COAs). Passive exposure to smoke is also a direct teratogenic effect that is also part of the environment [78].

Another problem with the behavioral teratology model is that as a deficit model it does not include protective or resiliency factors that buffer the child against adverse child outcome. Resiliency factors can be biological (such as self-righting, compensatory brain mechanism that may be genetically based) as well as factors such as stable temperament, high motivation, connectedness to parents/others, consistent parental supervision and discipline, relationship to prosocial institutions, intolerant attitudes toward deviance, peers with anti-drug attitudes and community anti-drug norms. Connectedness to others and intolerance of attitudes toward deviance were also highlighted by the Surgeon General Report [130] on youth violence.

Finally, the model includes the "development" arrow to indicate that development is a dynamic process. Nature and nurture are not viewed as static "either/or" categories. Rather there are reciprocal causal relations between intra- and extra-individual factors that change over the course of development.

We can say unequivocally that some children exposed to drugs *in utero* have learning and behavioral problems. Clearly in the case of cocaine the problem is not as severe as was once feared. We also know that environmental factors play a large role in determining the development of drug-exposed children. There is increasing evidence that amount of exposure makes a difference. This is well established for alcohol, for tobacco with respect to effects on birthweight, and the cocaine literature is just starting to study level of exposure. There is also some evidence that timing of exposure makes a difference, again especially for alcohol. Not all children who are exposed to drugs *in utero* show neurobehavioral deficits and those who are affected display a wide range of neurobehavioral effects. The same

drug, even at the same dose does not appear to produce the same deficits in all children.

It is almost superfluous to say that advances over the coming years will provide a much clearer picture and deeper understanding of the long-term effects of prenatal drug exposure. However, it is not superfluous to say that the data available today indicate that society must take the problems of substance abuse during pregnancy very seriously. Priority must be given to programs that help addicted pregnant women avoid drugs and to programs that provide postnatal intervention. We know that prevention and treatment programs are effective. We do not know which are most effective. With limited resources, clinical trials are necessary, and well-tested programs with fidelity should be adopted.

We don't have (and we may never have) the complete scientific picture. What we do have is enough information to make it a priority to identity and treat drug-using pregnant women and their children. We do know enough to provide an "antidote to complacency" [131].

There are important limitations to the research on the developmental consequences of MATID that have policy implications. First, our knowledge of use patterns (how much, when and how often during pregnancy drugs are used) is limited by reliance on self-report (including both problems associated with memory and reluctance to reveal drug use due to fear of prosecution and child removal), and limitations of drug toxicology (including no bioassay for alcohol). Second, it is not clear whom we are studying, that is, to what population the developmental effects of MATID generalize. For example, most women in the cocaine studies are recreational users; they are not "hard core" addicts. In the cocaine literature, a "heavy" use is defined as three or more times per week during the first trimester. This definition is a function of the patterns of use detected in the studies and is in sharp contrast to the heroin addict or methadone user where use is daily for the entire pregnancy. One reason that the developmental effects of cigarette smoking may be as strong as the effects of cocaine is that the use patterns of women who smoke cigarettes during pregnancy are closer to those of narcotics than cocaine – daily use throughout pregnancy. The severity of the effects of the drug is one important factor, as is the pattern of use.

Third, and related to the previous issue is that we know little about dose response relationships between MATID and developmental outcome. There is some evidence for thresholds in the literature (10 cigarettes/day, .5 oz alcohol/day, three days/week cocaine during the first trimester) but the developmental effects of these thresholds have not been well established. Fourth, there is virtually no information on polydrug effects, yet polydrug use is more common than single drug use. Little is known about the pharmacology of polydrug use, such as how drug interactions affect fetal development. Although the final common pathway model involving the dopaminergic system is attractive it has not been empirically applied to the child development literature. Fifth, although there are hundreds of published developmental studies, there are relatively few long-term outcome studies, and methodological problems make interpretation difficult. Alcohol effects, especially FAS and COA, are well established but, for example, untangling prenatal MATID use from postnatal environmental (including parenting) effects on developmental outcome is still problematic. Sixth, there is the uncomfortable problem of effect size. Other than FAS, the literature does not show a devastating pattern of developmental effects. This is fortunate for the many children in society affected but has left researchers in a quandary with respect to how to interpret these effects for the public. The research typically addresses the question of whether or not there is an association between variables; such as drug exposure and child outcome. The issue of whether or not the association is of practical importance, i.e., clinically significant, is often not addressed, however, this issue is critical for policymakers. For example, in our multisite study of prenatal cocaine exposure with 8600 subjects we did find increased medical problems, however, the prevalence rates were low, raising issues as to the clinical significance of the findings [90]. Most findings are presented in terms of tests of statistical inference (*p* value). Effect size (size of the estimate in standard units) is usually not presented. The practical importance of an effect is dependent on two contexts, scientific and empirical [132]. The scientific context refers to the fact that, ideally, policy decisions would be data-based. However, data, i.e., effect size is constrained or decreased by problems in measurement, design and methods. In other words, measured effects are likely to be small due to methodological limitations. The empirical context refers to the fact that results need to be evaluated in the context of the existing empirical literature. Meta-analysis is a useful tool for this [132]. For example, using meta-analysis, we were able to show that the effect sizes of prenatal cocaine exposure on IQ and language when children reach school age range from .33–.71. Our findings [133] from the Maternal Lifestyle Study of prenatal cocaine exposure and child outcome showed that the effects of cocaine on IQ actually *increased* over time from 1.5 in infancy to 3.5 IQ points at age 7. If this pattern continues, the deficit will be 7.6 IQ points at age 11. We also found that children in the cocaine exposed group are more than 1 1/5 times more likely to qualify for special education services than children in the unexposed group.

The question that the scientific community and policy makers have not come to grips with is how to interpret more subtle effects: what are clinically significant (as opposed to statistically significant) effects and how do these effects impact policy including treatment programs? There are tough questions to answer. If a study does show a MATID effect, how many children are affected, what is the magnitude of the effect and what does it mean? Lastly, as mentioned earlier, and related to the previous issue, developmental MATID effects must be understood in the context of the child's overall development. This means understanding protective and resiliency factors as well as risk factors, and viewing drugs as one of a number of events that will determine the developmental outcome of the child. This will help enable us to develop interventions designed to minimize risk factors and maximize protective factors.

Policy options

Importance of context

Context is always important for social policy, but in the case of drug abuse during pregnancy, context is important in several different ways. First, policy is, by definition, dependent on social context. As was clear from our historical review, the social context for prenatal drug exposure changed dramatically in the mid-1980's with the crack epidemic. Social consternation with the high level of use by pregnant women centered on consequences for the children and then shifted to the fetus. Once the fetus became the central protagonist there was a significant shift in social perception. The concept of harming the fetus by using drugs during pregnancy resulted in sanctions by both the criminal justice system and the child protective system.

Second, existing policies have been made in a climate of scientific uncertainly about the effects of prenatal drug exposure. Policies looking for a "quick fix" have taken a linear approach by focusing on the single risk factor of prenatal drug exposure as the explanation for the outcomes of these children. However, as we will show later, there is a wide variation in the developmental outcome of these children, and the determinants of development in these children are multifaceted and complex. Drug effects must be understood in the context in which the child develops. Parenting and other environmental factors in addition to drugs are responsible for the outcome of these children. Poverty (which can be a proxy for an inadequate environment) affects IQ without drugs. The combination of drugs and poverty can be a "double whammy" and put children at extreme disadvantage [91]. Policy must take into account the fact that biological vulnerability and environmental factors interact to determine the outcome of these children, and this is a dynamic process [134].

Third, context is also important because social policy in this area brings up many ethical dilemmas. In the "real world," drug-using pregnant women are mostly poor and minority. The social policy context for these women includes dramatic reductions in services and access to legal recourse. In the real world, child rearing is also affected by context, including culture. Drug-using mothers may want "the best" for their children, but what they mean by "best" will be influenced by their context, experience and belief systems and may differ from what the experts mean by "best." And "best" needs to be weighted against the alternative. Foster placement, especially multiple foster placements, is not necessarily a better alternative for the child. Pragmatic recognition of how these women are treated by policies is necessary to enlarge the frame and alter the construction of the problem.

Fourth, to say that policy is dependent on social context also means that policy is shaped by public perception and attitudes. One of the consequences of shattering the placental barrier, triggered primarily in response to the use of cocaine by pregnant women in the 1980s, has been two parallel sets of attitudes towards drug use during pregnancy resulting in two parallel sets of policy responses. One approach is to view drug abuse as a mental health/medical illness. Advocates of this approach recommend policy that emphasizes treatment and prevention including reproductive health care, therapy for past abuse and for parent child relationships. The other approach is punitive and views drug-using women as criminals and as irresponsible ("how could they do this to their babies?"). This approach translates into sanctions within both the criminal justice system and the child protection system. The new twist was the construct of harming the fetus by using drugs. The cocaine problem shone the spotlight on this issue and it has now intensified concern about other drugs as well including marijuana, alcohol and tobacco. For example, if "harm" to the fetus is no worse for cocaine than it is for legal substances such as tobacco and alcohol, should the same criminal and treatment policies apply for use of all these substances? It is important to point out that for many advocates of the sanction approach, treatment is included. The two approaches may not agree on issues such as the nature of addiction, autonomy of the pregnant woman, status of the fetus, and utility of punitive measures; they do agree that treatment is an essential component of the policy response [135].

Views of addiction

There is much societal debate on what should be the appropriate response to maternal substance abuse during pregnancy. One reason for the ongoing controversy is tied to the conflicting views of addiction, and again an historical perspective is useful. Society's approach to substance use has changed markedly over the decades from being

viewed as an individual problem for which society has no responsibility to a major social problem that must be addressed by the mental health, medical and criminal justice systems. For example, fifty years ago, a person seeking help for a serious alcohol or drug problem would have been treated for months in a psychiatric hospital diagnosed using the American Psychiatric Association's Greybook (APA 1942) as a character disorder along with stuttering and bed wetting. Today people with substance abuse disorder have a better chance of being identified and finding support and/or being required by the criminal justice system to undergo treatment. Alcohol and Drug Abuse are now distinct psychiatric (DSM-IV) disorders; treatment is specialized and more often outpatient.

Today this issue tends to get polarized, especially when it comes to pregnant women. There is the liberal perspective of drug abuse that calls on people to look at drug use as a public health problem requiring compassion and understanding. To deal with drug use during pregnancy in a harsh way would be unconstitutional, misogynistic, and ineffective [70]. From this perspective, drug use during pregnancy must be treated in the same manner as depression or other mental illness. It has also been suggested that not only is it ineffective to treat drug and alcohol addiction as a criminal act, but it is also a punitive approach that is akin to criminalizing mental illness [136,137]. The opposing conservative view of drug use during pregnancy is that it is a voluntary and illegal act that requires significant neglect of the rights of the fetus. From this view women who use drugs during their pregnancy are willfully committing a criminal act, deserving a legal response [138].

While the pendulum has swung back and forth between viewing addiction as a medical problem or viewing it as a criminal problem, the highest levels of the judicial system have made their perspective clear. As early as 1925, the United States Supreme Court recognized addiction to be a disease. In the Linder decision, the justices state, "...addicts...are diseased and proper subjects for such (medical) treatments" [139]. The Court reaffirmed this opinion in the 1962 decision in the case of Robinson v. California. The Court stated, "...It is unlikely that any state at this moment in history would attempt to make it a criminal offense for a person to be mentally ill, or a leper, or to be afflicted with a venereal disease...in light of contemporary human knowledge, a law which made a criminal offense of such a disease would doubtless be universally thought to be an infliction of cruel and unusual punishment in violation of the Eighth and Fourteenth Amendments...the prosecution is aimed at penalizing an illness, rather than providing medical care for it. We would forget the teachings of the Eighth Amendment if we allowed sickness to be made a crime and permitted sick people to be punished for being sick..."

From a medical perspective addiction is a chronic disease [140-143]. A medical dictionary defines disease as: "any deviation from or interruption of the normal structure or function of any part of an organ or system (or combination thereof) of the body that is manifested by a characteristic set of symptoms and signs, whose etiology, pathology and prognosis may be known or unknown." The vagueness of this definition illustrates the broad range of conditions that are called disease, and also that whether or not a particular condition is called a disease could be due to cultural consensus as much as medical factors. This social stigma probably plays a major role in addiction not being viewed as a disease.

Prosecution and state statutes

There are many different reasons why state legislatures have taken an interest in addressing the problem of substance abuse by pregnant women. One reason is the basic notion that the state has an obligation to provide for the welfare of its citizens. It is also of financial importance to the state to address the issue [144]. Immediate effects of MATID use include pregnancy complications as well as health issues for the newborn, driving up the amount of money that the state must spend on obstetrical and neonatal care. This is not where the cost of maternal drug use ends for the state. After birth, children born to mothers who used substances during pregnancy are at a higher risk of neglect, abuse, and abandonment, thus requiring the intervention of child protective services or juvenile courts at further cost to the states [145]. First year costs to states of births affected by maternal substance use can be as high as $50,000 each above the cost of "usual" births. State expenses for public assistance and foster care for each year after the first can be as high as $20,000 [146].

The costs to the state coupled with media attention as a result of the "crack baby" epidemic of the 1980s, forced states to respond. Most often the response came in the form of legislation [147]. Many different types of bills were introduced in an attempt to combat the problem on many different fronts and levels. Some bills addressed the roles of health professionals; specifically, these bills often required doctors to report incidents of maternal substance abuse to the proper authorities; others required social service agencies to assess families affected by alcohol or drugs for abuse and neglect; and other bills introduced the requirement of commercial vendors who sell alcohol and tobacco to post warnings about the effects of these substances on pregnant women [148].

State approaches to maternal substance use

States have employed a wide variety of strategies to combat maternal perinatal alcohol and drug use. Due to the public's outcry for an answer to the problem of "crack babies" and other drug-exposed infants, the courts implemented policies and practices that emphasized personal responsibility and punishment [1]. User accountability was stated as the basis for most drug control policies. User accountability was based on the idea that if there were no drug users, there would be no drug problems, and that users were responsible for creating the demand that made trafficking a lucrative criminal enterprise [149]. Of course, our cultural penchant for punishment and criminalization may have played a role in justifying these policies.

