KIDS NOW Plus FY2009

Annual Report

Kentucky Department of Mental Health, Developmental Disabilities and Addiction Services Division of Mental Health and Substance Abuse 100 Fair Oaks Lane, 4E-D Frankfort, KY 40621-0001 (502)564-4448



Kids Now Plus

FY2009 Annual Report

Anita Jennings Acting Director, Division of Behavioral Health

Jeff Jamar Substance Abuse Treatment Branch Manager

Connie Smith Substance Abuse Prevention Branch Manager

Suzanne Carrier Program Administrator and Coordinator of Women's Treatment

Fran Belvin Program Administrator

Carol Stange Prevention Services Program Administrator

Report prepared by: Robert Walker, M.S.W., L.C.S.W. University of Kentucky Center on Drug and Alcohol Research

Allison Mateyoke-Scrivner, M.S. University of Kentucky Center on Drug and Alcohol Research

Lori A. Shook, M.D. University of Kentucky, College of Medicine, Department of Pediatrics

TABLE OF CONTENTS

EXECUTIVE SUMMARY	3
INTRODUCTION AND BACKGROUND	4
KIDS NOW PLUS FY 2009 BASELINE CLIENT CHARACTERISTICS	8
GENERAL SOCIAL AND DEMOGRAPHIC CHARACTERISTICS	9
GENERAL PREGNANCY AND BIRTH EXPECTATIONS	9
BASELINE HEALTH CONDITIONS AFFECTING THE PREGNANCY	10
MENTAL HEALTH ISSUES	11
SUBSTANCE USE BEFORE/DURING PREGNANCY	13
FY 2009 POSTNATAL DATA ON KIDS NOW PLUS CLIENTS	15
POSTNATAL HEALTH CONDITIONS AFFECTING THE PREGNANCY	16
SUBSTANCE USE	16
CHANGES IN MENTAL HEALTH FROM INTAKE AMONG THE FOLLOW-UP SAMPLE	17
CHANGES IN SUBSTANCE ABUSE FROM INTAKE AMONG THE FOLLOW-UP SAMPLE	19
CLINICAL SERVICE INFORMATION	20
FY 2009 BIRTH EVENT OUTCOMES	22
DEMOGRAPHICS	23
BIRTH-RELATED INFORMATION	23
MATERNAL RISK FACTORS	26
DISCUSSION	
REFERENCES	
APPENDIX A – DSM-IV DIAGNOSES	

EXECUTIVE SUMMARY

In FY 2009, the KIDS NOW Plus program provided prevention services to 1,366 pregnant women and 12,055 outreach and follow-along case management services in eight community mental health regions of the state. Of the women who received outreach and follow-along case management services 667 were new KIDS NOW Plus clients in FY 2009. Next, 360 women received a focused clinical assessment and 195 women completed both the baseline and postnatal interviews and birth event data were available for 189 of them. They were compared to the birth events for 189 demographically similar women and 189 women from the general population. Women were interviewed during pregnancy and within 60 days after giving birth.

PROJECT OUTCOMES INCLUDE:

- 50% fewer clients reported alcohol use after they had given birth than before they knew they were pregnant.
- There was an 84% reduction in the percent of women reporting illicit drug use from baseline to postnatal follow-up and an 80% reduction in prescription drug use.
- There was an 83% reduction in the percent of women reporting marijuana use from baseline to postnatal follow-up.
- Kids Now Plus women attended an average of 12.5 prenatal visits compared to 13.1 for a matched comparison group and 12.7 for all other pregnant women.
- The percent of KIDS NOW Plus women with premature births was 11.1%, 13.8% for the matched comparison group and 12.2% for the general population.
- 9.5% of the births for KIDS NOW Plus women were early pre-term compared to 26.9% for the matched comparison group and 8.6% of the general population.
- There were no significant differences in birth weight or APGAR scores (5 Minute) for the infants of KIDS NOW Plus women and women in the two comparison groups.
- 93.5% of the KIDS NOW Plus women used WIC compared to 72.3% for the matched comparison group and 49.2% of the general population.
- Smoking rates and depression constitute the two remaining factors of greatest concern for fetal and infant health with 66.8% of KIDS NOW Plus women smoking during the pregnancy while 37.6% and 38.6% of the two comparison groups smoked. Over half the KIDS NOW Plus women (50.3%) still reported depression after child birth (almost 59% reported depression at baseline).

COST AND BENEFITS:

- Total project cost for FY 2009 was \$1,544,563, including \$783,000 in Tobacco Settlement Funds. The remaining funding came from the Substance Abuse Prevention and Treatment Block Grant and covers some of the cost of treatment and prevention services provided to clients through the Community Mental Health Centers.
- Services for each KIDS NOW Plus client in FY 2009 cost \$2,175. This can be contrasted with a prevented lifetime cost of intellectual disability where per-lifetime costs have been estimated at between \$450,000 to \$2.9 billion, with an average of \$1,014,000, or \$15,600 per year for 65 years. Preventing just 2 intellectual disability outcomes with these interventions would cover the entire year's program cost for the hundreds of women.

INTRODUCTION AND BACKGROUND

KIDS NOW Plus is a program of the Kentucky Department of Behavioral Health, Developmental and Intellectual Disabilities that is funded by the Kentucky Early Childhood Development Authority. KIDS NOW Plus provides a wide range of interventions for pregnant women with various risk factors for substance use during pregnancy.

The prevalence of alcohol use by women age 18-44 is lower in Kentucky than for many other states, with 38% of Kentucky women reporting some alcohol use and 9.9% reporting binge drinking in 2008 (CDC, 2009). However, even the relatively lower rates suggest a serious policy concern. Some states report binge drinking by over 20% of the female population 18-44 years of age (CDC, 2009). The estimated rate for fetal alcohol syndrome is between 0.5 and 2.0 per 1,000 births. Kentucky had 57,326 live births for the period of this study (1 July 2008 - 30 June 2009) and thus could expect to have between 29 and 115 births of infants with fetal alcohol syndrome (FAS) per year. Using a wider range of alcohol-related fetal conditions such as alcohol-related birth defects (ARBD) and alcohol-related neurodevelopmental disorder (ARND), the estimate may be as high as 10 per 1,000 live births or 573 affected infants per year (May & Gossage, 2001). Nationally, the percent of women age 18-44 reporting past month alcohol use varies considerably based on pregnancy and the age of their young children. Well over half (63%) of women in that age range who have no children report past month alcohol use (Office of Applied Studies, 2008). That percentage drops to 19% during the first trimester of a pregnancy, to 7.8% at the second trimester and 6.2% in the final trimester (Office of Applied Studies, 2008). The percent of women consuming alcohol in the past month steadily increases as the child ages, going from 31.9% when the mother's child is less than 3 months old to 52.1% by the time the child is 18 months or older (Office of Applied Studies, 2008). For the time period 2006-2007, the estimated rate of women drinking during pregnancy across all trimesters was 11.6% (SAMHSA, 2008).

An additional concern is that nationally, 22.9% of pregnant women age 15-44 report smoking tobacco in the first trimester, 14.3% in the second and 15.3% in

the third trimester, and overall throughout the pregnancy, 17.3% of women reported smoking tobacco (SAMHSA, 2007). Recent Centers for Disease Control and Prevention data suggest that the presence of depression greatly affects the prevalence of smoking with depressed women twice as likely to be smokers as non-depressed women (43% vs. 22%) (Pratt & Brody, 2010). Prenatal exposure to tobacco has been reported as resulting in adverse neurobehavioral problems later in life including cognitive deficits, attentional deficits, and conduct disorder (Januiaux & Greenough, 2007). The focus on alcohol use coupled with tobacco use during pregnancy is of particular importance given that these two appear to have more potential consequences for fetal development than other drugs both in short and longer term development (Andres & Day, 2000; Britt, Ingersol, & Schnoll, 1999; Lambers & Clark, 1996; Levin & Slotkin, 1998; Slotkin, 1998).

Of special concern for this project, Kentucky has among the highest smoking rates of any state, with 25.2% of adults reporting smoking and several eastern Kentucky counties have a prevalence rate between 40% and 51% (Kentucky Vital Statistics, 2007). In Kentucky, the 2003 incidence of SIDS (Sudden Infant Death Syndrome) for mothers who smoked during pregnancy was 2.5 per 1,000 live births compared to 0.5 for mothers who did not smoke during pregnancy (Robeson, 2006).

Clear prevalence data on substance use during pregnancy and on the effects on birth outcomes are more difficult to come by given problems with the representativeness of sampling, among other problems (Havens, Simmons, Shannon & Hansen, 2009). However, an estimate of 3.9% of pregnant women using illicit drugs often has been cited and may serve to ground understanding of the scope of the problem (Lester & Twomey, 2008). The drug that has gotten the most attention is cocaine, but the significance of cocaine exposure in utero is still unclear. A hospital in largely rural South Carolina examined cocaine prevalence at birth among 14,074 women. The hospital found that about 1% (n= 137) of the women had evidence of cocaine use during the pregnancy. Of the 137 cocaine using women, drug screens were positive in only 89 cases and self reports accounted for 48 cases (Weathers, Sauvain, Crane & Blackhurst, 1993). Thus, this account of the prevalence of cocaine fetal exposure is much lower than what has been reported in urban and inner city hospitals and gives evidence that drug testing alone will not identify much more than half the likely cases (Weathers, et al., 1993). However, the actual significance of cocaine use during pregnancy on childhood intellectual and emotional/behavioral development is very mixed and findings can often be explained by factors other than drug use during pregnancy, such as maternal poverty and parenting practices and other parental behaviors (Ackerman, Riggins, & Black, 2010; Bennet, Bendersky, & Lewis, 2002; Mayes, Granger, Bornstein & Zuckerman, 1992). In addition, clear evidence of specific effects of other types of prenatal substance use (of opiates, for example) is lacking. Most substance users use multiple substances and most smoke tobacco, thus making it difficult to identify specific harms from illicit drugs.

