
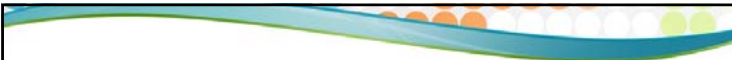


**Prenatal substance abuse services and birth outcomes**  
Robert Walker, M.S.W., L.C.S.W.  
University of Kentucky Department of Behavioral Science and Center on Drug and Alcohol Research



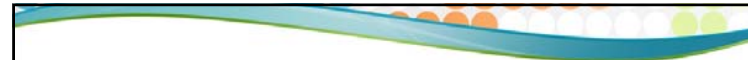
**Thanks to:**  
Members of the Kentucky Division of Behavioral Health

Jeff Jamar, Branch Manager, Treatment Services  
Suzanne Carrier, Fran Belvin, & Carol Stange



**Also,**

Thanks to:  
**Allison Scrivner**, at UK CDAR, who spent hours preparing and analyzing the state data.



**Background**

- Kentucky is a rural state with 17.3% of the population below poverty status ( U. S. Census, 2010).
- 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).
- 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.

- 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).
- Also, 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). Other research suggests a more complex set of outcomes.

- 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).

### Two projects for pregnant women with substance abuse

- A state-funded case management program in urban and rural Kentucky – KIDS NOW Plus.
- A CSAT-funded longer-term residential project (also under state contract) for pregnant and postpartum women who have substance dependence – Independence House.
- Birth events from vital statistics were examined for both programs using a matched comparison group and the general population.



## KIDS NOW Plus

### State Program Officers:

Suzanne Carrier, Fran Belvin, Carol Stange  
Kentucky Division of Behavioral Health



## Program Design

- KIDS NOW Plus is a substance abuse outreach, case management and treatment-linking program funded by Tobacco Settlement Funds and by the Substance Abuse Prevention and Treatment Block Grant (SAPT).
- The program is overseen and directed by the Kentucky Division of Behavioral Health through contracts with regional mental health centers.
- Funding is for 8 small projects in Kentucky, with about \$1.4 million in total outlays.
- The project is evaluated each year to demonstrate project effort and birth event outcomes.

## Method

- The evaluation design is a pre-test/post-test design supplemented with secondary state data on service events and birth events from vital statistics.
- Program case managers collect intake and follow-up data in interviews with clients then upload data to the University of Kentucky Center on Drug and Alcohol Research.
- Intake occurs when clients are referred for special attention to substance use problems.
- Intake typically is at 4.5 months into the pregnancy. Follow-up is within 60 days of delivery.

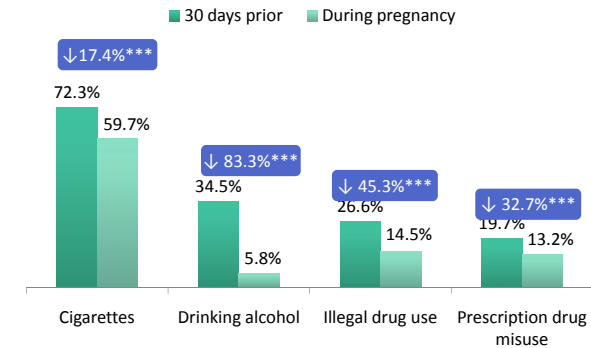
## Method

- To meet the special needs of the program an instrument was developed using self-report measures of substance use before being pregnant and after knowing of the pregnancy.
- Measures of mental health problems (depression, PTSD, anxiety) were from the M.I.N.I.
- Violence victimization items from Tjaden & Thoennes.
- Data collection moving from PDA devices to laptops with FTTPS-like uploading capacity.

## Demographics

	Kids Now clients (n = 1,616)	Comparison group (n = 1,616)	General population (n = 1,616)
<b>Race***</b>			
White	90.2%	90.3%	83.2%
Black	8.4%	8.4%	10.6%
Other	1.4%	1.2%	6.2%
<b>Education***</b>			
No high school degree	38.5%	38.5%	12.7%
High school graduate/ GED	37.7%	37.8%	22.1%
College	23.5%	23.5%	64.2%
<b>Avg. age***</b>			
	23.2	23.2	27.3
<b>Married***</b>			
	31.7%	46.6%	63.8%
<b>Urban/rural status***</b>			
Metro	45.9%	45.9%	58.8%
Non metro	39.6%	39.6%	34.7%
Very rural	14.6%	14.5%	6.5%

## Percent of KN+ Clients Reporting Substance Use

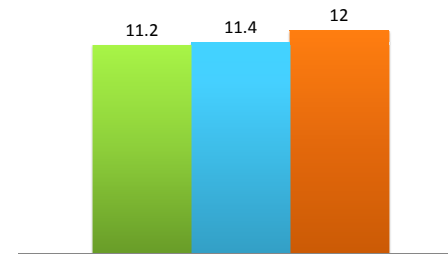


## Percent of Clients Reporting Specific Substance Use (n = 1,616)

	30 Day prior	During
Marijuana	21.9%	11.3%
Cocaine	5.8%	3.3%
Methamphetamine	2.7%	0.9%
Xanax	7.4%	3.8%
Valium	3.3%	1.5%
Oxycontin	7.0%	5.0%
Percocet, Oxycodone	7.2%	5.2%
Hydrocodone	10.2%	5.9%
Tylenol 2, 3, 4	2.4%	1.5%