Since there were not, and still are not, any statutes on the books specifically criminalizing drug use during pregnancy, women have been prosecuted under statutes that deal with child abuse, assault, murder, or drug dealing [150]. One of the newest attempts in prosecuting women is using statutes related to the delivery of drugs to a minor. However, it is much more difficult to convince a judge and jury of prosecuting on these grounds because there is no explicit language in any statute delineating that a fetus can be considered a minor, entitled to all the rights and privileges afforded thereto [151,152].

Prosecutorial strategies

Since 1985, approximately 240 women in thirty states have been criminally prosecuted in relation to their use of drugs during pregnancy [71]. State supreme courts have overturned nearly all these convictions. Prosecutorial attempts fall under a few general types of criminal statutes. There are statutes that deal with the delivery of a controlled substance to a minor, statutes that attempt to hold mothers who use drugs accountable under child abuse statutes, those that charge mothers with manslaughter should the baby die, and those related to involuntary detention and treatment of the mother [153].

Delivery of a controlled substance to a minor

In light of the lack of specific criminal statues applying to maternal substance abuse during pregnancy, state prosecutors have come up with creative ways of dealing with the issue. One such creative method is prosecuting under statutes that govern the delivery of a controlled substance to a minor. Prosecutions in these cases focus on the minute after birth before the umbilical cord is cut. At that moment the child is fully born, and thus a person under the Fourteenth Amendment entitled to full and equal protection under the law. At the same time the child is still attached to the mother and could possibly be receiving drugs through the bloodstream [20,153,154].

Arguably the most renowned case prosecuted in this manner is that of Florida v. Johnson [155]. Jennifer Johnson was convicted in Seminole County, Florida of delivering a controlled substance to her baby through the umbilical cord after birth. The conviction came after hospital officials discovered that her two children had positive toxicology results for cocaine following birth. Johnson also admitted to smoking crack cocaine three to four times every other day throughout the course of her pregnancy. Johnson was convicted and sentenced to 15 years probation. In 1992, the Florida Supreme Court overturned her conviction on the basis that the statute was not meant to apply to the delivery of controlled substances through the umbilical cord (Florida Supreme Court, 1992).

Child abuse

The most common strategy employed is charging pregnant drug users with child abuse and/or neglect. The challenge facing prosecutors is finding a way to convince the court that an unborn child falls under the legal definition of "child" and thus deserves protection [153,156]. The earliest prosecution using child abuse and neglect statutes was the 1977 case of Reyes v. California. In this case the mother gave birth to heroin-addicted twins. Ms. Reyes was convicted under child endangerment laws. However, the conviction was overturned and the case dismissed by the appellate courts on the grounds that child endangerment laws were never intended by the legislature to apply to fetuses. Thus in the eyes of the law a fetus was not really considered a child [157].

Cases tried using abuse and neglect statutes revolve around the central issues of whether or not the fetus can be considered a "child" in the eyes of the law, and whether or not the behavior of the mother prior to the birth of the child can be considered viable criteria for judging whether abuse or neglect has occurred. Even given these issues, many convictions have been obtained using these statutes. While convictions under these statutes have been overturned in higher courts of appeal, the high courts have also suggested that states take the initiative to pass pieces of legislation that specify prenatal maternal conduct as admissible in establishing abuse, or legislation that establishes the personhood of the fetus [149,150].

Manslaughter

Another form of prosecutorial strategy that states may employ is charging the pregnant drug user with manslaughter. Manslaughter statutes are difficult to apply to the cases of pregnant women because the statutes were intended for third party criminal culpability. This means that manslaughter laws were originally intended to cover the death of a baby as the result of the actions of a third party [153,157,158]. An example of this is the Florida criminal code which states that the willful killing of an

unborn child, by any injury to the mother of such child, is murder if it resulted in the death of such mother, to be deemed manslaughter, a second degree felony [159]. Despite these laws, there have been cases in which women with babies stillborn to mothers in their third trimester were charged with manslaughter. This prosecutorial strategy has seldom been employed and has never resulted in a conviction. It is doubtful whether manslaughter charges would ever actually result in a conviction for a drug-using mother if tested in a jury trial. It is even more unlikely that the charge would be upheld in higher courts of appeal. The case law does not lend itself to the legal conception of the fetus as a person with independent legal rights separate from those of the mother. When cocaine mothers have been convicted of manslaughter, it was the result of their guilty pleas without the deliberation of public trials [22].

Involuntary detention

In an attempt to decriminalize drug use in pregnant women, involuntary detention in treatment programs has been offered as an alternative. It has been argued that involuntary detention is the best available mode of administering punishment, rehabilitation, and deterrence all at once, as well as providing the addict with education and protection for the infant [160,161]. The trend in states is to move toward reducing the severity of the effects of drug use on the infant. According to The New York Times, when doctors specializing in maternal-fetal medicine were surveyed in 1986, more than half of them agreed that pregnant women who refuse medical advice and endanger the life of the fetus should be detained in hospitals and forced to follow their physician's orders [160]. By committing the pregnant drug user without her consent, the state is essentially taking custody of the child before it is ever born. This presents a legal and ethical conflict. By involuntarily committing the mother as a mode of protecting the infant, the court is, in some respect, putting the needs and the health of the child over those of the mother. There is an understood obligation to the mother's health and well being, but with involuntary detention, the health and well being of the fetus comes first, even though this is not a legally recognized obligation [150].

Civil interventions

With the waning popularity of criminal prosecutions against perinatal substance abusers, states have turned toward civil legal remedies. These actions are both more pervasive and more successful than criminal prosecutions. This is largely because in order to establish a prosecution against someone the state must prove that the defendant is guilty of the alleged crime beyond a reasonable doubt. In civil actions the state is only obligated to prove there is a preponderance of evidence to suggest the guilt of the accused [149].

Child neglect statutes

Civil actions in regard to child abuse and neglect provide a basis for which social welfare agencies, especially child protective agencies, can intervene and conduct investigations into the fitness of a parent [149,162]. While criminal child abuse and neglect statutes seek to punish the parents for their failure to properly care for their children, civil child neglect statutes seek to intervene in the family setting in an attempt to introduce plans of action for rehabilitating the parent and restoring normal order to the family unit [22,161]. Civil actions are established in the same way as criminal child abuse cases. They are most often based on the results of toxicology screens performed on the child at the time of birth. There are questions today on whether a positive toxicology screen is enough to establish neglect, remove the child from the home, and ultimately terminate parental rights. The general "rules" the courts have established in deciding these cases are that children have the right to be born with a sound mind and body and past evidence of neglect and abuse is relevant in determining future harm [147].

Involuntary civil commitment

Civil commitment is a civil action with state intervention that places individuals in some type of inpatient facility against their will after the state has demonstrated they are dangerous or unable to meet their most basic needs or both [149]. This type of intervention has been widely used against substance abusers, however only one state has successfully included pregnant women in the statutes that call for involuntary commitment.

Tort actions

Tort actions are civil actions that are filed by an independent party on behalf of the fetus [147,149]. These actions are meant to deter drug use by imposing financial consequences on the drug-using mother. In tort actions women are held accountable for the financial burden incurred for the cost of the birth of the drug-exposed baby.

State statutes

In formulating laws, whether criminal or civil, pertaining to perinatal substance abuse, there are certain general categories that are adhered to. There are laws dealing with the termination of parental rights and the removal of children from the home, testing/reporting/ identifying drug-exposed infants, child abuse, and treatment for the mother and alcohol. Figure 2 shows the number of states with laws in each of these categories. Table 2 shows which states have specific laws and Table 3 (see Additional File 1) provides a summary of the specific laws.

Child abuse and neglect

More than one-quarter of the states have passed laws that specifically define a mother's drug use as child abuse or

Table 2: Type of Substance Abuse Statutes by State

STATE	Mandates Prenatal Testing/ Screening for Substance Use	Includes maternal substance abuse or infant substance exposure under the definition of abuse	Mandates Neonatal testing For Drugs	Mandates Reporting as Child Abuse or Neglect	Mandates Postnatal Reporting Assessment or Services	Mandates Priority Access to Treatment for Pregnant Women	Provides Treatment Program or Coordination of Services	Perinatal Substance Abuse Task Force Established by State Legislature	Mandates Posting of Dangers of Alcohol to Pregnant Women
AL									
AK									
AZ		Yes		Yes			Yes		
AR									
CA					Yes		Yes	Yes	
CO							Yes		
CT							Yes		
DE									
DC				Yes					Yes
FL		Yes		Yes					
GA						Yes			Yes
HI									
ID									
IL		Yes		Yes					
IN							Yes		
IA		Yes		Yes				Yes	
KS						Yes	Yes		
KY								Yes	
LA							Yes		
ME									
MD		Yes		Yes		Yes	Yes		
MA				Yes					
MI		Yes		Yes				Yes	
MN	Yes	Yes	Yes	Yes			Yes		
MS									
MO									
MT									
NE									
NV				Yes					
NH								Yes	
NJ									Yes
NM									Yes
NY									Yes
NC							Yes		
ND									
OH							Yes		
OK				Yes				Yes	
OR									
PA							Yes		
RI									
SC		Yes		Yes					
SD		Yes		Yes			Yes		
TN									
TX									
UT				Yes					
STATE	Mandates Prenatal Testing/ Screening for Substance Use	Includes maternal substance abuse or infant substance exposure under the definition of abuse	Mandates Neonatal testing For Drugs	Mandates Reporting as Child Abuse or Neglect	Mandates Postnatal Reporting Assessment or Services	Mandates Priority Access to Treatment for Pregnant Women	Provides Treatment Program or Coordination of Services	Perinatal Substance Abuse Task Force Established by State Legislature	Mandates Posting of Dangers of Alcohol to Pregnant Women
VT									
VA	Yes	Yes		Yes			Yes	Yes	
WA									
WV							Yes		Yes
WI					Yes	Yes			
WY									

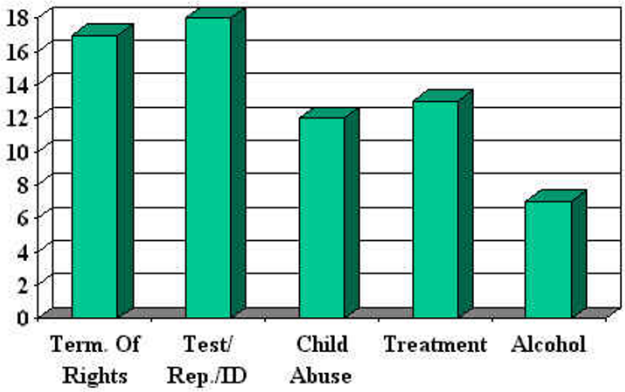

Figure 2
Number of States by Type of Substance Abuse Statue

neglect. Thus by defining maternal drug use as an act of child abuse, these states are insuring serious consequences for the mothers, including criminal prosecution, removal of the child(ren) from the home, and termination of parental rights. Every state has laws mandating reporting of child abuse [163]. Thus in the states where drug use is defined as child abuse, reporting of the abuse to the proper authorities is also mandated.

Termination of parental rights/removal from the home

A major reason women do not disclose their drug use and seek treatment is because they fear their children will be removed from their homes and their rights may be altogether terminated. This is not an unfounded fear. Sixteen states have enacted laws that allow for the removal of a child from the home based on various factors, including a positive toxicology screen at the time of birth, or a confirmed report of drug use in the home. After the child has been removed from the home, child protective services is obligated under ASFA 1997 to move quickly in ensuring that the parent has the opportunity to obtain treatment for their addiction through a court-formulated service plan. Noncompliance can result in termination of parental rights and adoption of the child.

Testing/reporting/identification

While every state in the country has mandatory reporting laws for child abuse and neglect, not every state has laws concerning testing/reporting/identification of pregnant and postpartum substance users. This is because not every state specifically defines drug use during pregnancy as child abuse or neglect. Given this fact, there are still a significant number of states, 17, that have laws specifically related to prenatal substance exposure. These laws range from mandating toxicology tests for infants of mothers suspected of using drugs, toxicology tests for the mother herself, to reporting the findings of any positive toxicology screen to the proper authorities, whether that be the police department or child protective services [164].

Criminal offenses vs. treatment

One of the most pressing questions among social service professionals today is whether maternal substance abuse warrants treatment or criminalization. The states also struggle with this question in formulating laws. Many states are leaning towards treating the mother. In fact, no less than one quarter of the states have laws in place mandating state establishment of treatment programs for expectant and parenting women who are also substance abusers. The state of California has enacted a law mandating an alternative sentencing program that combines treatment with criminal consequences for noncompliance. Under Cal. Pen. Code 1174.4, pregnant women with an established history of substance abuse, or pregnant or parenting women with an established history of substance abuse who have one or more children under the age of 6 are eligible to enter a drug treatment program, coupled with one year of transition services under intensive parole supervision. Should they complete the program they will be discharged from parole. If they do not complete the program, they will be returned to state prison to complete their original sentence.

Alcohol policy

Given the fact that alcohol is a legal substance in this country, it is difficult for states to enact laws criminalizing it for pregnant women. As long as they are over the age of 21, pregnant women are free to drink. However seven states do have laws in place requiring establishments that sell alcohol to post warnings about the dangers of drinking while pregnant [164].

The information in Tables 2-3 suggests that as a nation we do not have a uniform policy for dealing with drug use during pregnancy. State statues are quite varied ranging from no policies to strictly punitive policies. For some states, drug use during pregnancy equals child abuse (Iowa, South Carolina, Tennessee, Florida). Other states (Maryland, New York) are more vague and include treatment options. For example, Missouri grants pregnant women priority at drug treatment centers and Washington only requires an investigation. States also vary with respect to the definition of "drug." For example, some states (Maryland, Iowa, Oregon, Idaho, Illinois) only mention illegal drugs or controlled substances and not alcohol.

Policies for newborn drug testing, including conditions under which a drug screen can be ordered, and mandatory reporting also vary from state to state. Some states (e.g.,

Massachusetts, Arizona, Minnesota) require mandatory reporting to CPS following a positive drug screen; Colorado "encourages" but does require reporting; and other states (e.g., California, Kentucky) evaluate and determine if further investigation is necessary. In California, a positive toxicology screen is not in and of itself a sufficient reason to report; further assessment of the needs of the mother and child are required.

Foster care

Maternal drug use impacts directly on the foster care system. In the mid-1970s, there were over half a million children in substitute care in this country. There was concern with child welfare programs and in 1980 the concept of "permanency planning" was codified into law. By 1985, the foster care population dropped by almost 50%. But permanency planning was ultimately ineffective and in 1995 the number of children in substitute care had risen again to nearly 500,000. The number of children under five years of age is increasing at twice the national rate of the general foster care population. This dramatic increase in the number of children in foster care from the late 1980's through the 1990's is due in large part to increased drug use among women, particularly cocaine use among pregnant women.