In addition to the seriousness of prenatal substance use, the target population for this project has many other cooccurring disorders and conditions that can have equally disturbing consequences for birth outcomes. High rates of prenatal depression suggest preterm birth and numerous potential short and longer term consequences for child development (Dayan, Creveuil, Marks, Conroy, Herlicoviez, Dreyfus, & Tordjman, 2006; Wisner, Sit, Hanusa, Moses-Kolko, Bogen, Hunker, Perel, Jones-Ivy, Bodnar, & Singer, 2009). Partner violence poses additional risks for shorter gestational periods and negative birth outcomes. Women's stress appraisals exert a larger impact on birth outcomes than just exposures to stressful events (Wadhwa, 2005). Among the stressors women face, domestic violence and low socioeconomic status are among the more continual and distressing factors (Cohen, Doyle, & Baum,2006). Furthermore, domestic violence is robustly associated with mental health problems such as depression and Posttraumatic Stress Disorder (PTSD). Drug dependent pregnant women have extraordinarily high rates of violence exposure (72.7%) (Velez, Montoya, Jansson, Walters, Svikis, Jones, et al., 2006). Women with substance abuse also have high rates of co-occurring depression and anxiety (Logan, Walker, Jordan, & Leukefeld, 2006). Thus, attention to these disorders must be considered in assessment and treatment as well. Pre- and postnatal maternal stress, anxiety and depression, just like substance use itself, have been associated with childhood developmental problems (Dawson, Ashman, & Carver, 2000; Essex, Klein, Cho, & Kalin, 2002). There is also evidence that prenatal depression may have serious effects on infants' development as well (Davis, Snidman, Wadhwa, Glynn, Schetter, & Sandman, 2004).

This KIDS NOW Plus project may be characterized as generally moving toward what might be called "behavioral perinatology" in the community practice setting, as it focuses on a wide range of potentially critical behavioral health issues that can affect pregnancy outcomes (Wadhwa, Glynn, Hobel, Garite, Porto, Chicz-DeMet, Wiglesworth, & Sandman, 2002).

KIDS NOW PLUS BEHAVIORAL PROGRAM

.....

Part of the larger KIDS NOW initiative in Kentucky, the KIDS NOW Plus project focuses on the behavioral health dimensions of substance abuse risk during pregnancy. KIDS NOW Plus is funded by the Kentucky Early Childhood Development Authority and provides prevention and early intervention services to pregnant women in eight of the 14 community mental health center (CMHC) regions in the state. Centers were asked by the Kentucky Division of Behavioral Health to present proposals for KIDS NOW Plus and eight were funded. Each center is funded to provide prevention, outreach/case finding, case management, and referral

into treatment for pregnant women at high risk for substance use during their pregnancies. The projects expend considerable effort in outreach, recruiting clients into prevention and treatment services. A brief screening tool is used by KIDS NOW Plus workers to identify women at high risk for substance use during pregnancy who might benefit from prevention or treatment services. The linkage between public health and mental health was originally intended as providing the primary gateway for women into KIDS NOW Plus services. However, the health departments are gradually ceasing to provide OB/GYN care directly and this care is provided through various private providers. The gateway into KIDS NOW Plus is thus more complex than when originally planned, as there is no single point of entry for screening, identification, and referral. In addition to health departments, potential clients are now being identified by private OB/GYN providers, child welfare caseworkers, community mental health center clinicians, and other referring agencies. The KIDS NOW Plus case managers provide specialized training on effective approaches to use when asking pregnant women about their substance use, and employ evidence-based methods to engage the women in services once they have been referred.

The eight regional mental health centers providing KIDS NOW Plus are shown in Figure 1. They cover urban and rural areas, and while staffing for this program is very limited, each region has provided services to clients in almost all of the counties in their service areas.

FIGURE 1. KIDS NOW PLUS PROVIDER REGIONS



The general model of KIDS NOW Plus includes prevention, followed by outreach and follow-along case management services to help people navigate access to clinical services. This array of services is designed to inform and educate women while supporting their attendance in prenatal care and overcoming their potential reluctance to participate in treatment among those who need it. In FY 2009, 12,055 outreach and follow-along case management services were provided to women who were referred for possible engagement in KIDS NOW Plus. In addition, the program provided *education* services on topics relating to substance use during pregnancy to 1,366 women. From this group of women, 171 received more *specific selective prevention* services. In addition, there were 667 new women who received outreach and follow-along case management. Of the 667 new clients, 360 women agreed to participate in baseline assessments and 189 had follow-up assessments completed within 60 days postpartum. The 189 follow-up women provide the core findings for this report. The regional distribution of the 667 new KIDS NOW Plus case management clients is shown in Figure 2.

FIGURE 2. NEW CLIENTS BY REGION IN FY 2009



The 12,055 outreach and follow-along services were directly covered by the KIDS NOW Plus program using Tobacco Settlement funds and Substance Abuse Prevention and Treatment (SAPT) Block Grant funds. Each of the eight CMHCs that provide KIDS NOW Plus services treats the KIDS NOW Plus funds as a grant that supports staff positions rather than paying for the program through a fee-for-service approach. Some of these outreach and follow-along case management services are telephone contacts to arrange services on behalf of clients or to assist with obtaining resources for clients. There were 4,551 face-to-face follow-along contacts (37.8% of all contacts) between staff and clients over FY 2009. The region with the largest number of contacts was Pathways in eastern Kentucky with 3,096 contacts, of which 2,352 were telephone contacts. Interestingly, while KIDS NOW Plus places a small number of staff at key regional locations, clients from 36 counties were served throughout the eight regions. The original expectation was that given the small number of staff, that clients from only 1-2 counties per region might receive services. With transportation a continuing problem for service delivery throughout the state, this degree of penetration into multiple counties shows resilience of program effort. The distribution of outreach and follow-along services by region is shown in Figure 3.

FIGURE 3. OUTREACH AND FOLLOW-ALONG SERVICES BY PROVIDER REGION AND TYPE OF CONTACT



Each of the eight regional programs provided prevention services throughout the year. Table 1 shows the number of prevention services for each region. It also shows the prevention services by type: (1) universal prevention, which is aimed at general information for all pregnant women regardless of risk level; (2) selective, which is aimed at a narrower group with some indicators of risk; and (3) indicated, which is specifically targeted for persons with known problems needing specific intervention to reduce risk. In KIDS NOW Plus, this last category was rarely used in prevention services since these individuals were referred directly into more direct clinical services.

TABLE 1. PREVENTION CLIENTS BY PREVENTION TYPE
AND PROVIDER REGION

REGION	UNIVERSAL	SELECTIVE	INDICATED
Lifeskills	201	0	2
Communicare	60	83	0
Seven Counties	531	0	0
NorthKey	9	0	0
Pathways	101	0	0
Mountain	13	0	0
Cumberland	202	48	0
River			
Adanta	249	40	0
Total	1366	171	2

The Kentucky Division of Behavioral Health supports and oversees the KIDS NOW Plus program efforts through quarterly meetings, onsite technical assistance and frequent email communications, training, supervision and consultation. The Division presented twenty-six hours of training on Motivational Interviewing, a key evidence-based practice used in this project. In addition, more intensive follow-up was provided through coaching and feedback on 23 client cases that staff had taped for supervision. Each of the 23 cases were followed up with written feedback to the KIDS NOW Plus providers. In addition, 15 staff providers got telephone consultation based on their case presentations. The Division has placed a high premium on developing increased skills and capacities of program staff.

KIDS NOW PLUS FY 2009 BASELINE CLIENT CHARACTERISTICS

While not all women receiving case management or educational services want or will accept a more focused service during their pregnancy, many do. In FY 2009, 360 pregnant women received more intensive and focused prevention and case management services in the Kids Now Plus (KNP) program. The following intake assessment data represent the circumstances of these women within the first 3-4 contacts with the KNP worker before clients give birth.

GENERAL SOCIAL AND DEMOGRAPHIC CHARACTERISTICS

The average age of women involved in the KNP was 23 and almost one-quarter were married (see Table 2). Of those clients who reported being either married or cohabiting (n = 155), 65.8% reported that the partner was the father of their child. Most of the women were white and had a high school diploma or less. In addition, 73.7% were not currently employed.

TABLE 2. DEMOGRAPHICS FOR KIDS NOW PLUS WOMEN IN FOCUSED CARE (n = 360)

AVERAGE AGE	23.3 (range 15-41)
RACE ^a Hispanic Black Asian White Other	1.1% 3.2% 1.1% 94.7% 2.1%
EDUCATION COMPLETED ^a Less than 12 th grade 12 th grade or GED Some college Some voc/tech school Associates degree Bachelors degree	26.4% 37.9% 30.5% 1.1% 2.1% 2.1%
CURRENT WORK SITUATION ^a 35 or more hours/week Less than 35 hours/week Currently in school and working Not currently employed Other	7.4% 8.4% 5.3% 73.7% 5.3%
AVERAGE NUMBER OF PAID JOBS IN THE PAST YEAR ^a	1.2 (range 0-6) (n = 95)
Married Cohabiting Divorced Separated Widowed Never married	24.7% 18.6% 7.8% 7.5% 0.3% 40.6%
If married or cohabiting, is this partner the father of your child?	65.8%
^a Data collected on only 26% of the sample due to collection instruments during the ve	changes in data ear

GENERAL PREGNANCY AND BIRTH EXPECTATIONS

On average, the clients in FY 2009 were approximately 23.2 weeks into their pregnancies at baseline and 78.3% indicated that the pregnancy was not planned. Pregnant clients reported an average of 5.9 visits with a doctor or nurse about their pregnancy at baseline. Over 32% of participants knew they were having a boy; 28.3% knew they were having a girl; and 39.5% did not yet know the gender of their fetus.

Over half of the clients reported already having chosen a name (perhaps boy and girl names in those cases in which the gender was not yet known). Only 1.7% of clients did not plan on keeping their babies or were unsure they were keeping their babies. Forty-five percent (161) of the women planned on breast feeding their babies. Among those who had made plans for child care after birth (150, 41.7%), 74.7% reported the mother will be caring for the baby herself, and 30% indicated her mother or aunt will care for the baby (see Figure 4). The clinical relevance of these findings pertains to the degree to which KIDS NOW Plus mothers-to-be are giving signs of anticipating their child's birth and the degree to which they have plans in place. Since these data are collected about halfway into the pregnancy, they suggest that there has been time to give thought to some of these concerns. However, 55% of clients had not established any plans for child care. Stability and safety of living arrangements after birth may have important impact on behavioral outcomes for children who with prenatal drug exposure (Bada, Langer, Twomey, Bursi, Lagasse, Bauer, Shankaran, Lester, Higgins, & Maza, 2008)

FIGURE 4. PERCENT OF CLIENTS REPORTING CHILDCARE

ARRANGEMENTS AT BASELINE (n = 150)*



* Clients were given the opportunity to choose more than one arrangement and, therefore, percentages do not total 100%

BASELINE HEALTH CONDITIONS AFFECTING THE PREGNANCY

PHYSICAL HEALTH CONDITIONS POTENTIALLY AFFECTING PREGNANCY

Over 41% of respondents reported their current health was "very good" or "excellent." Clients were asked about several current health conditions that could potentially affect their pregnancy. Figure 5 shows that 18.1% reported severe headaches, 13.6% reported "other" (but the data collection device does not ask clients to specify), 12.2% reported vision problems, and 11.7% reported breathing difficulties. Over 45% of pregnant clients reported no health problems while 28.9% reported one health problem and 25.3% reported multiple health problems. While none of these conditions are diagnosed medical problems, they suggest the range of physiological problems that could lead to increased stress or actual harm to fetal development.

FIGURE 5. CURRENT HEALTH PROBLEMS (n = 360)



In addition, 8.8% reported currently having an STD (see Figure 6). Over one quarter experienced viruses or other infections since becoming pregnant and 9.2% reported a serious fall or accident since becoming pregnant. None of the women reported having HIV/AIDS.

FIGURE 6. OTHER HEALTH CONDITIONS AT BASELINE (n=360)



PREVIOUS PREGNANCIES

Clients reported being pregnant an average of 1.5 times (range = 0-6) prior to this current pregnancy. Of those reporting previous pregnancies (n = 234), the average age of first pregnancy was 18.6. Of those who reported a previous pregnancy, 24.4% reported ever having a miscarriage and 4.4% reported ever having an abortion.

MENTAL HEALTH ISSUES

At baseline, women were asked about symptoms related to specific mental health concerns in the past 30 days prior to the baseline interview (see Figure 7). Over 58% reported feelings of serious depression and 66.9% reported worrying excessively, and of those clients, 33.1% found it difficult to control their worries. In addition, over half reported experiencing a traumatic event in her lifetime.



FIGURE 7. PAST 30-DAY MENTAL HEALTH PROBLEMS REPORTED BY CLIENTS AT BASELINE (n = 360)

* Lifetime measure

SOCIAL COMPARISONS

Clients were asked to compare themselves to other pregnant women on stress experiences. Compared to other women who have been or are now pregnant, 46.3% of clients perceived themselves as having more stress than other pregnant women (Figure 8). Stress at weeks 26-31 is a potentially serious contributor to shortened gestation and how infant behavior will be interpreted and related to after birth (Sandman, Glynn, Schetter, Wadhwa, Garite, Chicz-DeMet & Hobel, 2006; Sheinkopf, Lester, Lagasse, Seifer, Bauer, Shankaran, Bada, Poole, & Wright, 2006).



FIGURE 8. STRESS COMPARED TO OTHER PREGNANT WOMEN (n = 360)

A social comparison ladder was used to estimate where women placed themselves in a social hierarchy. On a scale of 1-10 with 1 being the "worst I could expect" and 10 being the "very best I could expect," clients were asked questions about their situation in life compared to other pregnant women. Figure 9 presents the average placement of the women and the average person. Curiously, KNP women felt positive about the future yet placed themselves currently below the average person. Thus, while they see themselves as somewhat lower than the average person currently, they view their future as being better than the average person and decidedly better than they are now. A concern is that this positive estimation actually may have less than protective effects and may suggest a risk for depression when the future fails to match expectations.

FIGURE 9. SOCIAL COMPARISONS: "WHERE YOU ARE IN LIFE" – KIDS NOW PLUS WOMEN IN RELATION TO OTHERS (n = 360)



MENTAL HEALTH DIAGNOSES

Using the clinical service event data that providers report to the Department of Behavioral Health and Intellectual and Developmental Disabilities, diagnostic information could be derived for all clients who were diagnosed with a mental disorder. The DSM-IV diagnoses were obtained for KIDS NOW Plus clients who had a baseline in FY 2009. Figure 10 shows the percent of clients being diagnosed with various categories of mental health disorders. Almost 40% of clients were diagnosed as having a substance use disorder (abuse or dependence); 23.3% had a mood disorder (such as depression or nonpsychotic bipolar disorder); and 14.2% were diagnosed as having an anxiety disorder (such as generalized anxiety, panic disorder, or obsessive-compulsive disorder). No clients were diagnosed as having a sleep disorder, sexual disorder, or dementia. For a list of diagnoses that fall under the reported categories, please see Appendix A.

FIGURE 10. DSM-IV DIAGNOSES FOR FY2009 KIDS NOW PLUS CLIENTS



INTIMATE PARTNER VIOLENCE AND OTHER BEHAVIORS

Over thirty-five percent of clients (35.8%) reported some type of abuse in the past year in FY 2009. As mentioned above, 72.7% of pregnant women in another study reported lifetime physical abuse (Velez, Montoya, Jansson, Walters, Svikis, Jones, et al., 2006). However a past year physical abuse rate of 14.4% is still of great concern as it occurs within the pregnancy window. Figure 11 presents data related to victimization of the pregnant clients in the past year. Over 27% of the women reported having been verbally or psychologically abused by a partner in the past year. About 24% reported having a partner that was extremely jealous, and 14.2% of clients had a partner that frightened them by engaging in harassing behavior in the past year. In addition, 14.4% of pregnant clients reported having a partner that has hit, grabbed, pushed, or otherwise physically abused them in the past year. Four percent of clients reported having a partner or other man make them have sex by force or by threatening harm.





Over 40% of pregnant clients reported that the father of the child drank alcohol and 27.8% reported the partner used illegal drugs before or during the time the child was conceived. Almost 17% reported that the father worked around petroleum, paint, gasoline, or other strong chemicals before or during the time the child was conceived.

FEELINGS REGARDING PREGNANCY

Clients were questioned about their feelings and their partner's feelings regarding the pregnancy on a scale ranging from 1 to 5, with 5 being "very excited." Figure 12 shows the breakdown of responses concerning feelings regarding the current pregnancy. The majority of clients (88.6%) reported being excited to very excited about their pregnancy and believed that the father was also excited (67.2%). Less than 1% of female clients admitted not being happy about the pregnancy while 8.6% believed the father was not happy about the pregnancy. According to the clients, 3.6% of the fathers did not yet know about the pregnancy.

FIGURE 12. FEELINGS ABOUT THE PREGNANCY (n = 360)



SUBSTANCE USE BEFORE/DURING PREGNANCY

Figure 13 shows the percentages of women reporting substance use prior to and during pregnancy. Over threefourths of respondents (76.1%) smoked cigarettes in the month before they knew they were pregnant and almost two-thirds (63.9%) reported smoking since they have known they were pregnant. On average, those who smoked prior to pregnancy smoked about 19 cigarettes a day (or one pack) and those who continued to smoke during their pregnancy smoked about 10 cigarettes a day (or a half a pack). Prior to pregnancy, 33.3% of respondents reported drinking; since finding out they were pregnant, 5.6% admitted having an alcoholic drink. In the month prior to knowledge of the pregnancy, 26.4% used illegal drugs and 19.4% used prescription drugs other than as prescribed. After finding out they were pregnant, 10.6% continued to use illegal drugs and 12.5%

reported using prescription drugs other than as prescribed.