Substance use during pregnancy not only raises questions about the options for the drug-using women, treatment considerations, and the medical and developmental outcome of the infant, but also about the placement of the drug-exposed infant. There have been substantial reports of the effects of prenatal substance exposure upon both medical and developmental outcomes of the infant. Arising from this is the perception of drug-using mothers being unable to care for their children, thus propelling social service agencies to intervene and remove the child from the mother's custody.

The increased need for foster care homes has created a lack of available foster homes for these infants. The fear of detection, incarceration, and child removal associated with reported drug use drives women away from the health care system for prenatal care and from seeking treatment for their substance abuse problems. Thus, there is an increase in the number of "boarder babies."

Boarder babies

"Boarder babies" are at-risk infants (typically drug-exposed) in the custody of Child Protective Services (CPS) who remain in the hospital beyond the date of medical discharge, i.e., they do not require any special medical care but stay in the hospital because they are awaiting placement decisions or because placement options are sparse. The "boarder baby" problem is tied to the criminalization of mothers with infants who are prenatally drug exposed and to a decrease in the availability of appropriate foster homes [165].

The U.S. Department of Health and Human Services estimated that there were 9,700 "boarder babies" nationwide in 1991 [166]. For this study "boarder babies" were defined as infants younger than 12 months of age who remain in the hospital beyond the date of medical discharge. Almost one-fourth stayed from 21 to over 100 days beyond medical discharge. "Boarder babies" place increased demands on both the health care system and the child welfare system. A second study recently reported 1998 estimates and showed 13,400 boarder babies nationwide. This represents a 38% increase in the boarder baby population between 1991 and 1998. The majority was African American, although the percentage of African American boarder babies was less in 1998 (56%) than in 1991 (75%).

Although the total number of boarder babies increased by 1998, there was a change in the geographic distribution of these infants. In 1991, three jurisdictions (New York City, Cook County, Chicago and Los Angeles County) accounted for 47% of the boarder baby population. By 1998, boarder babies in these three jurisdictions decreased 21% and increased by 90% in the rest of the nation. Hospital staff in the three jurisdictions attributed the decrease in the boarder baby population to improved efforts by the child welfare agencies and hospitals to more promptly identify alternative placements for these children. The per diem cost for boarder baby care rose 17% from $476 in 1991 to $570 in 1998. Positive findings were that from 1991 to 1998, the mean length of stay for boarder babies beyond the point of medical discharge decreased from 22 days to 9 days, and the percent residing in hospitals for more than 21 days decreased from 24% to 12%. Also over this period the percent of premature infants decreased from 47% to 35%, and the percent low birthweight decreased from 57% to 33%.

Sixty-five percent of these infants were tested for drug exposure in 1991; 82% were tested in 1998. In 1991, 79% of those tested were positive for drugs. Drug exposure has been the most common reason for keeping babies in the hospital, with crack/cocaine as the most prevalent drug accounting for 71% of the cases. The number of boarder babies discharged to out of home placement was 66% in 1991 and 70% in 1998. The most common placement was foster care (59% and 57% in 1991 and 1998 respectively). Relative foster care was 14% and 12% in 1991 and 1998.

Abandoned infants

Although the terms "boarder babies" and "abandoned infants" are often used interchangeably, and both are

related to prenatal drug exposure, they are differentiated by the Federal government. Boarder babies may eventually be claimed by their families or abandoned and/or placed in alternative care. Abandoned infants are under the age of 12 months, and have not yet been medically discharged but who are unlikely to leave the hospital in the custody of their biological parent(s). This includes infants whose parents are unwilling or unable to provide care and/or whom the child welfare agency determines cannot safely remain in the care of their biological parent(s). Abandoned infants are viewed as "potential boarder babies" whose living arrangements were resolved prior to the time of medical discharge. Obviously, infants removed from their biological parent(s) due to maternal drug use during pregnancy fit into this category.

The survey also queried hospitals in those jurisdictions with a boarder baby problem about the number of abandoned infants. In 1998, there were 17,400 abandoned infants in these hospitals compared to 11,900 in 1991, an increase of 46%. They were mostly African American (67% in 1991 and 48% in 1998) and mostly premature or low birthweight in both years. The percent of infants positive for a drug was 78% in 1991 and 72% in 1998 and Cocaine was the drug in 70% of the cases in both years. Unlike the boarder babies, there was no change in the average length of stay for abandoned infants; the average was 34 days in both 1991 and 1998. Out of home placement was 68% and 58% in 1991 and 1998.

Foster care and child outcome

Infants placed in foster care because of illegal drug exposure have more health and caregiving needs than non-exposed infants placed in foster care [167]. Drug-exposed infants were more likely to have conditions such as anemia, asthma, small size, and feeding, sleep, and behavior problems. Other research has shown that intrauterine drug exposure predisposes infants to poorer outcomes such as low birthweight and delayed cognitive or motor development. Although research also suggests that the effects of intrauterine substance exposure may be subtle and most health care professionals may not consider the needs of these infants severe, they do place more demands upon the caregivers of these infants. Many caregivers feel they are ill equipped to care for drug-exposed infants. They do not understand the subtle needs of drug-exposed infants and therefore fear they will not be able to manage their care. These needs place additional demands on the foster family and thus the concerns of not being able to meet those needs contribute to the lack of placements for drug-exposed infants.

Even when foster care placements are available, foster parents of infants prenatally exposed to drugs have a higher "burnout" rate [168]; that is, they choose to return the baby more often than if the baby is not drug-exposed. They face a lack of supportive services. Interestingly, adoptive parents of infants whose drug exposure status was unknown to them expected the easiest time in caring for their children [169]. However, with regards to satisfaction, there was no difference between those families adopting substance-exposed infants as compared to those adopting infants not exposed to illegal drugs.

Infants that test positive at birth are more likely to be placed in foster care [170]. They are also more likely to have siblings in foster care and their mothers are more likely to have previous involvement with CPS. Infants exposed to drugs prenatally are also likely to be placed in kinship (relative foster) care but receive fewer visits from their biological parents [167]. Yet, these same families do not receive significantly enhanced services. One pressing issue is that the problems associated with infant outcome are influenced by other factors pertaining to maternal drug use such as poor health, nutrition, depression, poverty and the postnatal environment of these infants. From this arises the question of which needs and services are being considered when the infant is placed. All issues surrounding drug addiction (treatment, lack of support, finances) seem to negatively impact upon parenting. Abused or neglected children are at risk for developing poor attachments to their caregivers. The emotional consequences of multiple placements should be considered in the placement of infants.

In a study to determine factors that affect the nature of legal custody and placement, MacMahon [171] studied the outcome of infants who were dependents of the court at discharge from the hospital. Court-ordered services for the mothers differed, although most were required to attend a drug rehab program, undergo random drug testing, and receive public health nurse visits. Other families were required to attend psychological counseling and parenting education classes. Those infants reunited with their biological mothers in their first year of life had older mothers, had received some prenatal care, did not have previous involvement with CPS, and had mothers who had not had any other children removed from them. Two factors related to a parent never receiving custody of the child were the mother's previous involvement with CPS, and having previously lost custody of her child. Since some mothers were not able to comply with court-ordered drug treatment and had positive urine screens, they did not receive full custody of their infants. The MacMahon study showed that court-ordered monitoring of required services can help with permanency decisions. Yet, this raises questions about the additional supportive services necessary for these families.

Increased communication between the agencies that provide care to these at risk infants and families is critical [170]. Coordinated case management can decrease obstacles to services [172]. The increased healthcare risks of these infants suggest the need for more intensive interventions and training. A comprehensive and multidisciplinary approach to the care of these infants seems warranted [167,173]. Thorough assessment of the infants that includes an evaluation of developmental areas such as motor, cognition, language, self help skills, coping skills, and emotional well being should be conducted at regular intervals after placement in foster care. In addition, an assessment of the caregiver's parenting skills should be conducted. Helping both biological and foster parents understand the child's needs and capabilities is crucial in trying to de-stigmatize drug-exposed children [174]. Interventions should include biological and foster parents when appropriate. Having the biological mother attend the infant's medical or diagnostic appointments can enhance continuity of care [167]. Longitudinal follow-up is critical. Comparisons of infants in foster care exposed to drugs with infants in foster care not exposed to drugs did not show increased developmental delays in the group of infants prenatally exposed to drugs [174]. However, approximately half the infants in each group were at risk for further delays, suggesting the need for long-term follow up. Finally, training of foster parents is a key component for enhancing the caregiver child relationship.

While the research is unclear about the outcome of infants exposed to drugs, the research concerning those infants placed in foster care stresses the importance of coordinated, comprehensive, and intense interventions and monitoring. It is understood that the needs of infants prenatally exposed to drugs include consistent monitoring. More studies are needed to evaluate the longitudinal outcome of these proposed services.

Adoption and safe families act (ASFA)

Growing national concern regarding too many children who linger in foster care led to the passage of the Adoption and Safe Families Act (ASFA). ASFA was signed into law on November 19, 1997 and puts into place the most extensive changes in federal child welfare policy since the Adoption Assistance and Child Welfare Act of 1980. ASFA seeks to provide the states with the necessary tools and incentives to achieve the original goals of Public Law 96-27: safety, permanency, and child and family well being. The impetus for ASFA was the general dissatisfaction with the performance of state level child welfare systems in achieving these goals for children and families. ASFA seeks to strengthen the child welfare system's response to a child's need for safety and permanency at every point along the continuum of care.

In part, the law places safety as the paramount concern in the delivery of child welfare services and decision-making, clarifies when efforts to prevent removal or to reunify a child with his or her family are not required, and requires criminal record checks of prospective foster and adoptive parents. To promote permanency, ASFA shortens the time frames for conducting hearings, creates a new requirement for states to make reasonable efforts to finalize a permanent placement, and establishes time frames for filing petitions to terminate the parental rights for certain children in foster care.

ASFA requires child welfare agencies to pay heightened attention to children's well-being and safety and to their needs for permanent families, and is founded on five key concepts: (1) the child's health and safety "shall be the paramount concern" in determining what efforts should be made to reunify families, (2) in "aggravated circumstances" as defined in State law reunification services to families are not required (3) when no reunification services to families are required, the child needs a quick, alternative permanent placement, (4) in all other cases, services to families need to be improved and accelerated and, (5) in all cases, permanency – whether the goal is to return home, adoption, legal guardianship, or legal custody with a fit and willing relative – needs to be expedited.

Under ASFA, a permanency hearing must be held in Family Court 12 months after the child enters foster care and at 12-month intervals thereafter. For ASFA, the date that a child enters foster care is defined as either: 1) sixty-days after the child is removed from the home, or 2) the date that the child is found by a Court to be an abused or neglected child, whichever is earlier. At the hearing, the Family Court judge must determine whether and when the child will be either returned to the birth parents, placed for adoption, referred for legal guardianship, placed with a fit and willing relative, or placed in another planned permanent living arrangement.

In order to ensure that children do not linger indefinitely in foster care, ASFA creates a presumption that a petition to terminate parental rights must be filed, and concurrently steps to finalize an adoptive placement must be initiated in the following three circumstances: Where a child has been in foster care for 15 of the last 22 months, OR where a court has determined a child to be an abandoned infant, OR where a parent has committed certain crimes against the child or a sibling (i.e., murder, manslaughter, attempted murder or manslaughter, or a felony assault resulting in serious bodily injury to the child or another child of the parent).

Although ASFA creates the presumption that certain categories of foster children should be freed and adopted

quickly, it also creates three grounds for exceptions to that presumption: (1) at the option of the State, the child is being cared for by a relative, (2) a State agency has documented in the case plan (available for court review) a compelling reason for determining that filing a TPR petition would not be in the best interests of the child, or (3) the state has not provided to the family of the child, consistent with the time period in the State case plan, such services as the State deems necessary for the safe return of the child to the child's home if reasonable efforts to reunify the family are required.

Barriers to treatment

The overriding feeling among policy makers and social welfare agencies is that preserving the family is important where at all possible. This view has been reinforced by ASFA. Substance use is not always a clear indicator of a parent's lack of commitment to their child. In fact many drug users are committed to being parents. One large barrier to seeking treatment is that the substance addict is afraid that if they seek help they will lose their children [175]. While the main goal of civil interventions is to protect children rather than punish mothers, many women view them as the state trying to take their children. Thus agencies have taken steps to make removing children from their homes the last resort. If this cannot be achieved, the next goal is family reunification and often the success of a program is measured by how effectively the program preserves the family.

Thus in an attempt to preserve the family, the preferred method of state intervention has become treatment and rehabilitation. There has been little consensus over the years on the best methods to employ in treating pregnant women with substance abuse problems. While treatment is recognized as the best method of addressing the issue, there are many problems that plague it that have made it difficult to implement on a large scale. These problems include a shortage of drug treatment programs, the resistance of drug treatment programs to including pregnant women, lack of consensus on the most effective method of treatment, cost, and whether treatment should be voluntary or forced [176,177].

The reluctance of drug treatment programs to accept pregnant women is a large problem that has plagued the treatment approach to state intervention. In trying to understand this phenomenon it is important to note that historically drug treatment programs have exhibited a reluctance and insensitivity to addicted women in general. In the early 1970s the National Institute on Drug Abuse began research that targeted women addicts. In the treatment programs they surveyed, they found that male staff and participants were openly hostile to women clients, employed a confrontational "therapeutic" style uncomfortable for women, and directed them into gender-stereotyped tasks and training which offered minimal compensation or chance for success after completion of the program. The programs also failed to address many issues that played a strong role in female drug addiction. These issues included the environments of violence and sexual exploitation in which the women often live. The programs provided no provision for the care of the women's children and also included no contraceptive and prenatal medical services [86,175,178]. This all but ensured lack of participation by pregnant women in established programs.

Reviews of the literature with regard to chemical dependency reveal that as a group the female user has been overlooked. Research also shows the lack of availability of treatment programs for women, specifically pregnant or child-bearing women. In 1976, Public Law 94-371 gave consideration to the funding of women's treatment and prevention programs [179]. Still, programs frequently overlook the special needs of the female user. Historically, in studies that examined treatment outcomes, approximately half of these studies included women, whereas a very small number focused on women alone. Studies that included pregnant women are even fewer. Those that do include this population focus mainly on birth outcome of the baby or early infant development, and very little focus was placed on treatment issues for women, or treatment outcome [180]. Finkelstein [181,182] noted that drug-using women tend to be younger and are more likely to be pregnant than the typical female client found in alcoholism treatment centers.