FIGURE 13. PERCENT REPORTING SUBSTANCE USE PRIOR TO OR DURING PREGNANCY (n = 360) Prior to During 63.9% 26.4% 26.4% 22.0% 12.5% Cigarettes Alcohol Illegal drugs Prescription drugs

For those women reporting illegal drug use, Figure 14 shows specific illegal drug use prior to or during pregnancy. For the 26.4% of pregnant women who reported using illegal drugs prior to the pregnancy (n =95), 85.3% used marijuana, 17.9% used crack/cocaine, 4.2% used methamphetamines, and 9.6% reported using heroin, inhalants, MDMA, or amphetamines. Of those who reported illegal drug use after discovering they were pregnant (n = 38), 84.2% used marijuana, 13.2% used crack/cocaine, and 7.9% used heroin, inhalants, MDMA, methamphetamines, or amphetamines.

FIGURE 14. PERCENT OF CLIENTS REPORTING SPECIFIC ILLEGAL DRUG USE PRIOR TO OR DURING PREGNANCY AMONG THOSE REPORTING ILLEGAL DRUG USE



For those women reporting prescription drug use other than as prescribed, Figure 15 shows specific prescription drug abuse prior to or during pregnancy. Among the 22.0% of clients reporting prescription drug use prior to pregnancy (n = 79), 55.7% used Hydrocodone, 32.9% used Xanax, 34.3% used OxyContin, and 28.6% used Percocet. Of those clients who reported misusing prescription drugs during pregnancy (n = 45), 42.2% reported using Hydrocodone, 44.4% reported using OxyContin, and 22.2% reported using Xanax.

FIGURE 15. PERCENT OF CLIENTS REPORTING SPECIFIC PRESCRIPTION DRUG USE PRIOR TO OR DURING PREGNANCY AMONG THOSE REPORTING PRESCRIPTION DRUG USE



Prior to (n = 79) During (n = 45)

FY 2009 POSTNATAL DATA ON KIDS NOW PLUS CLIENTS

The following data represent self-reported baseline data on the postnatal follow-up sample of women in the Kids Now Plus program. This sample was not random and follow-up was usually conducted among women who continued to use KIDS NOW Plus services even after delivery. This follow-up sample includes 195 women, many of whom had their baseline interviews in FY 2008. The 195 follow-up women are used to best understand the outcomes of the program.

POSTNATAL HEALTH CONDITIONS AFFECTING THE PREGNANCY

Almost one-quarter of Kids Now Plus follow-up clients reported having severe headaches at baseline; 14.9% reported dental problems, 13.8% reported vision problems, and 12.3% reported breathing difficulties (see Figure 16). Over 28% of women reported having a virus while pregnant.



FIGURE 16. REPORTED HEALTH PROBLEMS AT INTAKE FOR FOLLOW-UP SAMPLE (n = 195)

Over three-quarters of clients reported that the pregnancy was not planned, but almost 91% reported

SUBSTANCE USE

Prior to knowledge of the pregnancy, 76.9% of KIDS NOW Plus follow-up clients reported smoking cigarettes while 64.6% reported smoking cigarettes after discovering they were pregnant (a 16.0% decrease). In addition, the number of cigarettes decreased significantly from 21.4 cigarettes for those women who reported using prior to the pregnancy to 9.2 cigarettes per day during pregnancy (a 49.1% decrease). Alcohol use decreased 86.0% from before pregnancy to during pregnancy, with only 4.6% of clients reporting alcohol consumption while pregnant. Over one-quarter of KIDS NOW Plus clients reported using illegal drugs prior to pregnancy and 13.3% reported using illegal drugs during pregnancy (a 49.2% decrease). Prescription drug misuse also decreased from 18.5% prior to pregnancy to 9.7% during pregnancy (a 47.6% decrease).

they had someone to provide emotional support during the pregnancy. Half of the KIDS NOW clients felt they had more stress compared to other pregnant women, while 27.2% felt they had less stress (see Figure 17).

FIGURE 17. STRESS AT INTAKE COMPARED TO OTHER PREGNANT WOMEN FOR FOLLOW-UP SAMPLE (n = 195)



When asked about the father of the baby, 42.1% reported the father drank prior to conception and 30.3% reported the father used drugs prior to conception. In addition, 9.7% reported the father worked around strong chemicals, such as petroleum products, prior to conception.





^{***} p < .001, ** p < .01, * p < .05

As shown in Figure 19, of those women who reported using illegal drugs prior to pregnancy, 92.2% reported using marijuana prior and 47.1% reported using during pregnancy. This means that there was a 48.9% decrease in the number of women who reported marijuana use during their pregnancy. Slightly under 20% of women who reported illegal drug use prior to pregnancy reported cocaine use and during pregnancy this number was down to 9.8% (a 50.0% decrease).

FIGURE 19. PERCENT OF FOLLOW-UP CLIENTS REPORTING SPECIFIC ILLEGAL DRUG USE PRIOR TO AND DURING PREGNANCY AMONG THOSE REPORTING ILLEGAL DRUG USE AT PRIOR AND RATE OF CHANGE



For those women reporting using prescription drugs prior to pregnancy, the use of painkillers such as Hydrocodone, Percocet and Oxycontin all decreased during the pregnancy (Figure 20). Tranquilizer use of Xanax and Valium decreased 100% and 66.3%, respectively.

FIGURE 20. PERCENT OF CLIENTS REPORTING SPECIFIC PRESCRIPTION DRUG USE PRIOR TO AND DURING PREGNANCY AMONG THOSE REPORTING PRESCRIPTION DRUG USE AT PRIOR AND RATE OF CHANGE



CHANGES IN MENTAL HEALTH FROM INTAKE AMONG THE FOLLOW-UP SAMPLE

SELF-REPORTED MENTAL HEALTH

The following figures show positive changes on mental health measures from baseline to postnatal (see Figure 21). At baseline, 61.5% of pregnant women reported experiencing depression in the past 30 days. At postnatal, 50.3% of women reported depression, a 13.3% decrease. At baseline, 72.8% of KIDS NOW Plus clients reported feeling excessively anxious and at postnatal, this percent dropped to 52.8% of the women, a 27.5% decrease.





*** p < .001, ** p < .01, * p < .05

^a time frames between baseline and follow-up are not necessarily the same

^b Significance established using z-test for proportions

In addition to reported mental health problems, clients' perceptions of life and social comparisons also improved from baseline (Figure 22). On a scale of 1-10 with 1 being the "worst I could expect" and 10 being the "very best I could expect," clients' perceptions of their current lives increased 8.6% from 5.8 at baseline to 6.3 at follow-up. Their perceptions of how life would be a year from now also increased. On average, at baseline clients rated their lives one year from now at 7.7, but at follow-up they rated their future at 8.1, a 5.2% increase.

FIGURE 22. SOCIAL COMPARISONS: "WHERE YOU ARE IN LIFE" – KIDS NOW PLUS WOMEN IN RELATION TO OTHERS AND RATE OF CHANGE (n = 195)^a



^a Significance established using paired sample t-test
 *** p < .001, ** p < .01, * p < .05

DSM MENTAL HEALTH DIAGNOSIS

Using the clinical service event data that providers report to the Department of Mental Health, Developmental Disabilities and Addictive Services, diagnostic information could be derived for all clients who were diagnosed with a mental disorder. The DSM-IV diagnoses were obtained for KIDS NOW Plus clients who had a postnatal follow-up in FY 2009. Figure 23 shows the percent of clients being diagnosed with various categories of mental health disorders. Over 38% of clients were diagnosed as having a substance use disorder (abuse or dependence; 26.7% had a mood disorder (such as depression or nonpsychotic bipolar disorder); and 17.4% were diagnosed as having an anxiety disorder (such as generalized anxiety, panic disorder, or obsessive-compulsive disorder). No clients were diagnosed as having a sleep disorder, sexual disorder, or dementia. For a list of diagnoses that fall under the reported categories, please see Appendix A.





ABUSE

Reports of abuse significantly decreased from intake to postnatal follow-up as shown in Figure 24. At baseline, 15.4% of KIDS NOW Plus clients reported being physically abused by a partner in the past 12 months; however, since giving birth, 1.0% reported physical abuse by a partner -- a 93.5% decrease. Reports of verbal abuse decreased 75.3%, from 29.2% at baseline to 7.2% at postnatal follow-up. In addition, the percent of clients who reported being harassed by a partner decreased 89.1%, from 13.8% at baseline to 1.5% at follow-up.

FIGURE 24. PERCENT OF CLIENTS REPORTING PARTNER VICTIMIZATION FROM BASELINE TO FOLLOW-UP AND RATE OF CHANGE (n = 195)



^a time frames between baseline and follow-up are not necessarily the same

Significance established using z-test for proportions *** p < .001, ** p < .01, * p < .05

CHANGES IN SUBSTANCE ABUSE FROM INTAKE AMONG THE FOLLOW-UP SAMPLE

At baseline, 76.9% of clients reported smoking cigarettes in the month before they had knowledge of their pregnancy (see Figure 25). At postnatal, this percent dropped 12.6% to 67.2% of women. Of clients who reported smoking at baseline, the average number of cigarettes smoked per day decreased 48% from 21.4 cigarettes a day at baseline to 11.1 cigarettes at postnatal. Almost one-third of the Kids Now Plus clients reported drinking alcohol in the month prior to discovering they were pregnant and at postnatal, 16.4% reported drinking since giving birth (a 50% decrease). Prior to pregnancy, 26.2% of clients reported using illegal drugs and 18.5% reported prescription drug misuse. After having their babies, 4.1% reported using illegal drugs and 3.6% reporting misusing prescription drugs (an 84.4% and 80.5% decrease, respectively).



Of those reporting illegal drug use at baseline, the types of substances used also decreased (Figure 26). Over 90% of clients who used illegal drugs at baseline reported using marijuana. After giving birth, 15.7% of those women reported using marijuana, an 83% decrease. Similarly, cocaine was reportedly used by 19.6% of clients in the month prior to knowledge of the pregnancy, and no clients reported cocaine use since giving birth (a 100% decrease). FIGURE 26. PERCENT OF CLIENTS REPORTING SPECIFIC ILLEGAL DRUG USE PRIOR TO AND AFTER BIRTH AMONG THOSE REPORTING ILLEGAL DRUG USE AT BASELINE AND RATE OF CHANGE (n = 51)



^{***} p < .001, ** p < .01, * p < .05

For those women reporting prescription drug use at baseline, the use of painkillers such as Hydrocodone, Percocet® and OxyContin® all decreased from baseline to postnatal (Figure 27). Tranquilizer use of Xanax® and Valium® decreased 100% and 66%, respectively, from baseline to postnatal.

FIGURE 27. PERCENT OF CLIENTS REPORTING SPECIFIC PRESCRIPTION DRUG USE PRIOR TO AND AFTER PREGNANCY AMONG THOSE REPORTING PRESCRIPTION DRUG USE AT BASELINE AND RATE OF CHANGE (n = 36)



^{***} p < .001, ** p < .01, * p < .05

CLINICAL SERVICE INFORMATION

Clinical services (not funded by KIDS NOW Plus) were examined for the 195 women who completed a postnatal assessment in FY 2009. Of these, approximately 70% (n = 137) were matched to the clinical service event files in the Department of Behavioral Health, Developmental and Intellectual Disabilities data set. About 30% of the women had no data on clinical services that might have been provided by the community mental health centers during the time period under review. All the services listed below were funded by the Substance abuse Prevention and Treatment Block Grant or state general funds. Almost 40% of clients received substance abuse case management services, 33.3% received individual substance abuse therapy services, and 8.7% received other services. Very few (2.1%) received residential treatment, suggesting either difficulty getting women to accept residential care or that few met the criteria for that level of care.

FIGURE 28. PERCENT OF KIDS NOW PLUS CLIENTS MATCHED TO SERVICES (n = 195)



Figure 29 shows the average number of each type of service for clients who received at least one of those services. A total of 137 KIDS NOW Plus clients (70.3%) received 3,688 clinical services, or about 27 services each. A total of 2,084 case management services, 699 days of residential treatment, and 149 therapeutic services were provided to this group of women. The residential stays are consistent with the stays called for by a new provider of residential care for pregnant

women (Independence House) and can include transitional living even after pregnancy.

FIGURE 29. MEAN NUMBER OF CLINICAL SERVICES RECEIVED BY CLIENTS RECEIVING AT LEAST ONE OF THE SERVICE TYPES (n=195)



Figure 30 illustrates the range in the number of services received by pregnant clients. Interestingly, 20.5% of clients received the fewest services and 20.5% of clients received the most services.

FIGURE 30. RANGE OF NUMBER OF CLINICAL SERVICES (n = 195)



Of the postnatal clients who were matched to the event service dataset using their social security numbers, 58 did not have data for clinical services that would have been provided by the community mental health centers. However, 40 clients (20.5%) received 31 services or more. The following figures show a regional distribution of clients receiving no CMHC services (Figure 31) and clients receiving 31 services or more (Figure 32). The region with the largest percent of KIDS NOW Plus clients with no data on CMHC clinical services was Pathways with 46.6%, followed by Cumberland River with 25.9%. The region with the greatest percent of clients receiving 31 or more clinical services was Lifeskills (51.0%) followed by Adanta and Seven Counties, both with 40.0%.

FIGURE 31. PERCENT OF KIDS NOW PLUS CLIENTS WITH NO DATA ON CLINICAL SERVICES BY CMHC REGION (n = 58)



FIGURE 32. PERCENT OF KIDS NOW PLUS CLIENTS RECEIVING 31+ CLINICAL SERVICES BY REGION (n = 40)



COST OF SERVICES FOR POSTNATAL FOLLOW-UP CLIENTS

Overall, Kids Now Plus postnatal clients received 3,688 state-funded services including medical and non-medical detoxification, outpatient counseling, intensive outpatient, case management, crisis stabilization, therapeutic rehabilitation, and supported employment. A total of 137 clients received state-funded services (including Medicaid) from their intake date to their postnatal date. The total cost of state-funded treatment services for these 137 clients was \$81,798 or \$597 per client (see Figure 33). The cost of services for the 137 clients included both specific substance abuse treatment (\$70,711, or \$516 per person) and mental health treatment (\$11,086, or \$81 per person). In order to generalize this treatment cost to the entire follow-up sample, the per client treatment cost was multiplied by the total sample size (n=195) to arrive at a generalized total cost of \$116,415 for state and SAPT-funded treatment services.

FIGURE 33. TOTAL COST OF STATE-FUNDED TREATMENT SERIVCES AND TOTAL COST OF ALL TREATMENT FOR POSTNATAL CLIENTS



FY 2009 BIRTH EVENT OUTCOMES

Female clients completing postnatal assessments in FY 2009 were matched to Kentucky Department of Public Health Vital Statistics birth event data. Three groups were used to analyze the birth data. In order to better understand how Kids Now Plus clients compared to similar women who are not in the program, a matched comparison group was created based upon age, race, education, and county residence. In addition, a group was formed of all other women in the birth event dataset who were not in either of the other two groups in order to describe characteristics among the general population of all birth women in Kentucky for this reporting period. The following results compare the KIDS NOW Plus clients (KNP), a matched comparison group (matched to age, race, education and urban/rural environment) and a random selection of 189 women from the general population of women giving birth in the same time period.

DEMOGRAPHICS

The general population group had a greater percentage of individuals in the "other" category and was slightly older compared to the other two groups (see Table 3). The general population group also had a greater percentage of individuals who had college educations and were more metro than rural. The Kids Now Plus group was the least likely to be married among the three groups.

TABLE 3. DEMOGRAPHIC INFORMATION OF BIRTH DATA GROUPS

	Kids Now	Comparison	General
	ciferites	Broup	population
Race*	(n = 189)	(n = 189)	(n = 189)
White	94.2%	95.2%	87.8%
Black	4.2%	4.2%	6.9%
Other	1.6%	0.5%	5.3%
Education***	(n = 187)	(n = 189)	(n = 189)
No high school degree	33.7%	33.9%	16.9%
High school graduate or GED	43.9%	43.4%	27.0%
College	22.5%	22.8%	56.1%
Avg. age***	24.2	24.2	26.1
Married***	(n = 188)	(n = 189)	(n = 189)
	35.6%	52.4%	55.0%
Urban/rural status***	(n = 184)	(n = 187)	(n = 180)
Metro	35.3%	35.3%	57.8%
Non metro	49.5%	49.7%	34.4%
Very rural	15.2%	15.0%	7.8%

BIRTH-RELATED INFORMATION

The comparison group had the greatest average number of prenatal visits (13.1) while the Kids Now Plus group had the fewest (12.5); however, the differences were not significant.





No statistically significant differences were found in gestational age at birth among the three groups as

shown in Figure 35; all group averages were above the 37-week cut-off for prematurity.

FIGURE 35. AVERAGE NUMBER OF GESTATIONAL WEEKS



A closer review of the number of weeks of gestation reveals that the comparison group had a larger number of pregnancies at less than 37 weeks and six pregnancies that were less than 30 weeks, compared to only two for the KIDS NOW Plus group and one for the general population. Of all preterm cases, only two of the KIDS NOW Plus women (9.5%) fell under 32 weeks gestation and thus would be considered "early pre-term" (American Congress of Obstetricians and Gynecologists, 2010). For the matched comparison group, seven cases or 26.9% were early pre-term cases and two or 8.6% of the general population had early pre-term births. Table 4 shows the distribution of pre-term births and Figure 36 plots the data in a line graph.

TABLE 4. NUMBER OF CASES OF EARLY PRE-TERM (IN YELLOW FONT) AND PRE-TERM FOR KIDS NOW PLUS, A COMPARISON GROUP AND THE GENERAL POPULATION

Number of	KIDS NOW	Comparison	General
Weeks	Plus	Group	Population
23	0	1	0
25	1	0	0
26	0	1	0
27	1	1	1
28	0	1	0
29	0	2	0
30	0	0	1
31	0	1	0
32	1	2	0
33	1	0	1
34	3	3	3
35	6	3	5
36	8	11	12
All under 37	21	26	23
weeks			

FIGURE 36. GESTATIONAL WEEKS FOR KIDS NOW PLUS, A COMPARISON GROUP AND THE GENERAL POPULATION



The KNP group had the lowest percentage of premature births (11.1%) compared to the matched comparison and the general population groups (13.8% and 12.2%, respectively) as shown in Figure 37. These differences, however, were not significant.

FIGURE 37. PERCENT OF PREMATURE BIRTHS ACROSS GROUPS



Similarly, the matched comparison group had the lowest birth weights of the three groups as shown in Figure 38 but the differences are not significant.

FIGURE 38. AVERAGE BIRTH WEIGHT (IN GRAMS)



Among the cases of premature delivery, only three KIDS NOW Plus babies had birth weight under 1500 grams. For the matched comparison group, six babies had birth weight under 1500 grams and for the general population, only two fell in that category.