States have used a variety of approaches to address problems created by prenatal substance use. These approaches include criminal prosecution of the mother, civil intervention by child protective service agencies, and public health initiatives providing education, intervention, and treatment. Some states are combining approaches by creating "drug courts" (discussed later) that mandate treatment and/or jail time. However, at this time, no state has made pregnant drug addiction illegal, per se. Instead, states have applied statutes dealing with child abuse, assault, drug dealing to a minor, etc., to pregnant women who use drugs. In fact, the Supreme Court recently ruled that it is illegal for birthing hospitals to provide law enforcement agencies the results of drug screens performed in the hospital. It is unconstitutional for hospital workers to test maternity patients for illegal drug use if the purpose is to alert the police to a crime [183].

As mentioned earlier, 16 states consider alcohol or drug use during pregnancy sufficient grounds for an investigation of parental fitness and/or removal of the children from the home. Because of this, women using substances

during their pregnancy are often reluctant to seek help. The National Women's Resource Center also reports that women are unwilling to be separated from their children for long therapeutic interventions and fear losing custody more than criminal prosecution. Yet, Hser et al. [184] reports that legal pressure is a strong predictor of entry into treatment.

The financial cost of treatment is high. The National Association of State Alcohol and Drug Abuse Directors found that in 1997, states spent approximately $2 billion on treatment programs and the federal government contributed approximately $1.5 billion more. Funding for these treatment programs came from such sources as The Substance Abuse Prevention and Treatment (SAPT) Block Grant, which mandates that 5% of the grant must be allocated for pregnant women unless the state can demonstrate that the needs of pregnant users are already being met. Transitional Assistance for Needy Families (TANF) funds can be used for treatment if these funds are used for non-medical services such as those provided by psychologists or social workers. Despite the availability of funds and allocation for a variety of services, only one third of individuals admitted to drug treatment programs were women. Clearly, an even smaller percentage of pregnant users are receiving treatment.

Although the financial cost of treatment is great, there is limited information regarding the cost effectiveness of drug treatment. One study compared hospitalization rates for infants of two groups of women [185]. Both groups consisted of pregnant drug-using women. One group included women who had enrolled in a treatment program that provided both prenatal medical and drug abuse treatment services. The second group consisted of pregnant drug using women who did not undergo treatment because it was unavailable. Infants of mothers in the treatment groups had substantially better outcomes at birth and were less likely to need intensive care services. Mothers in this group also showed less drug use. Total cost comparisons showed that even with the cost of the treatment program included, the cost for intensive care services far outweighed the cost for treatment for pregnant drug-using women. While further cost effectiveness studies are warranted, this study indicates both the financial and medical benefit of drug treatment.

Our meta-analysis of the effects of prenatal cocaine exposure on school age children showed that special education services for these children cost our society upwards of $372 million per year [91]. That figure represents additional costs to society due to prenatal cocaine exposure alone. If that money was spent on services for these mothers and infants prenatally or at birth, the school age deficits could be prevented or at least minimized, the children would not have to wait for services until school age, and therefore they would suffer less. Intervention would be provided while the child's brain was still in the period of most rapid growth and thus easier to change, as compared with school age when there is less brain plasticity. In addition, there would be cost savings because the children would not need as extensive (if any) special education services. In a recent study of children growing up in poverty (not drug-exposed), it was found that an increase in economic resources of $13,400 over three years improved social skills and school readiness (Day care study, November CD). That's $4,466 per year compared to the $6,335 average cost for special education services years later once children start school [91].

One way to think about cost savings is through integrated drug treatment. Weisner et al. [186] found that patients with psychiatric and medical conditions linked to substance abuse can benefit from receiving their medical and addiction care in the same treatment program, without significant higher costs than is the case when treatments are separate. The prevalence of medical disorders is high among substance abuse patients but medical services are seldom provided in coordination with substance abuse treatment. This randomized clinical trial compared independent delivery of substance abuse treatment with treatment integrated with primary care. Patients in the integrated services group had higher abstinence rates and longer periods of abstinence than did patients in the independent services group. Moreover, costs were not higher in the integrated services group.

On the other hand, we need to be clear that policy recommendations should not be based on cost-benefit analysis alone. A sobering reminder was the Philip Morris report that the Czech government had saved 147 million dollars in health care, pensions and housing as a result of premature deaths due to smoking. Drug treatment is justified because people suffer and need it regardless of economics.

History of treatment issues

Policymakers and legislators have "led the charge" in trying to curb the problem of maternal substance abuser. However it is virtually impossible to have an impact unless the complex legal, ethical, emotional, and moral issues are seriously examined and overcome. Although there has been a boom of research in what substance exposure does to a fetus and subsequent child, there is a considerable lack of empirical research on treatment options for the substance-using mother [182]. At first, there was the documented shortage of substance abuse treatment programs, particularly for pregnant women [182]. In fact, most traditional treatment programs were designed primarily for men and were not appropriate for

women, especially pregnant women [187]. However, after the evidence regarding cocaine exposure in the 1980's, many government agencies such as the National Institute on Drug Abuse (NIDA), the Center for Substance Abuse Treatment (CSAT), etc., began to support treatment programs specifically designed for the pregnant or mothering substance user. In 1989 and 1990, NIDA supported 20 research demonstration projects that focused on the treatment of drug-using pregnant women. A description of these projects, termed the Perinatal 20, in addition to several other model programs, will be discussed later.

Despite the increased support and availability of treatment programs, there exist serious barriers to treatment for pregnant substance users. Very few treatment programs have existed for women or have used treatment modalities designed specifically for women. Many programs have relied on male-based recovery models. These treatment approaches followed the medical or disease model, with a focus on the client's problem without any regard for any other variables that may foster treatment. This approach, focused on the individual and not the pregnant addict within the context of her family or environment, presents a challenge to women willing to access treatment. For instance, it is difficult for many users to be accepted into programs. Breitbart, Chavkin, and Wise [188] surveyed five U.S. cities as to the availability of treatment programs to pregnant women. Although the large majority of programs did accept pregnant women (80%), many did not accept women on Medicaid and did not provide or arrange for childcare. Addiction treatment is more effective when it is designed to account for women's needs. Addiction treatment counselors find that gender-specific treatment is much more effective than mixed-gender approaches. For seriously addicted women, the most effective treatments are long-term and residential. Also low-income women often have a variety of other service needs such as the need to learn parenting and career skills [144,148,188,189].

Another barrier to treatment is identification of the target population. Many pregnant substance users are reluctant to admit to drug use for fear of losing custody of their children especially in states that legally require or practice mandatory reporting. Many of these women also fear criminal prosecution. The fear or threat of domestic violence is another serious concern.

The stigma against a pregnant user has been discussed in the literature. These women are frequently seen as weak willed and negligent of their children and are often blamed for exposing their children to drugs [190]. This in turn has led to legal interventions such as criminal prosecution, mandatory treatment, and removal of custody [144]. In addition, research has documented negative attitudes towards pregnant users by treatment providers, [182] which may make them reluctant to admit substance use.

Another barrier to treatment is the recognized lack of resources designed to help the pregnant addict and her children. Staff often lack knowledge and training regarding issues of pregnancy and addiction. The first challenge is a concern over to how to medically manage these women. Addiction to alcohol and other drugs is a biochemical process. Many addicted women wish to quit using drugs or alcohol but are physically unable to stop. Detoxification is usually the first step in treatment. Usually this takes place is an inpatient setting and is a short term way to eliminate chemical dependence, although it does not treat the enduring psychological and behavioral aspects of addiction. Since there is a fear of harming the unborn fetus with many of the medications used for detoxification, opiate-dependent women are especially susceptible to this barrier. Thus, their access is limited to most residential treatment programs. The concerns seem to be centered around the fact that detoxification can precipitate fetal withdrawal *in utero*, and that there is a high rate of recidivism among opiate-dependent individuals, which makes it harder to keep the unborn baby away from inconsistent levels of a drug and drug impurities. Many programs are ill equipped to include infants and children into the program. There is also a fear of liability for negative birth outcomes and a lack of appropriate care for the infant and/or other children while the mother is in treatment. The lack of services for both the mother and the baby together leads to mothers being reluctant to obtain treatment because of the amount of time spent away from the child. All too often, it is a choice between treatment or caring for a new infant and other children [182]. Even though programs do not include treatment services for children, they do not offer childcare as an alternative or incentive to treatment. Once again, the substance user must choose extended time away from the infant in order to obtain help.

Such factors contribute to the low numbers of pregnant substance users receiving medical care. When women do receive prenatal care it provides an opportunity for intervention or access to support providers. Prenatal care clinics may also be a venue for screening for substance use. Several brief screening tools have been devised that are appropriate for individuals with minimal substance abuse training [191]. However, many treatment programs do not include prenatal care as a vital component.

Another barrier is the lack of coordination between the resources needed by the pregnant substance user and lack of personnel who are sensitive to the issues and needs of this population. Also, many physicians are reluctant to

identify the pregnant user for a variety of reasons. For instance, they may feel that they are ill equipped to provide pregnant women with support, or they may have little confidence in social service agencies.

Finally, women may not seek treatment because they do not have transportation to and from programs and for economic reasons. They may not have insurance, money to pay for treatment, childcare, or treatment programs that are even available to them.

Historically, the approach for drug and alcohol treatment has been individually based, thus causing the pregnant addict to represent two avenues for intervention. Treatment professionals are often divided. First, there are those concerned with child welfare and second, there are those concerned with the addiction, thus leaving a clear lack of coordinated, comprehensive, family centered treatment [182]. Instead, a fragmented social service system stands in the wake of this division. Funding is usually not family centered so each service necessary in the treatment is in a separate location with unique regulations and procedures. Coordinating and accessing all these services becomes a burden and thus services are not utilized. Clearly, barriers to treatment exist for pregnant women and many programs are not providing the vital services needed for success.

Merely accessing treatment should be considered as a component for success. There is little definitive evidence in the treatment literature with regard to why a client interrupts or stops treatment. There may be differing rationales based on the type of user, i.e., age, race, education, gender, pregnant or parenting women. Hser et al. [184] examined factors affecting treatment entry. Characteristics that predicted treatment entry include legal pressure, lower levels of psychological distress and family or social problems, and prior successful treatment experiences. Perhaps treatment programs should identify such factors as part of their recruitment and service delivery and create individual, family centered treatment services.

Research on treatment effectiveness

There is no clear empirical evidence as to what treatment modality is best for substance using mothers, including inpatient or outpatient. The limited research on treatment programs is in part due to small sample sizes and the obvious lack of control or comparison groups. Hence, most of the information about treatment programs is descriptive in nature. Amidst the descriptions of these programs exists a discussion of what is the most effective approach to treatment. In this question lies the debate over one-step expectation programs of immediate abstinence or programs that institute a stage process of recovery. No current stage measure is designed specifically for substance using populations. Prochaska and DiClemente's Transtheoretical Model of Behavior Change posits that an intervention should fit an individual stage of readiness for change. This stage model has been used successfully with cigarette smokers. However, some research suggests this may not be an appropriate model for street drug-using populations [192,193]. Drug users who are not highly educated have difficulty completing a lengthy questionnaire and have difficulty with the vocabulary used within them [193]. Wing [194] proposed a four-stage model of alcohol recovery that included steps for life planning and recommended nursing interventions. Kearney [192] suggests that this model may be more appropriate for substance users because of the similarities between alcohol and drug users, and because this model recognizes the need for whole life restructuring required for lasting recovery.

Once again, even with the increase in treatment services there is little empirical research on them. The outcomes for these are usually retention in the treatment program and/or negative drug screens or abstinence from substances. Treatment retention has been related to successful program outcome [195]. The NIDA supported Perinatal 20 consists of twenty individual demonstration projects located across the country. Outcome information is not published for all of the projects as of yet, however, results for some of the projects will be discussed below in the context of type of treatment program.

Residential treatment programs

Camp and Finkelstein [196] investigated 170 pregnant and parenting substance dependent women who were placed in two residential treatment programs. In addition to drug use, this study examined the effectiveness of parenting component and aftercare services. Measures of parenting skills, self-esteem, etc., were compared before and after program participation. Birth outcomes were also examined. Results suggest that participants improved considerably in their parenting knowledge and self-esteem. With regard to infant outcome, few infants exhibited poor birth outcomes such as low birth weight or early gestational ages. Completion of the program resulted in longer periods of abstinence.

The Salvation Army Treatment program in Honolulu is a long-term residential chemical dependency treatment facility. Women have been admitted to the program for approximately 6 – 18 months either with or without their children. Most of the women are referred to the program by child protective services or the courts. The residents of the program are usually single, unemployed, and have a criminal history. Treatment plans are developed for the mother and if needed, her child. Treatment usually includes individual and group counseling, family groups, practical life skills, trauma resolution groups, and parent-

ing classes. The treatment team includes addiction counselors, early childhood specialists, nurses, social workers, and psychiatrists. Women enrolled in the program also have a weekly parent child therapy session to maximize their interaction capabilities. This program also includes a therapeutic nursery for the children focused on developmental mastery and remediation of any problems associated with prenatal drug exposure. A psychiatric day treatment program for children aged 3–7 years who have emotional or behavioral problems is also located on the program's campus. This program has conducted an internal study of treatment retention for participants who entered the program with their children as compared to participants who did not enter with children. Mothers admitted to the program with their children had better treatment retention and higher rates of successful treatment completion (treatment goals met) than women admitted without their children [197].

Amity Inc. in Arizona revised its program in 1981 to be more conducive to the female user. The female to male client ratio increased, regular groups were created, and children were permitted to stay with their mothers in the residential program. These changes significantly improved the treatment outcomes for both men and women. The length of stay for the women increased over time; in fact, the length of stay for women with children in the program was highest overall. The authors suggest another factor in addition to including children that contributed to the improved success. This was the creation of an environment in which female clients feel safe in disclosing and addressing treatment issues [198]. In the early 90's, Amity received funds to continue these changes from NIDA and CSAT [199].