FIGURE 39. NUMBER OF LOW BIRTH WEIGHT IN GRAMS BY 500 GRAM INCREMENTS



In comparison to the general population of women, KNP clients and the matched comparison group were significantly less likely to breastfeed.



*** p < .001, ** p < .01, * p < .05

The birth event data set also shows the final APGAR scores for newborns. The final APGAR scores (5 minute) suggest that very few newborns have troubling scores with the KNP group having the largest number of under 7 scores (Figure 40). However, the between group differences were not statistically significant. Women in the fourth group are women who gave birth in 2008 and 2009 but either did not match the Kids Now Plus clients, were not chosen for the comparison group, or were not chosen for the general population sample.

The KNP clients were significantly more likely to have Medicaid as their source of pay for the birth of the baby whereas the general population was more likely to have private insurance (see Figure 42). We were unable to achieve a comparison group that precisely reflects the demographics and use of Medicaid of the KNP group.







Similarly, a significantly greater percentage of KNP clients receive WIC compared to the comparison group and the general population. The higher rate of participation in WIC may suggest greater effort by KIDS NOW Plus program staff to connect women with this service.

FIGURE 43. PERCENT OF WOMEN WITH WIC***



MATERNAL RISK FACTORS

According to the birth data, over two-thirds of KNP clients were smokers compared to fewer than 40% for both the comparison group and the general population. Though significantly more women were smokers in the KNP group, no significant differences were reported between the groups for the number of cigarettes smoked before the pregnancy, in the first trimester, in the second trimester, and in the last trimester of pregnancy.

FIGURE 44. PERCENT OF WOMEN WHO REPORT SMOKING***



*** p < .001, ** p < .01, * p < .05

Figure 45 shows the percentage of mothers who, according to the Body Mass Index (BMI), were obese, severely obese, or morbidly obese based on measures taken at the first prenatal visit. Excess weight during pregnancy can create a host of problems for the mother

and baby such as: gestational diabetes, gestational hypertension, low APGAR scores, premature birth, neural tube defects, and even death (Galtier-Dereure, Boegner, & Bringer, 2000; Mighty, & Fahey, 2007). Furthermore, mothers who are obese during pregnancy use a greater number of health care services (longer hospital stays, medication, and doctor visits) compared to women who are normal weight (CDC, 2008). The increase in service utilization translates into increased cost, with the cost of prenatal care for overweight women five times higher than for pregnant women with normal pre-pregnancy weight (Galtier-Dereure, Boegner, & Bringer, 2000). While there are no significant differences among the three groups, a 34.1% obesity rate (63 women) for KNP clients should be cause for concern. If mothers who are overweight are added to this group, the rate of overweight or obese KNP clients climbs to 58.9%.

FIGURE 45. PERCENT OF WOMEN WITH OBESITY



General population (n = 187)



Other general health conditions of pregnancy were also collected from Vital Statistics. The only significant difference among the three groups occurred in the general population having higher numbers of women who experienced a previous poor health outcome. No significant differences were reported among the groups for sexually transmitted diseases. Figure 47 shows birth event characteristics, with the only significant difference being the greater percentage of women with nonvertex presentation in the general population group.



General population (n = 189)







*** p < .001, ** p < .01, * p < .05

DISCUSSION

After three decades of research on prenatal substance use among pregnant women, a complex picture emerges of birth outcomes, early childhood development following fetal exposure, and maternal mental and physical health during and after the pregnancy. This project provides outreach and case management services for a difficult-to-recruit and difficult-to-retain population of women whose clinical picture during pregnancy is very complex. Not only do they present with substance use problems including heavy tobacco use, but they also have disturbingly high prevalence of depression and anxiety both prenatally and postnatally. Pre- and postnatal maternal stress, anxiety and depression have been associated with childhood developmental problems including cognitive problems, impaired emotion regulation and poor stress reactivity responses (Dawson, Ashman, & Carver, 2000; Essex, Klein, Cho, & Kalin, 2002). While there is limited research on the longer term effects of maternal depression during pregnancy, there is support for the idea that prenatal depression particularly during the third trimester - has serious effects on infants' responses to novelty, which has important implications for a wide range of behavioral problems (Davis, Snidman, Wadhwa, Glynn, Schetter, & Sandman, 2004). The fact that almost 59% of the women receiving focused attention in KIDS NOW Plus reported serious depression during their pregnancy is of central concern. Among the women who were followed from baseline to follow-up (n=195), 61.5% reported depression at baseline and 50.3% still reported depression at follow-up two months postpartum. These data strongly suggest a need to focus more intensely on depression and the many contributors to it.

The women participating in KIDS NOW Plus show significant reductions in substance use upon learning they are pregnant and at follow-up in the postpartum period. Certain illicit drugs drop off the screen entirely by follow-up. What persists is tobacco use (with 65% still smoking during pregnancy) and this pattern may relate to the high prevalence rate for depression. Clearly, a more targeted approach to tobacco use is indicated for

this population of pregnant women. Recent research suggests that once studies control carefully for the effects of tobacco use when examining the effects of prenatal drug use, tobacco ends up accounting for most, if not all, of the variance in birth weight and other outcomes (Schempf & Strobino, 2008). Even for cocaine and opiate use, which in bivariate analyses showed lower birth weight, the lower birth weight outcomes were then shown to be due to prenatal tobacco use and maternal stress (Schempf & Strobino, 2008). Smoking does not stand alone as a clinical problem, however. A recent Centers for Disease Control and Prevention report shows a linear relationship between smoking and depression (Pratt & Brody, 2010). In fact, the study findings show that depression severity is associated with the percent of women who smoke, with greater severity meaning a larger percent of women smokers (Pratt & Brody, 2010). Also, having depression is associated with a greater percent of smokers using more than one pack per day (Pratt & Brody, 2010).

The women served by KIDS NOW Plus suggest a need for far more intensive effort to treat several behavioral health problems pre- and postnatally. This project, with its focus on a wide range of clinical problem areas, lends additional support to the call for more emphasis on behavioral perinatology (Wadhwa, Glynn, Hobel, Garite, Porto, Chicz-DeMet, Wiglesworth, & Sandman, 2002).

While only three of the KIDS NOW Plus mothers had underweight babies, it is important to note the clinical risk factors associated with low birth weight. As one example, low birth weight and premature birth are with risk for associated greater Attention-Deficit/Hyperactivity Disorder (Linnet, Wisborg, Agerbo, Sechor, Thomsen, & Henricksen, 2006). These three babies may in fact experience more serious developmental consequences over time.

COST OR INVESTMENT?

The FY 2009 KIDS NOW Plus program was funded by \$783,000 in Tobacco Settlement funds supplemented by \$295,159 in SAPT Block grant funds, in addition to mental health center funding for treatment and other clinical services. For this report, we matched the 360 women to the clinical services data and found a match for 231 women. Among the 231 in the baseline group, 66 were also in the follow-up group. The FY 2009 cost of treatment and other clinical services for the 231 women was \$385.873 and the cost of services for the 71 followup women not included in the baseline cost was \$80,531. Thus, the total cost of all clinical services for the KIDS NOW Plus women in FY2009 was \$466,404. The evaluation is funded from the SAPT allocation to the project. The total project allocation for FY 2009 was \$1,544,563 with the Division of Behavioral Health contributing \$761,563 or 49.3% of total project cost. The cost of KIDS NOW Plus services to the Tobacco Settlement funds is approximately \$2,175 per client or \$116.28 per client contact. With the transportation barriers in place in the mostly rural counties of this project, the average prevention or outreach function takes considerable travel time in addition to the two hours plus for each prevention presentation.

With the wide range of psychosocial, psychological and substance abuse problems among the women served by KIDS NOW Plus, it is important to examine what resources are actually committed to interventions and what potential gains there are for society as a result of those allocated resources. The decrease in drug use during pregnancy stands to result in substantial savings of health care dollars as well as ongoing savings in foster care placements, social services, and, potentially, special education programs in schools. During 2009, 37 infants were admitted to the University of Kentucky Neonatal Intensive Care Unit (NICU) for treatment of neonatal abstinence syndrome (NAS). Of these infants, 34 of 37 had opiate exposures in utero that required postnatal treatment for withdrawal symptoms. These infants accumulated nearly 900 patient care days in an NICU, with an average length of stay of nearly 24 days per infant. Nearly all of these infants were receiving Medicaid for their health insurance coverage. With a conservative estimate of \$1500.00/day hospital charges for NICU care, well over \$1.3 million dollars are spent on this small group of infants. Factoring in physician charges and social service needs results in an astronomical financial burden from this small group when viewed on a state-wide basis. Treatment of mothers before delivery through programs such as KIDS NOW Plus could result in savings of millions of health care dollars. A brief report such as this only sketches out the scope of complex clinical and developmental problems that are launched by a pregnancy associated with the problems shown among these women.

There are good outcomes for society among many of the findings of this report, among which is the low number of low birth weight babies and the low percent of mothers with preterm deliveries. We can assume that the low number of troubled deliveries likely results in lower health care costs. However, given that this program provides care during a very narrow episode in women's lives, the cost and benefit assessment must be understood from a perspective that differs from the assessments used to show cost offsets with traditional substance abuse treatment. In traditional cost offset analyses, client behavior for a specified period before interventions and the same period after interventions is used in calculating reductions in criminal activity and increases in employment to show economic returns to offset the cost of care. With a program focused on fetal, maternal and infant health, there are few dramatic or immediate cost savings to be shown apart from lower delivery and immediate neonatal care with non-drug exposed babies. The economic context for understanding the cost/benefits of KIDS NOW Plus is more like that of schools. Using this approach, the best way of understanding the net economic effects of KIDS NOW Plus is to view it as an investment in future child wellbeing rather than as a short-term cost saving effort. For example, the U.S. Bureau of Labor Statistics shows that there is a direct linear relationship between level of earnings education and median weeklv and unemployment rates (U.S. Bureau of Labor Statistics, 2009). Society rarely looks at shorter returns on investments in child health or education. In Kentucky, the 2007-2008 per-pupil per-year education cost is \$8,839 (Hoyt, Jepsen, & Troske, 2008). Multiplied by 12, this suggests that a high school diploma costs Kentuckians \$106,068 in education costs alone, not counting all school ancillaries, medical care and home support. The long term interest from this cost, however, is unquestionably an investment with a greater likelihood of employability and better quality of life than if the investment had not been made.

Another way to consider the current cost per clients for KIDS NOW Plus is to contrast the expenditure of \$2,175 for one client for one year against the lifetime cost of intellectual disabilities where per-lifetime costs have been estimated at \$450,000 to \$2.9 billion, with an average of \$1,014,000, or \$15,600 per year for 65 years (Centers for Disease Control, 2004; Honeycutt, Grosse, Dunlap, Schendel, Chen, Brann, & Homsi, 2003). Thus, one prevented case of intellectual disabilities through reduced substance use or other behavioral health factors might offset the entire cost of this program for one year. The few low birth weight infants and the small number of newborns with low APGAR scores suggests that the aims of the program to achieve healthy birth outcomes have largely been met.

There are several limitations to this evaluation report. First, the substance use data, including data on tobacco, and all the behavioral health problems are self-reports by pregnant and postpartum women. Second, the follow-up data may or may not include a representative sample as follow-ups are only conducted on women who remain in the KIDS NOW Plus program. However, given the constraints of the program and its funding, this evaluation suggest that the healthy birth outcomes and positive behavioral changes among mothers from baseline to postnatal follow-up are suggestive of contribution from the KIDS NOW Plus program. This evaluation study joins with many research findings on the relatively modest contribution of prenatal substance use to eventual negative outcomes among infants and toddlers.

RECOMMENDATIONS

This is the second year for KIDS NOW Plus evaluation that shows marked improvement in substance use patterns after learning of the pregnancy and after birth. It is also the second year that we have shown persistent tobacco use and still high rates of alcohol use. Even more disturbing is the persistence of depression.

Several key clinical recommendations should be considered for the future of the program:

- A fuller assessment of tobacco use should become a part of the standard of care for pregnant women entering case management or clinical services. It is unlikely that prevention interventions will change these patterns.
- Interventions might need to focus more on planning for the baby after birth, including thoughts about child care, medical care, and preparation for a safe and nurturing environment for the child. Research has shown that warm, nurturing, and positively stimulating environments can moderate many of the possible effects of fetal exposure to substances.
- Interventions need much greater emphasis on depression and anxiety, including consideration of circumstances in which medications might be used.
- Given possible interactions of depression and tobacco use, the KIDS NOW Plus program might need to explore possible interventions that address both issues.
- While progress has clearly been made, there is still a need for greater effort to draw women into treatment for substance use disorders and related behavioral health problems.
- These data suggest a continuing need for the KIDS NOW Plus case managers and clinicians to focus on obesity even though that is a physical health problem rather than a behavioral health problem per se.

There are also recommendations in regard to how KIDS NOW Plus is to function within the broader behavioral health and public health domains. KIDS NOW Plus receives a very small proportion of overall Tobacco Settlement funding and yet, its focus is directly on the most at-risk pregnancies of all. Interestingly, the stigma associated with the behaviors of pregnant women who use substances may be extended even to those who become their clinicians. Currently, while the Early Childhood Authority has representatives from key public sector agencies, numerous departments in state government and the Cabinet for Health and Family Services in particular, no one represents the behavioral health dimensions of the programs for early childhood development. Therefore, there are three policy recommendations.

- The Commissioner for Behavioral Health, Developmental and Intellectual Disabilities might be considered for membership in the Early Childhood Development Authority.
- The proportion of Tobacco Settlement funds currently allocated for perinatal behavioral health might be reviewed to examine whether there is a need for more funding to provide more and different services to women during pregnancy and in the postpartum period. The need for maternal treatment and other interventions in the first 2-4 years of the child's development would appear to be important considerations in funding allocations.
- In addition, the presence of cigarette use (tobacco dependence) may have troubling consequences for child health and development and this might suggest a need for combined Public Health and Behavioral Health focus on the tobacco problem among postpartum women.

REFERENCES

Ackerman, J.P., Riggins, T., & Black, M.M. (2010). A review of the effects of prenatal cocaine exposure among school-aged children. *Pediatrics*, *125*, 554-565.

American Congress of Obstetricians and Gynecologists. (2010). *ACOG Education Pamphlet AP 173*. Retrieved on March 25, 2010 from http://www.acog.org/publications/patient_education/bp173.cfm.

Andres, R. L., & Day, M. C. (2000). Perinatal complications associated with maternal tobacco use. Seminars in Neonatology, 5(3), 231–241.

Bada, H.S., Langer, J., Twomey, J., Bursi, L., Lagasse, L., Bauer, C.R., Shankaran, S., Lester, B.M., Higgins, R., & Maza, P.L. (2008). Importance of stability of early living arrangements on behavioral outcomes of children with and without prenatal drug exposure. *Journal of Developmental and Behavioral Pediatrics, 29*, 173-182.

Bennett, D.S., Bendersky, M. & Lewis, M. (2002). Children's intellectual and emotional-behavioral adjustment at age 4 years as a function of cocaine exposure, maternal characteristics, and environmental risks. *Developmental Psychology, 38*, 648-658.

Britt, G. C., Ingersoll, K. S., & Schnoll, S. H. (1999). Developmental consequences of early exposure to alcohol and drugs. In P. J. Ott, R. E. Tarter, & R. T. Ammerman (Eds.), Sourcebook on substance abuse: Etiology, epidemiology, assessment, and treatment (pp. 75–97). Needham Heights, MA: Allyn & Bacon.

Centers for Disease Control, 2004). Economic costs associated with mental retardation, cerebral palsy, hearing loss, and vision impairment – United States, 2003. *Morbidity and Mortality Weekly Review, 53*, 57-59.

Centers for Diseases Control (2009). State-specific alcohol consumption rates for 2008. Retrieved on March 17, 2010 from http://www.cdc.gov/ncbddd/fasd/monitor_table2008.html.

Cohen S., Doyle W. J., Baum A., (2006). Socioeconomic status is associated with stress hormones, *Psychosomatic Medicine*, *68*, 414-420.

Davis, E.P., Snidman, N., Wadhwa, P.D., Glynn, L.M., Schetter, C.D., & Sandman, C.A. (2004). Prenatal maternal anxiety and depression predict negative behavioral reactivity in infancy. *Infancy*, *6*, 319-331.

Dawson, G., Ashman, S.B., & Carver, L.J. (2000). The role of early experience in shaping behavioral and brain development and its implications for social policy. *Development and Psychopathology, 12,* 695-712.

Dayan, J., Creveuil, C., Marks, M.N., Conroy, S., Herlicoviez, M., Dreyfus, M., & Tordjman, S. (2006). Prenatal depression, prenatal anxiety, and spontaneous preterm birth: A prospective cohort study among women with early and regular care. *Psychosomatic Medicine*, *68*, 938-946.

Essex, M.J., Klein, M.H., Cho, E., & Kalin, N.H. (2002). Maternal stress beginning in infancy may sensitize children to later stress exposure: Effects on cortisol and behavior. *Biological Psychiatry*, *52*, 776-784.

Galtier-Dereure, F., Boegner, C., & Bringer, J. (2000). Obesity and pregnancy: Complications and cost. *The American Journal of Clinical Nutrition*, 71 (suppl), 1242-1248.

Havens, J.R., Simmons, L.A., Shannon, L.M., & Hansen, W.F. (2009). Factors associated with substance use during pregnancy: Results from a national sample. *Drug and Alcohol Dependence*, *99*, 89-95.

Hoyt, W.H., Jepsen, C., & Troske, K.R. (2008). *Educational Spending: Kentucky vs. Other States*. Indianapolis, IN: Friedman Foundation. Retrieved on March 24, 2010 from <u>http://www.freedomkentucky.org/images/a/a4/UKReport1.pdf</u>.

Honeycutt, A.A., Grosse, S.D., Dunlap, L.J., Schendel, D.E., Chen, H., Brann, E., & al Homsi, G. (2003). Economic costs associated with mental retardation, cerebral palsy, hearing loss, and vision impairment. In B.M. Altman, S.N. Barhartt, G.E. Hendershot, & S.A. Larson (Eds.), *Using Survey Data to Study Disability: Results from the National Health Interview Survey on Disability* (pp. 207-228). Amsterdam: Elsevier.

Jauniaux, E. & Greenough, A. Short and long term outcomes of smoking during pregnancy. *Early Human Development, 83,* 697-698.

Lambers, D. S., & Clark, K. E. (1996). The maternal and fetal physiologic effects of nicotine. Seminars in Perinatology, 20(2), 115–126.

Lester, B.M. & Twomey, J.E. (2008). Treatment of substance abuse during pregnancy. Women's Health, 4, 67-77.