A Perinatal 20 project conducted by Hughes et al. [200] between April 1990 and October 1992 consisted of 53 women with children who were randomly assigned to either a standard residential treatment program or a demonstration residential program, in which the children were allowed to live with their mothers. Operation PAR or PAR Village includes a treatment component focused on working with the client as a parent. The psychosocial interventions employed are aimed at facilitating the parent-child relationship through group interventions, parenting education, and structured bonding activities. Operation PAR also includes licensed therapeutic daycare. Clients in the demonstration component of the program had significantly longer length of stay, suggesting that including children in the treatment program has implications for success. The authors also suggest that the inclusion of children could strengthen mother self-esteem and mother-child bonds while also improving post-treatment outcomes.

Outpatient programs

Haller, Knisely, Dawson, and Schnoll [201] compared subjects randomly assigned to two outpatient treatment programs. One program was a time-limited program of five months. The other was a self-paced program for up to 18 months. Results showed that the women in the time-limited program had significant reductions in alcohol and drug use.

Another Perinatal 20 project was conducted in South Central Los Angeles. This program was designed for the special treatment and support needs of drug-using women. It also sought to test the effectiveness of a modified relapse prevention approach. This project compared an intensive six-month treatment program with a traditional outpatient program. The day treatment component focused on drug relapse prevention and competency building and empowerment. Clients were required to participate for five and one half hours per day, seven days per week. The model was based on the intensity of a residential seven-day week program; however, clients were allowed to return to their homes at night. Clients received four hours per week of education regarding drug abuse, and ten to twelve hours per week of group or individual counseling to address problem solving. Refinement of cognitive/behavioral action plans for relapse prevention was addressed in the twice-weekly individual counseling sessions. Clients in the program were also required to complete six hours of parent training focused on the special care of infants exposed to drugs. Two days per week the mothers were required to bring their infants to the site and engage in the practice of childcare in the nursery. The goal of this component was to improve the client's ability to bond and interact positively with her infant, thus strengthening infant physical and social development. A parent education component was required to help strengthen parenting skills with older children. Here, clients were educated about development and positive approaches to discipline. An alcohol and drug free lifestyle was required, although clients were allowed up to three lapses. These lapses provided the clients and professionals valuable information regarding relapse triggers, and aided the relapse prevention plan.

The outpatient component was not as intense as the day treatment component. Here, the problem of drug dependence was addressed in semi-structured groups, individual counseling, and other program activities that included male as well as female clients. The clients in this component also received parent education but did not participate in special training regarding infant development. This program was a five-day a week, one and one half hours per day commitment. Clients could participate in this component for a year or more provided they appeared to be benefiting from the program.

Results suggest that an intensive day treatment model is more effective than a standard outpatient treatment model for a variety of reasons. First, the staff at the day treatment program was comprised mostly of women and the staff caseload was smaller that at the outpatient program. The study reports that if the day treatment clients retained custody of their infant, it was a predictor of length of stay in treatment, however, if the mother had more children at home, this was a negative predictor of length of stay. The authors suggest that it may have been harder for the mothers to secure childcare for more than one child, if she were in an intensive seven-day a week program. With regard to amount of social support or psychological distress (reported by the clients), neither predicted treatment retention [202].

A New York City program, Pregnant Addicts and Addicted Mothers Program (PAAM) was created in 1975. PAAM is an outpatient program for pregnant women who are addicted to opiates or methadone. Potential clients who have multiple addictions must receive inpatient detoxification before attending PAAM. Women enrolled in the program must attend the program five times per week for methadone maintenance and attend prenatal visits, individual counseling sessions, and parent education classes. There is a preschool nursery incorporated into PAAM and children are periodically assessed via the Bayley Scales of Infant Development. Several of the goals of the PAAM program concern helping the mother have a normal pregnancy and deliver a healthy newborn, as well as helping the newborn develop normal cognitive and motor abilities. This is a comprehensive program that has demonstrated positive outcomes such as treatment compliance and favorable newborn outcomes [180].

California's Options for Recovery was created as an alternative to incarceration or relinquishment of custody of children by substance dependent women. Options for Recovery offered a specific residential and intensive day treatment services for dependence on alcohol and or other drugs, comprehensive case management, foster parent recruitment and training, and respite care for drug exposed infants. This program also included a full evaluation component to understand its effectiveness. Seven sites (Alameda County, Contra Costa County, Harbor South Bay, South Central LA, Sacramento County, Shasta County) were developed to help pregnant alcohol- and other drug-dependent women, postpartum women identified with a prenatal history of alcohol and other drug exposure, and parenting women impaired in their ability to care for their children due to drug addiction. Most of these projects included goals of increasing services to drug dependent women, alleviating the deleterious effects of drug dependence, improving health outcomes for pregnant and postpartum women and their children, and improving family integrity and quality of life.

To provide comprehensive profiles of Options for Recovery, many evaluation approaches were used. For instance, in addition to client demographics and satisfaction, staff were also surveyed and interviewed regarding their impressions of the program. The development of the children participating in the program was also included. Results have been published regarding profiles of the clients, outcomes for participants, family functioning, child health outcomes, and participant satisfaction. Specifically, there were increased numbers of children reunited with their biological mother after foster care placement and children in Options homes were more likely to be reunited with their biological mothers. Children participating in Options programs displayed normal child development on standardized tests. Cost effectiveness was also assessed for Options for Recovery. Options for Recovery, as compared to the combined cost of incarceration and other drug and alcohol treatment, was significantly more cost effective [203].

Acknowledging all barriers present in treating pregnant and postpartum substance-using women, the Federal government granted money to demonstration programs to address these barriers and to combat the epidemic of children born substance-exposed. The Parent and Child Enrichment Program (PACE) program in Harlem began in 1990 as a result of these grants. The program integrated the services of social workers, drug treatment counselors, parent educators, childcare workers, and medical personnel, including a pediatrician and a nurse midwife. PACE was set up to provide comprehensive, women-centered, and family-oriented services. The key focus of the program was to provide a flexible schedule of treatment to the women in order to maintain a high retention rate within the program without encouraging relapses into drug use [176]. The successes and failures of the program provided good learning opportunities for the future development of similar programs.

The program reinforced the need to develop a female model of drug treatment. Many women enter drug treatment for different reasons, have different reasons for staying, and have different needs than men. PACE's clients often came into the program in order to be drug free at the time of their child's birth in order to keep their child, or to regain custody of their children. They struggled with feelings of being overwhelmed at their roles as mothers and caretakers. PACE showed that program flexibility to meet the needs of the individual client was critical. Comprehensive care in one location (one-stop shopping) also decreased barriers to treatment, allowed women to establish trusting relationships with a consistent team of pro-

Table 4: Comparison of Services at New York City Drug Treatment Programs in 1989 and 1993

	1989			1993		
Services Provided, by City	No. Sites	No. Accepted	% Accepted	No. Sites	No. Accepted	% Accepted
Accept pregnant women						
Methadone maintenance	31	21	68	55	47	85
Drug free	47	15	32	99	79	80
Total	78	36	46	154	126	82
Accept pregnant women on Medicaid or for free						
Methadone maintenance	21	21	100	47	47	100
Drug free	15	5	33	79	65	82
Total	36	26	72	126	112	89
Accept pregnant women and provide for prenatal care						
Methadone maintenance	21	13	62	47	23	49
Drug free	15	2	13	79	40	51
Total	36	15	42	126	63	50
Accept pregnant women and provide or arrange child care						
Methadone maintenance	21	1	5	47	8	17
Drug free	15	1	7	79	23	29
Total	36	2	6	126	31	25

(Breitbart et al., 1994)

viders, reduced the likelihood of dropping out, enabled staff to get to know clients well, and allowed women to feel comfortable disclosing sensitive personal information to providers. Many of the program's clients lacked the necessary skills to be good parents. Offering parenting classes gave the women confidence in their abilities to effectively parent. PACE recognized that drug relapse prevention must begin from day one of the treatment program so that the women would be aware of the danger of relapse and be prepared to deal with the urge to go back to drug use. For many women, their drug use was related to their status as abused women. The counselors realized that addressing this issue was as key as addressing the drug use itself. Finally, PACE showed that drug use does not happen in a vacuum. Including family members in the treatment process may help to establish a network of support for the women, both while they are in treatment and after [176].

Quantitative results of the program have shown that the program has had a positive effect on its clients and thus the project is a useful model for drug treatment programs. Also the program helped to start a trend in the city of New York of providing treatment for pregnant and postpartum women. Table 3 compares services in New York between 1989 and 1993.

Vital components for success

Most professionals agree that a comprehensive program is best for mothers [204]. Services should be family centered, community based, multidisciplinary, individually tailored, and promote competency of the individual [182]. Finkelstein [205] suggests a relational approach as a framework for the delivery of services to substance dependent women. This model develops prevention and treatment in the context of a multigenerational and lifespan perspective. A more family centered model of care may improve treatment and post treatment outcomes. Table 4[182] includes a list of programs and their components.

There is general agreement in the literature that programs need to be comprehensive and include the following components: a cognitive/behavioral approach, parent role models and support, educational and vocational planning, transportation, mostly female staff, staff sensitive to issues of population, relapse considered part of treatment, outreach, case management, family support services such as child care, medical (including prenatal care), mental health services, multi-method approaches to measure success, follow-up, parent training, child development services, family planning, legal services, crisis intervention, respite care, life skills management, pharmacological services, referral services, self-help groups and stress management.

Family drug courts

Many states are establishing drug courts that deal with drug offenders. In drug courts the drug offender is regarded as both a client and a defendant at the same

Table 5: Model Programs and Key Indicators for Success

Name	Type of program	Key components related to outcome
Camp & Finkelstein, 1995	Residential	Parenting component After care services Measured self-esteem Evaluated birth outcomes
Szuster, Rich, Chung, & Bisconer, 1996 Salvation Army Treatment Program	Residential	Children included Family groups Parenting component Parent – child interaction therapy Therapeutic nursery Psychiatric day treatment for children
Stevens, Arbiter, & Glider, 1989 Amity, Inc	Residential	Children included Increased female to male client ratio Supportive environment for the females
Hughes, et al, 1995	Residential	Children included Parenting component Parent – child interaction therapy Therapeutic nursery
Haller, et al, 1993	Outpatient	Time limited program
Strantz & Welch, 1995	Outpatient	Intensive day treatment Cognitive / Behavioral plan Parenting component Parent – child interaction therapy Therapeutic nursery – infant not enrolled FT Relapse / lapse considered part of treatment Female staff Lower staff caseload
Suffet & Brotman, 1984 PAAM	Outpatient	Prenatal care Parenting component Therapeutic nursery Infant developmental assessment
Brindis, et al, 1997 Options for Recovery	Outpatient & Residential	Intensive day treatment Comprehensive case management Foster parent recruitment Bio and foster parenting component Respite care for infants Multi-method approach to evaluation Developmental assessment of infant

time. The reason that this is important is because the term "client" implies that the court has an obligation to offer certain services [189,206]. With the drug court the offender is given the opportunity to contract with the court to seek treatment instead of receiving a jail sentence. Participants in the drug court system are referred to the courts from the regular judicial system. If the client agrees to seek treatment, she will receive inpatient detoxification services, and in the case of pregnant women, medical treatment to provide for the care of the fetus during the withdrawal stage of recovery. After the initial inpatient detoxification, clients are required to enroll in a one- to two- year process of outpatient treatment and aftercare [175,189,206].

Throughout the course of the treatment process participants report to a caseworker and the drug court judge, who monitor the progress of the individual. The participants are often drug tested to ensure that they are indeed "clean" and are thus abiding by the terms of their "sentence" [189]. There are different consequences, dependent on the particular court, for not complying with the terms. For some courts this may mean immediate expulsion from the program and jail time; for others the participant may be given a second chance to prove her commitment.

At the present time there are 195 drug courts in 43 different states and territories. Between 50 and 65 percent of offenders choose to enroll in the treatment programs [206]. While the majority of these courts have not been open long enough to truly evaluate the success of the programs, initial results are promising. Only time will tell if the court programs are able to foster long term success, measured by a lack of relapse into drug use on the part of the participants in the programs.

Family drug courts are a relatively new innovation in an effort to protect the best interests of the child. Drug courts that focused on the adult substance abuser were established in the late 1980s. However, it was not until the 1990s that drug courts dealing with family and dependency issues were established. A family drug court is defined as "a drug court that deals with cases involving parental rights...which arise out of the substance abuse of a parent" [207]. Once children are in danger of or have already been removed from their parents, the family drug court attempts to help the parent regain or retain custody or if necessary, permanently place the child. This is done through intensive use of resources, and commitment on the part of the parent, the treatment team and the judge.

Family drug courts were developed because traditional case management methods were not working with substance abusing parents. For example, a typical case would involve a referral for abuse and neglect that would be substance abuse-based with the children removed. Parents would be given a list of actions to regain custody and they would be given a court date 6–12 months later. However, social service workers trying to motivate the parents did not have the power to compel compliance and the parents lacked the skills to follow through with that much latitude. The family drug court has the ability to impact the entire family, including obtaining better compliance on

the part of the parents, by taking jurisdiction of the child; ongoing monitoring of the cases, and making services available to the family that are not available in the adult criminal court. Since the 1997 implementation of ASFA, the growth of family drug courts has become even more significant. The timeframe imposed by ASFA has added momentum to the development of court programs and procedures to enable families to remain intact, or if necessary, to terminate parental rights allowing children access to placement.

There are currently more than 37 family drug courts operating in 27 states in the U.S. plus 10 combined adult/juvenile/family programs, and an additional 50 programs are being planned. Almost all these programs (88%) focus on civil abuse and neglect cases and 4% are handling abuse and neglect cases prosecuted as criminal matters. Most (90%) family drug courts are voluntary. To date 2,200 have enrolled (84% female), 550 have graduated, 800 are currently enrolled and there are 3,500 children involved. Most participants (80%) range in age from 26–45, 48% are Caucasian, 36% African American and 15% Hispanic, 63% of the females (and 48% of the males) are single, 8% are living with a significant other, 70% of the females (52% males) have no high school or GED, 44% of the females (5% males) are unemployed. And 66% of the participants had two or more children, while none of the children were living with the participant in 65% of the cases [208].

More than 60% of the children were not living with their parent at the time of enrollment. Since the first family drug court started in 1994, 1,000 participants nationwide have graduated (875 women, 135 men) thereby either retaining or regaining custody of or visitation with their children. Another 300 participants representing 20% of those enrolled have been terminated for noncompliance. There are currently 900 participants estimated to be enrolled.