Levin, E. D., & Slotkin, T. A. (1998). Developmental neurotoxicity of nicotine. In W. Slikker & L. W. Chang (Eds.), Handbook of developmental neurotoxicology (pp. 587–615). San Diego, CA: Academic Press.

Linnet, K.M., Wisborg, K., Agerbo, E., Sechor, N.J., Thomsen, P.H., & Henricksen, T.B. (2006). Gestational age, birth weight, and the risk of hyperkinetic disorder. *Archive of Disease Childhood*, *91*, 655-660.

May, P.A. & Gossage, J.P. (2001). Estimating the prevalence of fetal alcohol syndrome: A summary. *Alcohol Research and Health, 25,* 159-167.

Mayes, L.C., Granger, R.H., Bornstein, M.H., & Zuckerman, B. (1992). The problem of prenatal cocaine exposure: A rush to judgment. *JAMA*, *267*, 406-408.

Mighty, H.E. & Fahey, J.O. (2007). Obesity and pregnancy complications. Current Diabetes Reports, 7(4), 289-294.

Office of Applied Studies. (2008). *Results from the 2007 National Survey on Drug Use and Health: National findings* (DHHS Publication No. SMA 08-4343, NSDUH Series H-34). Rockville, MD: Substance Abuse and Mental Health Services Administration.

Pratt, L.A. & Brody, D.J. (2010). Depression and smoking in the U.S. household population aged 20 and over, 2005-2008. Centers for Disease Control and Prevention, National Center for Health Statistics, No. 34, April, 2010.

Robeson, S. (2006) Smoking during pregnancy. Substance Abuse Epidemiology Work Group. University of Kentucky. Retrieved on April 9, 2010 from http://cdar.uky.edu/epi/Media/Robeson%20-%20Smoking%20&%20Pregnancy.pdf.

Sandman, C.A., Glynn, L. Schetter, C.D., Wadhwa, P.D., Garite, T.J., Chicz-DeMet, A., & Hobel, C. (2006). Elevated maternal cortisol early in pregnancy predicts third trimester levels of placental corticotrophin releasing hormone(CRH): Priming the placental clock. *Peptides*, *27*, 1457-1463.

Schempf, A.H., & Strobino, D.M. (2008). Illicit drug use and adverse birth outcomes: Is it drugs or context? *Journal of Urban Health*, *85*, 858-873.

Sheinkopf, S.J., Lester, B.M., Lagasse, L.L., Seifer, R., Bauer, C.R., Shankaran, S., Bada, H.S., Poole, W.K., & Wright, L.L. (2006). Interactions between maternal characteristics and neonatal behavior in the prediction of parenting stress and perception of infant temperament. *Journal of Pediatric Psychology*, *31*, 27-40.

Slotkin, T. A. (1998). Fetal nicotine or cocaine exposure: Which one is worse? Journal of Pharmacology and Experimental Therapeutics, 285(3), 931–945.

Substance Abuse and Mental Health Services Administration, Office of Applied Studies. (February 9, 2007). *The NSDUH Report - - Cigarette Use among Pregnant Women and Recent Mothers*. Rockville, MD. Retrieved on March 18, 2010 from http://www.oas.samhsa.gov/2k7/pregCigs/pregCigs.htm

Substance Abuse and Mental Health Services Administration, Office of Applied Studies. (September 11, 2008). *The NSDUH Report - - Alcohol Use among Pregnant Women and Recent Mothers: 2002 to 2007*. Rockville, MD. Retrieved on March 18, 2010 from http://www.oas.samhsa.gov/2k8/pregnantAlc/pregnantAlc.htm

U.S. Bureau of Labor Statistics. (2009). *Employment Projections*. Retrieved on April 9, 2010 from <u>http://www.bls.gov/emp/ep_chart_001.htm</u>.

Velez, M.L., Montoya, I.D., Jansson, L.M., Walters, V., Svikis, D., Jones, H.E., Chilcoat, H., & Campbell, J. (2006). Exposure to violence among substance-dependent pregnant women and their children. *Journal of Substance Abuse Treatment, 30,* 31-38.

Wadhwa, P.D. (2005). Psychoneuroendocrine processes in human pregnancy influence fetal development and health. *Psychoneuroendocrinology*, 2005; 30(8): 724-743.

Wadhwa, P.D., Glynn, L., Hobel, C.J., Garite, T.J., Porto, M., Chicz-DeMet, A., Wiglesworth, A.K., & Sandman, C.A. (2002). Behavioral perinatology: Biobehavioral processes in human fetal development. *Regulatory Peptides*, *108*, 149-157.

Weathers, W.T., Sauvain, K.J. Crane, M.M. & Blackhurst, D.W. (1993). Cocaine use in women from a defined population: Prevalence at delivery and effects on growth in infants. *Pediatrics*, *91*, 350-354.

Wisner, K.L. Sit, D.K.Y., Hanusa, B.H., Moses-Kolko, E.L., Bogen, D.L., Hunker, D.F., Perel, J.M., Jones-Ivy, S., Bodnar, L.M., & Singer, L.T. (2009). Major depression and antidepressant treatment: Impact on pregnancy and neonatal outcomes. *American Journal of Psychiatry*, *166*, 557-566.

APPENDIX A – DSM-IV DIAGNOSES

Substance abuse disorder	Substance-induced delirium
	Withdrawal
	Substance-induced anxiety disorder
	Substance-induced mood disorder
	Substance-induced sexual dysfunction
	Substance-induced sleep disorder
	Substance-induced psychotic disorder
	Substance-induced dementia
	Substance dependence
	Substance abuse
Dementia	Delirium due to a general medical condition
	Dementia due to Alzheimer's
	Dementia with behavioral disturbances
	Dementia without behavioral disturbances
	Dementia due to a general medical condition
Mood disorder	Bipolar disorder (with no psychotic features)
	Major depressive disorder (with no psychotic features)
	Dusthemic disorder
	Mood disorder not otherwise specified
Anvioty disorder	Anviety disorder not otherwise specified
Anxiety disorder	Anxiety disorder not otherwise specified
	Generalized anvietu disorder
	Conversion disorder
	Eastitious disorder
	Agoranbohia
	Social phobia
	Specific phobia
	Obsessive-compulsive disorder
	Senaration anvietu disorder
	Desttraumatic stress disorder
	Acute stress disorder
	Adjustment disorder with anviety
	Adjustment disorder with anxiety
Personality disorder	Paranoid porconality disorder
Personality disorder	Cuslethumia personality disorder
	Schizoid personality disorder
	Schizotungi personalitu disorder
	Obcassiva compulsiva personality disorder
	Histrionic personality disorder
	Dependent personality disorder
	Antisocial nersonality disorder
	Antisocial personality disorder
	Avoidant personality disorder
	Avolaani personality disorder
	Bordenine personality disorder
Council discussion	Personality disorder not otherwise specified
Sexual disorder	Pedophila
	Exhibitionism Condenidentitu disender
	Gender laentity alsoraer
	Sexual aysfunction not otherwise specified
	Hypoactive sexual desire disorder
	remaie arousal disorder
	remaie orgasmic disorder
	Dyspareunia
	Sexual aversion disorder

	Voyeurism
	Sexual masochism
	Sexual sadism
	Frotteurism
	Paraphilia
Learning disorder	Reading disorder
	Mathematics disorder
	Disorder of written expression
	Expressive language disorder
	Mixed receptive-expressive language disorder
	Phonological disorder
	Developmental coordination disorder
	Learning disorder not otherwise specified
Patardation	Mild to profound mental retardation
sleep disorder	Narcolepsy
	insomnia
	Hypersomnia Desetti se setetede lesse d'assider
	Breathing-related sleep disorder
	Mixed-type sleep disorder
	Parasomnia sleep disorder
	Circadian rhythm sleep disorder
	Sleep terror disorder
	Sleepwalking disorder
	Dyssomnia not otherwise specified
	Nightmare disorder
Abuse disorder	Physical abuse of adult
	Sexual abuse of adult
Behavior	Impulse-control disorder
	Pathological gambling
	Kleptomania
	Pyromania
	Intermittent explosive disorder
	Trichotillomania
	Conduct disorder
	Disruptive behavior disorder
	Selective mutism
	Oppositional defiant disorder
	Identity problem
	Reactive attachment disorder
	Attention deficit/hyperactivity disorder
Other non-psychotic disorder	Depersonalization disorder
	Body dysmorphic disorder
	Hypochnodriasis
	Somatization disorder
	Somatoform disorder
	Unspecified mental disorder (non-psychotic)
	Stuttering
	Anorexia nervosa
	Tic disorder
	Chronic motor or vocal tic disorder
	Tourette's disorder
	Stereotypic movement disorder
	Adjustment disorder with mixed disturbance of emotion and conduct
	Adjustment disorder unspecified
	Cabinanthanain
Other psychotic and developmental disorder	Schizophrenia Maior depending disorder, requirement excess with except the fact
Other psychotic and developmental disorder	Schizophrenia Major depressive disorder, recurrent, severe with psychotic features Bioclass disorder, course with south stic features
Other psychotic and developmental disorder	Schizophrenia Major depressive disorder, recurrent, severe with psychotic features Bipolar disorder, severe with psychotic features
Other psychotic and developmental disorder V codes	Schizophrenia Major depressive disorder, recurrent, severe with psychotic features Bipolar disorder, severe with psychotic features Pregnancy

Parent-child relational problem
Occupational problem
Bereavement
Neglect /abuse of a child
Borderline intellectual function
Phase of life problem
Religious/spiritual problem