The demographic characteristics of family drug court participants indicate that almost all have had at least one prior contact with CPS and 75% have had two or more prior contacts. Approximately half have had al least one prior criminal (generally misdemeanor) conviction prior to entering the family drug court with less than 10% having been incarcerated for a drug related offense. 68% are single and not living with a significant other, 22% were living with a significant other (who in most cases was the parent of at least one of the children) and 6% were married. 43% were African American, 35% Caucasian, 19% Hispanic/Latino and 8% Asian/other. More than two thirds are unemployed. More than two thirds have been using drugs for more than 5 years, 15% for more than 10 years with the most common drugs of choice as alcohol, cocaine and marijuana with one-third reporting addition to methamphetamine and/or heroin. Addiction to cocaine, heroin and methamphetamine is rising and more than half report addiction to prescription medication. Most have been enrolled in at least one treatment program prior to entering family drug court. At least 75% have a history of being abused and more than one third suffer from mental health problems.

Outcome research has shown a significant decrease in drug use by participants once they enter the program with 95% showing negative drug tests [208]. The frequency of drug testing and the frequency of negative drug tests for parents in family drug court programs are higher than for parents in other abuse/neglect (non-drug court) programs. All participants who completed a family drug court program were able to improve their legal relationship with their children, one third retained or regained legal custody and the remaining two thirds retained or regained visitation. Participation in family drug courts also resulted in obtaining or retaining employment in one half of the cases, two thirds enrolled in vocational training an additional one third completed their GED and/or enrolled in college, 90% received mental health treatment, and 40 drug free babies were born to participants while in the program. Half of the courts have developed alumni groups or other aftercare support networks.

It should be clear that the focus of family drug court is in the best interest of the child, while addressing the needs of the parent participant and the family. These interests may be in conflict, as the court must be prepared to make permanency decisions, especially with ASFA. In addition, the best interest of the child should not be narrowly defined – that which helps the parents is in the best interests of the child. Although substance abuse is the trigger that brings the child to the attention of the courts, family drug courts must go far beyond treating the parent's addiction issue alone. The treatment team needs to address the issues that impact the parent's ability to stay sober, including specialized services such as mental health, domestic violence, sexual abuse, parenting, social support and financial resources (housing and employment) and by trying to identify strengths in the family.

Model programs

Programs are being established through the cooperative efforts of the courts, social service workers, and treatment professionals that can overcome the barriers preventing pregnant women from seeking treatment, including access to services, fear of losing their children, cost, and lack of coordination of care and available services.

The Dependency Court Recovery Project in San Diego County, California, coordinates treatment services, as well

as other social welfare services the court provides, in order to keep families intact, or at the very least to reduce the amount of time that children spend in foster care. The main feature of the program is the Substance Abuse Recovery Management System. The purpose of this system is to make alcohol and drug treatment immediately available for parents. In this system when a referral is made from the juvenile court, the family is assigned a social worker, responsible for overall case management. The parent is also assigned a recovery specialist, responsible for ensuring that the dependent parent is assigned to the appropriate alcohol and drug services and the necessary follow-up case management.

This program has been successful in meeting statutory case processing timelines, expediting substance abuse assessment, achieving "reasonable efforts", reducing the frequency and length of removal of children from their homes for placement in foster care, providing immediately available services and "safe house" residences for the parent with their child(ren) during recovery, increasing personal accountability and responsibility of parents for progress of individual case plans, providing a recovery management system to engage parents in appropriate treatment, monitoring progress and increase judicial oversight, reducing court workload, determining timely and appropriate placement for the children, and accomplishing family preservation, reunification or early permanent placement.

The success of the program has been attributed to several factors. These include that all the necessary treatment services are made readily available to the women, thus the issue of transportation and access to care are overcome. They also include the establishment of treatment sites where women can go with their children without fear of losing them. In addition, disciplinary actions are tied to the program. Since the program has the full backing of the court, noncompliance with the program bears legal consequences. The first or second time a patient is noncompliant ("dirty test", no-show, or failure to comply with treatment program activity), the client/offender may get a warning, but further noncompliance can, and will, warrant expulsion from the program and a prison term or other punitive measure [189].

The Jackson County, Missouri, family drug court targets mothers who have given birth to drug-exposed infants and blends both civil and criminal cases [209]. The advantage of the blended court is that it avoids the problem of the client needing to be in two different courtrooms where court issues may conflict and not provide a unified approach for the family. In the civil family/dependency setting, the court is able to obtain jurisdiction over the children, allowing the court to order necessary services for the children. However, because the court does not have jurisdiction over the parent, the court has the carrot of custody of the children but not the authority to force the parent to comply with the requirements of the court. The court gains jurisdiction over the parent through the criminal charge. Here the court has jurisdiction over the defendant but not the family, thus, family members do not have to comply.

The program is immediate and intensive and includes substance abuse assessment and development of a treatment plan including additional specialized services. Mothers are seen on a weekly basis to ensure treatment compliance and to insure that the needs of the child are being met. Both sanctions and incentives are used. Sanctions can be written assignments; more frequent court appearances and urine screens, chastisement in court and community services, as well as the ultimate sanction of child removal. Incentives include reduced court appearance, praise from the bench, certificates, movie passes, and grocery vouchers. If the mother successfully completes the family drug court program the criminal case is treated in a diversionary manner and is dismissed.

The Family Treatment Court in Suffolk County, New York provides comprehensive and integrated case management services and intensive case supervision to address the multifaceted needs of chemically dependent parents and their children. The program emphasizes immediate assessment and early intervention and integrates chemical dependency and child welfare services for the entire family system.

The Vulnerable Infants Program of Rhode Island (VIP-RI) [210] is based on research suggesting that drug-exposed infants are vulnerable, not damaged, and that many of these infants can recover and develop normally given an appropriate environment. VIP works with CPS and the court to comply with ASFA and provide a program of coordinated care for drug-exposed infants and their families. VIP conducts a comprehensive and standardized assessment of the mother (maternal substance dependency, mental health, parenting and attachment, life skills, family support and resources) and of the infant (medical and neurobehavioral status) as soon as the baby is identified as drug exposed in the hospital. The assessments are used to help CPS make recommendations to the court regarding placement of the infant with the biological mother or in foster care and to develop a treatment plan for use by the court. A special Family Treatment Drug Court for drug-exposed infants has been established for VIP clients based on the "treatment with teeth" concept. The program allows mothers the opportunity to get the appropriate treatment to be reunited with their infants and to provide the kinds of ancillary services including

mental health, to make reunification effective and facilitate the development of the mother infant attachment relationship. In this voluntary program, the VIP treatment plan is court ordered and sanctions are used for noncompliance, the ultimate sanction, of course being loss of custody of the infant.

Policy issues and recommendations

While it is widely acknowledged that there must be a societal response to the issue of maternal substance abuse, there is much controversy on just what this response should be. Much of this debate is linked to the complications and dilemmas present in the different policy responses that have arisen in attempts to address the issue.

Prevention

Most interventions to address the problem of maternal substance use during pregnancy have focused on preventing the problem in the first place. These include education campaigns about the dangers of smoking and drinking during pregnancy, legislation requiring warning labels on cigarettes and alcohol, education about the dangers of illicit drugs such as cocaine and efforts to reduces the use of illicit drugs through criminalization. Yet, despite these efforts, drug use by pregnant women continues to be a significant public health problem. Thus, policy recommendations must go beyond attempts to prevent drug use by pregnant women.

Policy approaches for MATID use include primary, secondary and tertiary prevention strategies. Because of the complex substance abuse, psychological, parenting, social, family and medical issues involved in maternal drug use during pregnancy, it is easy to fathom that all aspects of prevention will be required to combat this problem. Different strategies for intervention can be used including treatment and research in addition to education and legislation. These are interrelated and interdependent, and inform and feedback on each other.

Primary prevention is aimed at preventing the initial occurrence of the problem – in this case, MATID abuse during pregnancy or avoiding pregnancy while using substances. This includes informing women of childbearing age about the dangers of prenatal drug exposure and education to abstain from drug use during pregnancy or to avoid pregnancy if using drugs. Specifically, women of childrearing age and pregnant women can be educated about the potential danger to the fetus and child from exposure to drugs. Providing treatment for drug-using women of childbearing age could help eliminate drug use during pregnancy. This could even be an incentive for women who want to have a baby to initiate treatment. Intervention to practice contraception is a way to prevent pregnancy in drug-using women and would also help reduce the spread of STDs and HIV. Use of fetal ultrasound to show the mother her fetus can increase attachment and potentially result in cessation of dug use during pregnancy.

Secondary prevention aimed at minimizing a problem when a risk factor exists would identify pregnant drug-using women and attempt to minimize their drug use through educational, treatment, research, and regulatory interventions [30]. Relatively little attention has been paid to the early detection of substance use during pregnancy [211,212]. We mentioned earlier that many pregnant drug-using women receive little or no prenatal care and it is known that fear of detection because of potential punitive actions against the women and the potential for removal of the child drive pregnant drug using women away from the health care system. As a result many prenatal substance exposure cases are not identified until birth. For prevention to be effective, the health care system needs to be perceived as friendly and supportive by drug-using pregnant women, not as punitive. They can be attracted to take advantage of prenatal care if they think it will help them and their child. Health care professionals can be better trained to detect substance abuse during pregnancy and to respond to comply with reporting requirements and in arranging services for the patient.

A harm reduction model might argue for low-level use of some substances, or even that use of some substances is tolerable for the benefit of cessation of other substances. For example, should pregnant women on methadone maintenance or those who use cocaine in residential treatment, or those who are in prison be allowed to smoke? Should they be allowed less than 10 cigarettes a day if that is the threshold for negative effects on the baby? Should they be given psychotropic medication to treat the anxiety/depression that accompanies abstinence even if these drugs are contraindicated for pregnant women?

Tertiary prevention aims to minimize the adverse consequences of a problem, in this case the short term or long term harm to the child caused by drug exposure. This includes mental health, medical and social interventions, treatment for the mother and family members as well as treatment for the infant, and parenting and parent/child relationship therapy.

Prevention efforts should include education and treatment and target all drugs (i.e., licit and illicit) that have abuse potential during pregnancy. In addition to the drugs mentioned in this review (alcohol, tobacco and illegal drugs), abuse of prescription drugs should also be included. For example, there is an emerging literature on abuse of benzodiazapenes, OxyContin, during pregnancy. Prevention efforts should be organized to enhance protec-

tive factors and to minimize risk factors. These efforts need to be developmentally and culturally appropriate, capitalize on the mother's motivation to change and desire to keep or be reunited with her baby. They also should deal with the complexity of these cases including mental health co-morbidities and should have a family and community focus.

Scientific uncertainty

Policies have been established in the context of uneven scientific knowledge about MATID use and developmental outcome. The literature is uneven with respect to type of drug (more is known about alcohol than other drugs) and in terms of drug effects, there is uncertainty as to whether or not illegal drugs have more deleterious effects than legal drugs. Mostly we do not know the long-term developmental effects of prenatal drug exposure per se. That is, drug effects have not been "isolated" from other effects (environmental as well as genetic), drug effects have not been studied in a developmental model that would enable us to determine the risk associated with drugs in the context of other risk factors, and polydrug effects have not been studied. It is remarkable that at a time when we acknowledge that most women who use drugs during pregnancy are polydrug users, studies have not examined the effects of polydrug exposure on developmental outcome. It is probably safe to say at this point that scientific facts do not support the "quick fix" linear approach that focuses on the single risk factor of prenatal drug exposure as the explanation for the outcomes of these children.

Public awareness

A related issue is that the public should be aware of the scientific advances in the last 20 years. These advances include understanding of addiction as a chronic, relapsing medial/mental health problem, consequences of prenatal drug exposure for child development, and effectiveness of treatment. It does not appear as if this knowledge has reached (or been accepted by) the general public or has been applied in clinical programs or policy settings. This situation is exacerbated by the stigma surrounding drug use during pregnancy. Pregnant women are not extended the compassion normally displayed by the public towards individually suffering from chronic diseases. The view that substance abuse should not be treated as another mental health and medical illness is at odds with established science.

Fetal rights

There have been several routes that the courts have taken in attempting to prosecute women for substance abuse during pregnancy. The most basic routes of societal response include the following: (1) use of the penal code to regulate all behavior of pregnant women that places the fetus at risk of harm; (2) use of the penal code to regulate all illegal behavior (particularly the use of controlled substances) that place the fetus at risk of harm; (3) use of family law and the power of the state to ensure that the best interests of the child are served, whether the behavior of the parent is legal or illegal; and (4) the use of no additional criminal or family law regulations specifically targeted at fetal abuse, relying instead on current language and policies to guide decision making [151,162].

The filing of any charges against a substance-abusing mother hinges on the notion of fetal rights, namely that fetuses are human beings entitled to certain rights and privileges [213]. Much of the debate around the issue of perinatal substance exposure has focused on this very idea. There are many questions as to whether fetuses are really entitled to protection under the law, and if they are, what are the widespread social implications. Certainly the question of what rights the fetus is entitled to is intrinsically tied to the argument of when life begins and when is it appropriate for society to regulate the current behavior of the mother in order to prevent potential future harm to the child [214].

Since the beginning of the fetal rights movement, proponents have maintained that the fetus is a human being possessing an existence separated from that of its mother and because of its existence, entitled to legal acknowledgement. Among these fundamental rights is the right to be born with a sound mind and body [156]. The court has favored this point in several cases, ruling in favor of the fetus in such cases as In re Baby X [215], Grodin v. Grodin, [216] and In re Ruiz [217].

More recent effects of the fetal rights movement are evident in legislation that states have tried to adapt in response to the wave of media attention directed towards "crack" babies. Most of the changes and adaptations in legislation have been in existing criminal child neglect and abuse legislation, essentially widening the definitions of child to include the unborn. It is interesting to note however, that while states have successfully adapted existing laws to include fetuses and have even successfully prosecuted between 200 and 300 women, no state has created legislation that specifically penalizes pregnant drug users with additional punishment for the effect that their drug use and abuse has on their unborn child. One factor that this is attributed to is the difficulty in definitively establishing a correlation between the mother's drug use and harm to the child.

There is certainly a flip side to the fetal rights movement. In fact, strong opposition has been raised to the idea that the fetus is a human with its own existence separate from that of its mother. Opponents fear the "slippery slope"

effect that may occur if the rights of the fetus are acknowledged [154,158,213]. The slippery slope argument purports that acknowledging the rights of the fetus in any circumstance potentially has the adverse effect of making the rights of the fetus take precedence over the rights of the mother in all circumstances. It poses the question: if we allow the regulation of one sphere of pregnancy, where do we stop [162]? This would have serious implications for other issues surrounding the rights of the fetus versus the rights of the mother, including abortion.

Fetal/maternal conflicts

It is important to acknowledge at the outset that policies for the pregnant woman/mother may be in conflict with policies for the fetus/infant. For example, high doses of methadone used for heroin-addicted pregnant women can produce withdrawal in the infant. Lower doses that would not produce withdrawal in the infant increase the risk that the methadone will be less effective and the pregnant woman return to street drugs. As another example, both managed care and welfare reform have resulted in sanctions that reduce services to drug using mothers, such as when drug users are not eligible for benefits [135]. The irony is that such policies are based on concern for the child ant not only create a rift between advocates for women and advocates for children, but also mean that mother and child face poverty without public assistance or the child enters the foster care system.

Perinatal drug screening

One of the major issues that arise in trying to isolate a response to maternal drug use is related to screening for drug use in women and for exposure in newborns. It is difficult to determine who should be tested. Often times this question is answered in a way that exhibits different biases present in society. Targeted testing, which leaves testing up to the discretion of the hospital and physicians, introduces the possibility of significant bias in decision-making. Tremendous inconsistency is inevitable with targeted testing because it is highly plausible that identification can more be a function of area of residence, hospital policy, and physician prerogative [218]. One argument for universal testing of newborns is that it is the only way to employ testing devoid of social biases. A second argument is that universal testing also ensures that exposed infants who are detected will be able to receive all available services and treatment [219].

However, universal testing of infants places hospitals in a precarious position. Traditionally hospitals provide services to patients in a confidential and nonjudgmental way. But if a newborn exhibits a positive toxicology screen and the state has a mandatory reporting law, the hospital has a responsibility to report that fact to the necessary authorities in order to ensure the protection of the welfare of the child. In cases such as this there is a conflict between the hospital's responsibility to protect the confidentiality of the mother and responsibility to protect the welfare of the infant [178,220].

Another problem is that hospitals typically only screen for illegal drugs. There is no newborn screen for alcohol, yet the effects of prenatal alcohol exposure are at least as severe as the effects of illegal drugs. Some have argued that the effects of nicotine are comparable if not worse than the effects of cocaine. Yet even though there are nicotine assays for urine and meconium they are not used to identify exposed infants. And what would we do with this information? Would we really report up to 25% of new mothers to an already overburdened child welfare and criminal justice system because nicotine and cocaine have similar effects on the baby?

Another option for screening is to not test at all and simply rely on the self-report of the mother. The benefit of this option is that it greatly reduces the possibility of violating the civil liberties of the mother, treatment avoidance by the mother, and biased use of child welfare/criminal involvement. It would also allow healthcare workers to simply treat the mothers without being in an investigative role. By allowing healthcare workers to simply treat them, the mothers may feel more comfortable in admitting their drug use and more willing to accept treatment. However there is also the risk that mothers will not disclose their drug use. Lack of disclosure by the mother would render physicians unable to identify high-risk infants and thus unable to prevent negative outcomes[219].

Finally, it might be possible to develop very specific criteria for drug testing based on specific medical indicators and that avoids use of such open-ended criteria as "clinical suspicion" that invite discriminatory testing. This solution would work with two caveats. First, all drugs would be included (legal and illegal and prescription medication that can also be abused such as benzodiazipines or percodan, OxyContin) Second, the mother would not be automatically reported to CPS. Rather, the point of drug testing would be to provide hospital staff with the opportunity for intervention and the possibility of an additional standardized assessment if there is concern for the welfare of the child. Only if such an assessment suggested indicated inadequate parenting would the mother be reported to CPS.

Who gets prosecuted

Another problem associated with criminalization is that of prejudicial reporting practices. Many fear that racial discrepancies in prosecutions are related to racial prejudices among people who report maternal substance abuse and

the criminal justice system as a whole. The overwhelming majority of the 200 to 300 women prosecuted for perinatal substance abuse have been illegal drug users; most notably and most often crack cocaine users [221]. Studies have shown that more minority women are crack cocaine users than other demographic groups. Thus women of color are most likely to be prosecuted for perinatal substance abuse. This has led to the concern that criminalizing of perinatal substance abuse is in fact a process that is discriminatory against poor women of color [220].

Beyond the fact that more crack users are prosecuted than pregnant drug users, there is a class component regarding who is prosecuted for drug use. The government prosecutes more impoverished women than those in the middle class [218]. This is because middle class women are more apt to use the services of private physicians. Private physicians who treat middle class and wealthy women are less likely to question their patients' behavior based on an unsubstantiated belief that wealthier women are less likely to use or abuse substances. By contrast, physicians are more likely to question poor minority women about their substance abuse and ultimately report their drug use [152].

A 1990 Florida study produced statistics supporting the notion that there is a race and class bias in reporting. The study revealed that while there was very little difference in abuse rates between black and white women, rates of reporting are drastically different. According to the study, physicians are ten times more likely to report a black woman than a white woman. The most frequently reported subjects were low-income women who relied on public health care [222]. In a similar study, poor minority women were the subjects of 81% of government sought court-ordered interventions [33].

Another illustration of this point is found in a 1990 American Civil Liberties Union report. This report stated that 50% of the nation's drug arrests were in South Carolina. Of those arrested all were low income and most were black. Specifically, between 1989 and 1993, forty-one pregnant women were arrested for drug abuse in South Carolina. Forty of those women were black. Finally in a separate review of thirty-five states' police records, 70% to 80% of all women arrested on drug charges were minorities [71].

Little is known about the intersection of cultural variation and parenting in drug-using mothers in ways that help us understand culturally determined family behavior that is not maltreatment but is likely to be interpreted as such. We need to understand the role that institutional and other forms of racism play in the identification and treatment of drug-using mothers.

Constitutional issues

There are many constitutional issues surrounding the prosecution of pregnant drug users. At the heart of controversy are several Fourteenth Amendment entitlements, including due process, liberty, and equal protection. The Fourteenth Amendment states, "...nor shall any State deprive any person of... liberty...without due process of law; nor deny any person within its jurisdiction the equal protection of the laws."

This statement of due process under the law creates a situation in which the state must have a clearly defined objective when intervening in the lives of citizens. This objective must be tied to public health, safety, or welfare. This is certainly not where the due process clause stops. In fact it goes on to assert that whatever the planned intervention the state chooses to implement must be related to achieving the aforementioned objective. There also must be a relative degree of certainty that the intervention will be effective in accomplishing the intended goal. If the fundamental rights of an individual will be infringed upon due to the intervention, then the State must demonstrate that the intervention is reasonable, narrowly constructed, and that there is no less intrusive way of accomplishing the goal [150,220].

Based upon the criteria laid out by the due process clause of the Fourteenth Amendment, there have been several issues raised in relation to state intervention in the lives of drug-using mothers. Firstly, there is the issue of criminal prosecution itself. Is criminal prosecution really an effective intervention in deterring pregnant women from using drugs? There is much controversy over whether criminalization of the act really is an effective deterrent.

There is also the issue of physician disclosure of positive toxicology results to the authorities. The public disclosure of these results coupled with the use of the women's medical records are often used against the women in prosecutorial settings. This could be a violation of the women's right to privacy and freedom of association. Along the same lines it is often argued that by requiring physicians to report positive toxicology results the medical provider is forced into a situation where they are law enforcers and thus must obtain informed consent from their patients before performing any tests that may result in criminal prosecution [144,149,162]. This is likened to law enforcement officials having to obtain a warrant before search and seizure. Often, drug screens are performed on the mothers without their knowledge or consent. This raises strong questions about violation of the mother's rights as

related to their Fourth Amendment protection against illegal search and seizure.

Policing pregnancy: Ferguson v. Charleston

With the case of Ferguson v. Charleston, the Supreme Court has entered into the legal arena surrounding maternal substance abuse. The case of Ferguson v. Charleston deals with the practices of a Charleston, S.C. public hospital regarding the testing and reporting of women for substance abuse when they come to deliver their babies. In the fall of 1988, staff members at the Charleston public hospital operated by the Medical University of South Carolina became concerned with the increasing numbers of patients coming in for prenatal care who were also using cocaine. To combat these numbers, in April of 1989 the hospital adopted a policy of referring cocaine-using maternity patients to both counseling and treatment programs. Referrals would be made based upon drug screens performed on urine samples from maternity patients who were suspected of using cocaine [221,223,224].

Despite the efforts of MUSC staff, the number of cocaine-using maternity patients remained constant. The hospital then decided to offer its support and cooperation to the city in prosecuting mothers whose children tested positive for drugs at the time of birth. The women could undergo drug treatment to avoid prosecution. Babies would be tested only if their mothers were suspected of drug use. Suspicion was based on the following criteria: no prenatal care, late prenatal care after 24 weeks gestation, incomplete prenatal care, abruptio placentae, intrauterine fetal death, preterm labor "of no obvious cause," intrauterine growth retardation "of no obvious cause," previously known drug or alcohol abuse" or unexplained congenital anomalies.

The plaintiffs were ten women, including nine women of color, who were arrested directly based on the hospital's policy. Four of the women were immediately arrested, while six were offered the option of drug treatment, but either failed to comply or failed a second drug screen. The women challenged the practice on the theory that warrantless and nonconsensual drug tests conducted for criminal investigatory purposes were unconstitutional searches [223]. The Supreme Court ruled in favor of the women, saying that the women's Fourth Amendment Rights had indeed been violated. Because MUSC is a state hospital, its staff members are government actors subject to the Fourth Amendment's strictures. They found that a state's performance of a diagnostic test to obtain evidence of a patient's criminal conduct for law enforcement purposes is an unreasonable search if the patient has not consented to the procedure. The interest in using the threat of criminal sanctions to deter pregnant women from using cocaine cannot justify a departure from the general rule that an official nonconsensual search is unconstitutional if not authorized by a valid warrant [183,225]. This ruling will change the relationship between hospitals and law enforcement with respect to reporting of evidence of illegal drug use during pregnancy.

Backlash against criminalization

There are other reasons beyond the constitutionality of prosecuting perinatal substance abusers that have come into play in the backlash against criminalization. Many professional health care and child welfare organizations have banded together against criminalization on the basis that it is antithetical to the best interests of both the mother and the child. They also argue that it puts health-care providers in the inappropriate and uncomfortable position of having to police their patients. Reasons for the rejection of criminalization include that criminalization has no proven effect on improving infant health or deterring substance abuse by pregnant women. In fact, criminalization may in fact deter the pregnant woman from seeking out necessary prenatal care for fear of losing their children or being arrested.

Criminalization of perinatal substance abuse creates untenable legal and ethical obligations for health care providers and other statutory mandatory reporters. It stretches the limits of what it means to be a caregiver. Finally, criminalization has been shown to be discriminatory based on race and socioeconomic status [220].

Impact of welfare reform

The passage of the Personal Responsibility Work Opportunity and Reconciliation Act (PRWORA), or welfare reform act in 1996, affects availability of resources, living conditions and medical services to drug using mothers. The act sought to reduce the number of children growing up in poor single parent families by promoting marriage and requiring mothers to move from welfare to work. The legislation is probably best known for having repealed the Aid to Families with Dependent Children (AFDC) program and for providing states with TANF (Temporary Assistance for Needy Families) block grants to design work focused, time limited welfare programs. However, the 1996 law was more extensive as it made major changes affecting a wide range of programs that provide services to low income children, including child support enforcement, child care, Medicaid, food stamps, child welfare and disability benefits. The law restricted services to immigrants and reduced federal protections for individuals while expanding state discretion and flexibility in implementing social policy. The law also generated new rounds of discussion about out-of-wedlock births, fathers, and marriage and family formation.

Under AFDC, states were mandated to provide assistance to all eligible poor families, but had broad discretion in setting benefit levels. The federal government paid half or more of all program costs based on caseload levels. States were required to provide work-related services and requirements for AFDC families but these programs were often not well funded and reached a limited number of eligible families. Under TANF, each state receives a block grant and has broad discretion in using the funds for programs that provide case assistance for needy families, as well as for other benefits and services that accomplish the four purposes of the law:

• Provide assistance to needy families so that children can be cared for in their own homes or in the homes of relatives;

• End needy parents' dependence on government benefits by promoting job preparation, work, and marriage;

• Prevent and reduce the incidence of out of wedlock pregnancies; and

• Encourage the formation and maintenance of two-parent families.

TANF enabled states to tie assistance to specified maternal behaviors and includes drug-related prohibitions including ineligibility for drug felons. Thirty-five states have elected to deny options to drug felons and at least 10 states require drug testing for TANF applicants [226]. Other provisions of these new rules will also affect drug-using mothers. Estimates are that 15–20% of the TANF population has drug problems that limit their ability to work [227,228]. Drug treatment improves employability [229], but drug treatment and related services are inadequate. Moreover, if mothers are ineligible for benefits due to sanctions, the funds available for treatment programs will be reduced because many treatment programs depend on block grants, Medicaid reimbursement, and public assistance benefits.

TANF could also be detrimental because of the historical connection between AFDC and the child welfare system. Families in the two systems face substance abuse and related mental health problems, domestic violence, and poverty, and both programs support many children who are being cared for by grandparents and other relatives [230,231]. The more stringent work load, sanction, and time limit requirements under TANF, as well as the disposable income some families may experience as they move from welfare to work could lead to increased drug use and involvement of child welfare. Two studies looking at AFDC caseloads found that sanctions and work combined in ways associated with more CPSA involvement and longer stays in foster care [232,233]. In another study [234], neglect and out of home care increased when cash assistance benefit levels decreased. In addition, rates of neglect increased as the number of single working mothers increased. Families that participated in Delaware's AFDC waiver program (similar to TANF requirements) had higher rates of child neglect than those in the control group [235]. Child welfare agencies in 12 states reported that lack of child care supervision had increased under TANF as had the number of families surrendering their children to child welfare agencies or delaying reunification of children already in care [236].

TANF can affect the amount of money spent on child welfare services such as substance abuse treatment, mental health, parenting education, and supports available for children in kinship care (grandparents or relatives) [237]. Finally, there is the related concern that TANF legislation could impact poor children with disabilities receiving supplemental social security income. The criteria used by the Social Security Administration for determining "marked and severe functional limitations" in children has been criticized for being too stringent [238,239] and would rule out many drug-exposed children from obtaining much needed services.

Policy recommendations

It would be easy to look at the shortcomings of the current policies surrounding issues of maternal substance abuse and lose hope at the prospects for improvement for the future. However, strides in the right direction are being made. The pendulum has swung back in the direction of providing treatment to pregnant drug users in an attempt to both address their addiction and preserve their families. There is certainly progress to be made in achieving policies and practices that effectively address all the issues that these women and their children face. We have divided policy recommendations into the following categories: (i) Education, (ii) Legal, (iii) Assessment, (iv) Financial, (v) Training, (vi) Treatment and (vii) Research.

Education

Educate the public about the social and political issues surrounding the stigma of drug abuse in general and specifically with respect to dug use by pregnant women

This includes acceptance about drug use as a mental health/medical problem, that drug use does not automatically rule out adequate parenting, how development unfolds in drug exposed children, the effectiveness of treatment including court involvement, barriers to treatment, and that barriers to treatment and punishment of the mother may not be in the best interests of the child. In addition to the "general' public, this education should also target state and federal legislators, state agencies, CPS,

child welfare workers, court, drug and alcohol treatment programs.

Educate the public about the dangers of prenatal drug exposure

Although pregnant women and women of childbearing age should be high priority, it is also important to educate preadolescent girls and boys, and men as well as women. Partners can have a substantial influence on each other's drug use. Having partners and friends with anti-drug use attitudes can help prevent drug use during pregnancy. This education should make it clear that 1) although not all drug exposed children will be affected, some will and they will be affected from birth; others might look normal at birth and not show problems until years later, 2) all drugs of abuse (legal as well as illegal and prescription medication such as benzodiazapenes and OxyContin, percodan) can affect the child, 3) prenatal care and connection to the healthcare system is important for the health of the baby and can lead to treatment if drugs are involved, 5) good parenting can help these babies but it is hard to be a good parent when you are using drugs, 6) mental health problems are often co-morbid with drug dependency and will also affect child outcome.

Educate health care providers

This includes education to 1) detect drug use during pregnancy, 2) understand that non-supportive, punitive attitudes drive pregnant women away from the health care system depriving them of prenatal care and opportunity for help, 3) learn about the unique issues and needs of these women, and 4) learn what resources are available in the community to make appropriate referrals and connect these women to services.

Educate that policies must be developed that are fair to both mother and child

Treatment providers and policy makers should not have to "choose" between the welfare of the mother and the welfare of the child.

Disseminate educational materials

Education includes dissemination. Educational materials should be prepared so that they are understandable, meaningful and user friendly for the targeted audience. This will require the preparation of different materials for different audiences including different media (e.g., printed, audio, video, in-person testimony, Internet, conferences, "town meetings,"). Dissemination should be geared at reaching the public using the media (newspapers, etc), and lawmakers.

Legal

Develop federal laws and guidelines for dealing with the detection of drug use during pregnancy, placement of drug-exposed infants and the treatment of drug using mothers and their infants

The purpose of these laws would be to provide a set of uniform policies for the nation based on current "state of the art" knowledge described above under "Education."

These Federal policies would include:

Drug testing should be targeted and only be based on specific medical criteria and not include ambiguous criteria (such as "clinical suspicion") that invite discriminatory testing of minority and underprivileged patients.

An infant should be considered drug-exposed and in need of some level of intervention if the mother states she has used illegal drugs during pregnancy or if drug exposure is shown through toxicology tests of the infant.

When an infant is identified as drug-exposed, the infant and his/her family should be assessed by hospital health providers (with assistance when necessary from developmental, drug treatment, and other specialists) using a standardized assessment battery to determine what intervention, if any, is needed. An identified drug-exposed infant should be reported to child protective services only if factors in addition to prenatal drug exposure show that the infant is at risk for abuse or neglect. Drug use alone is not sufficient to report to CPS. It is a risk factor. Reporting to CPS is only required when the standardized assessment battery indicates evidence of inadequate parenting that places the child at risk for abuse/neglect in addition to drug use.

A drug-exposed infant should be removed from the custody if his/her parent (s) only if the parent (s) are unable to protect and care for the infant and either support services are not sufficient to manage this risk, or the parent (s) have refused such services. If the parent (s) are not capable of resuming custody of the infant within 12–18 months, despite receiving services to make reunification possible, a permanent alternative placement should be promptly provided for the infant.

Family drug courts for drug-exposed infants should be established with the goals of keeping infants with their biological mothers if there is no documented risk of abuse/neglect, providing court ordered treatment and plans for reunification or alternative permanency planning to comply with ASFA.

The availability of resources, living conditions, benefits and medical services to drug using mothers and their infants including benefits (e.g. TANF) should not be

denied to drug-using women who comply with their court-ordered treatment program.

A woman who uses illegal drugs during pregnancy should not be subject to special criminal prosecution on the basis of allegations that her illegal drug use harms the fetus. Nor should states adopt special civil commitment provisions for pregnant women who use drugs.

Barriers to child protective services' capacity to meet the requirements of current child welfare laws should be identified and removed. These barriers include high caseloads, lack of drug treatment and support services for the family, backlogs in the court, and inadequate numbers of foster or adoptive homes.

Assessment

Develop universal guidelines for comprehensive risk assessment

A standardized assessment battery that includes maternal substance dependency, mental health, parenting, family resources and support, life skills, home environment, and infant neuro-behavior and medical status should be administered. The battery includes standardized scoring with specific criteria for additional evidence of abuse/neglect that requires reporting to CPS. The battery also includes guidelines for placement recommendations and developing treatment plans based on the assessment. If the mother is identified prenatally, much of the battery can be administered before delivery. If the mother is identified at birth, the battery should be administered before the infant is discharged with follow-up assessments at selected intervals determined by the court. The battery should be administered by trained, certified staff that can interface with hospital, CPS, and court staff and with treatment providers.

Financial

Spend early, spend often, spend more: Specifically, increase funding for prevention and intervention programs during the prenatal and infancy periods

Funding should be available for programs that are frequent and comprehensive dealing with mental health and family issues as well as drug dependency. The portion of the National Drug Control Budget for treatment, prevention and research should be doubled. The proportion of the NIH research budget for substance abuse research including policy research and research on developmental consequences of prenatal MATID exposure, treatment, prevention and health services should be increased. Specific funds should be allocated for "out of the box" research in areas that cross traditional disciplinary lines and therefore, NIH institutes. For example, joint NIMH and NIDA funds should address mental health and substance abuse issues. NIAAA and NIDA should collaborate on research involving alcohol and illegal drug use. Policy research cutting across all institutes should also be funded.

Develop cost effective services

Treating substance abuse as an isolated problem is doomed to fail. Wraparound mental health and family support services need to be provided for these families. Develop reimbursements strategies so that mental health, parenting and family support services can be bundled in with substance abuse treatment. These should be viewed as packages rather than as compartmentalized separate services. Establish one carve-out for the maternal substance abuse, mental health and family assessment and treatment services, a second carve-out for all of the child assessment and treatment services and a third carve-out for case management. The same service provider or provider group should provide these services at a single location (one-stop shopping). Medicaid coverage should be expanded to include these services.

Guarantee that drug using mothers in treatment keep their insurance

This includes medical benefits and TANF.

Understand that economic issues need to be understood and factored into policy decisions but they should be viewed only as one of many factors, never the sole factor

View economic issues in the context of moral values and value systems to relieve suffering and provide needed care. Understand that there is no cheap fix but that prevention and treatment are cost effective when compared with the toll that drugs take on society.

Training

Develop training programs and train hospital personnel in the administration, scoring and interpretation of the assessment battery

Train CPS staff, the court, treatment and service providers and third party reimburses in how to understand the assessment battery, and provide cross-training so that all parties involved appreciate each other's areas of expertise. Train foster/adoptive parents and treatment providers in best practices for drug-exposed infants. Develop training programs and train professionals to provide multiple (bundled) services. Train one set of professionals in maternal issues (assessment and treatment of substance abuse, mental health disorders, and family systems, parenting, child development and women's issues) and second group in infant and child assessment and treatment and a third in case management. Provide multidisciplinary substance abuse clinical training of health professionals as part of academic programs, postgraduate programs, and specialty licensing programs.

Treatment

Improve access to treatment

Drug treatment programs should be available for all drug-abusing pregnant women and parents of infants as well as women of childbearing age, and these programs should be comprehensive and responsive to other related needs of these families, including mental health, health, developmental, parenting education and other support services. Treatment programs should include thorough assessment of the infants that includes an evaluation of developmental areas such as motor, cognition, language, self help skills, coping skills, and emotional well being, and should be conducted at regular intervals including after placement in foster care for infants not with their biological mothers. Treatment programs should be family-based and include partners as well as other siblings.

Develop coordinated multidisciplinary treatment programs with interconnected services based on the needs mothers and children

Include expectations for relapse as part of treatment models and mechanisms to help reduce relapse such as programs for transition back to the community, halfway houses and step-down facilities. Extended follow-up should be seen as an integral part of treatment. Recognize that maltreatment includes both abuse and neglect, that more is known about abuse than neglect, abuse is more visible, easier to diagnose and less subtle than neglect. Develop different strategies and interventions for abuse and neglect based on the different family dynamics involved. Establish connections to state programs such as early intervention programs, early head start, head start and follow through to preschool services.

Develop preventive intervention efforts

These efforts should start as early as possible (during pregnancy, if and when possible). All drug-exposed infants should automatically qualify for early intervention services. Prevention efforts should enhance protective factors and minimize risk factors, be developmentally appropriate and culturally sensitive, but at the same time should not stereotype families. They should capitalize on the mother's motivation to change and desire to keep or be reunited with her baby while also working within her readiness to change; that deal with the complexity of these cases including mental health co-morbidities; and should have a family and community focus.

Research

Basic research should study (a) the prevalence of MATID use among pregnant women (not solely based on self-report), (b) the relationship between such use and birth and developmental outcomes, and (c) the effectiveness of drug treatment and intervention programs

Special focus should be given to evaluating drug treatment programs for pregnant women and parents with infants for their effectiveness in enabling participants to function as adequate caretakers of their children. Research should address the demographics of perinatal drug users (geography, social and minority status), level of use (hard core addicts versus recreational users), and drug and drug combinations (polydrug use). The consequences of prenatal MAITD exposure should be studied with reference to developmental models, long term effects, specific as well as polydrug effects, comparison of legal and illegal drugs, effect size and clinical significance, the role of confounding variables and drugs as a risk factor. Research also needs to determine the role of protective and resiliency factors and to understand factors that buffer the child against the adverse consequences of prenatal drug exposure.

Research needs to be conducted in which treatment programs are monitored by independent evaluators, which use clinical trials methodology and determine cost effectiveness. This includes research on the effectiveness of drug courts. Finally research needs to determine which interventions are most effective for specific groups of the maternal drug using population.

Policy research should have a specific focus on issues related to mothers (MATID) and their infants.

• Research needs to address how policies for mothers and infants are affected by:

• Findings that suggest subtle and comparable effects due to MATID including similar effects for legal and illegal drugs;

• Criminal/punitive versus mental health/disease views of addiction;

• Conflicts between programs that address fetal issues and programs that address maternal issues;

Policy research also needs to address the:

• Effects of ASFA including long-term effects of on relapse after reunification

• Effects of treatment drug courts on permanency placement, compliance with ASFA, foster care, substance participation in substance abuse treatment, relapse, and child outcome;

• Effects of welfare reform on participation in treatment courts and participation in substance abuse treatment;

• Effects of hospital drug testing (universal, selective, and none) on mothers' use of the health care system (e.g., prenatal care), and participation in treatment programs;

• Effects of prenatal enrollment in drug treatment programs on placement of the infant, CPS and court involvement and ASFA;

• Effects of insurance and treatment programs that bundle substance use and mental health treatment on treatment outcome permanency placement and child outcome;

• Cost effectiveness of new approaches such as prenatal enrollment, treatment courts, maintenance of health benefits and TANF for mothers involved with CPS and bundling of substance abuse and mental health services;

• Effects of types of substance abuse state statutes (including different statues for different types of substances) on factors such as MATID, treatment outcome, child removal foster care and permanency placement, and CPS involvement, long-term outcome of mother and child.

Conclusions

The issue of MATID use during pregnancy sits squarely at the intersection of behavioral teratology, jurisprudence, mental health, medicine, child protection, chemical dependency, civil rights, and women's issues perhaps in a way that no other controversy has. We learned a hard lesson from the cocaine controversy and saw the pendulum swing from an overestimation of risk associated with prenatal cocaine exposure to a more balanced view. That view includes the notion that, from a public health perspective, even subtle effects have significant societal impact and cost. The task at hand is to make sure that we view all drugs of abuse through a common lens, regardless of legal status, social or political considerations, so that their impact on child outcome can be adequately assessed leading to appropriate policy making.

There is a substantial disconnect between our knowledge, policy and practice regarding maternal drug use during pregnancy. For example, the drug control budget has more than doubled in the past decade. Yet the proportion of the budget devoted to treatment and prevention is unchanged, despite the gains made in science, and in our understanding of the nature of addiction in research showing that treatment and prevention are effective.

Arguably, the major barrier facing changes in policies for drug-using mothers is societal attitude. We have Supreme Court rulings that define drug use as a mental problem, we have modern evidence that treatment is effective and that there is no reason to consider drug use as different than any other mental/medical problem; there are treatment programs shown to be effective with drug-using mothers; and there are treatments with the programs involving the courts. We have identified all other barriers, yet why has policy not changed? Is it because we are still angry and want to punish these mothers? That we will not forgive them for using drugs when they are pregnant? The great tragedy is that we are only harming the children. We harm them by denying service, by increasing the number of children in out of home placement, by undermining the ability of the children to form attachment relationships, and by labeling these children as damaged. We know the danger of self-fulfilling prophecies. If we expect these children to fail, they will fail. It is time to realize that getting angry and punishing the mother is not in the best interests of either the mother or the child. It is time that we develop a national consensus on how to deal with maternal prenatal drug use that does justice to the state-of-the-art knowledge in research and treatment and demonstrates a fair and unbiased attitude towards these women and their children.

Competing interests

None declared.

Additional material

Additional File 1

Table 3 is a Word table and is submitted separately. The file name is Lester Table 3. It is Substance Abuse Statutes for Each State.
Click here for file
[http://www.biomedcentral.com/content/supplementary/1477-7517-1-5-S1.doc]

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