## Average number of prenatal visits\*\*\*

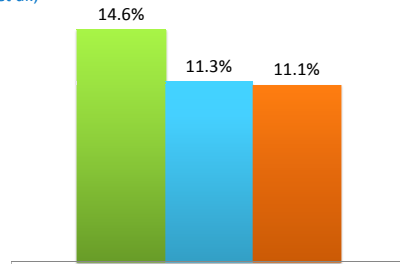
■ KIDS NOW Plus (n = 1616)  
■ Comparison group (n = 1616)  
■ General population (n = 1616)



## Percent of births that were premature\*\* (less than 37 weeks gestation)

In the U.S., in 2008, average was 12.3% - down from 12.8% in 2006 (Martin, et al., 2010)

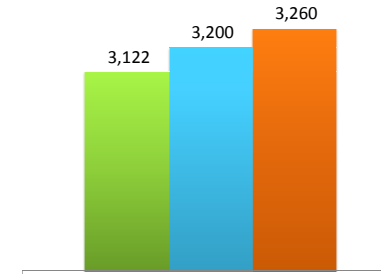
■ KIDS NOW Plus (n = 1616)  
■ Comparison group (n = 1616)  
■ General population (n = 1616)



According to the March of Dimes (2011), the average preterm first year medical cost is \$32,325 versus \$3,325 for full term babies

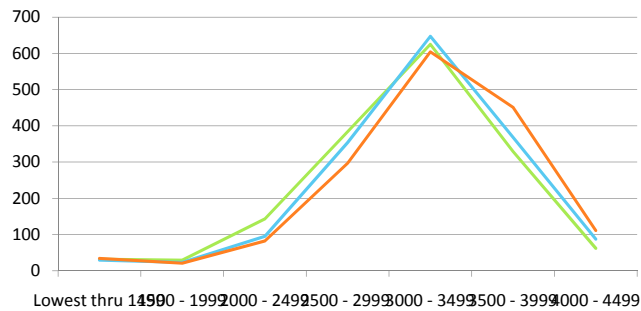
## Average birth weight (in grams)\*\*\*

■ KIDS NOW Plus (n = 1,616)  
■ Comparison group (n = 1,616)  
■ General population (n = 1,616)



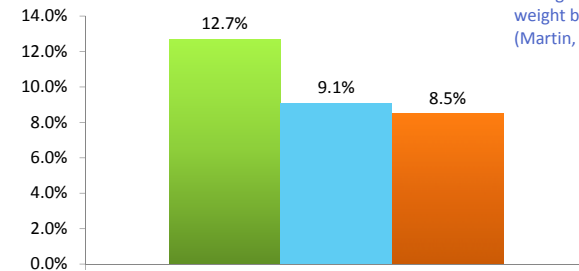
## Number of low birth weight by 500 gram increments

— KIDS NOW Plus (n = 1,616)  
— Comparison group (n = 1,616)  
— General population (n = 1,616)



## Percent of babies with low birth weight (< 2500 grams)\*\*\*

■ KIDS NOW Plus (n = 1,616)  
■ Comparison group (n = 1,616)  
■ General population (n = 1,616)

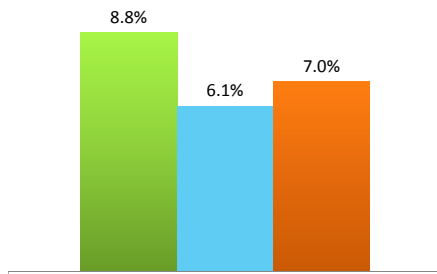


8.3% is national average of low birth weight babies (Martin, et al., 2006)

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

## Percent of babies going to NICU\*

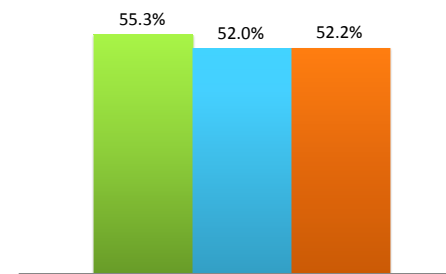
- KIDS NOW Plus (n = 1,616)
- Comparison group (n = 1,616)
- General population (n = 1,616)



## Of those in NICU, percent of babies born premature and with low birth weight

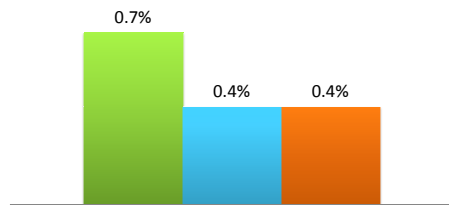
Average NICU cost = \$2,500/day

- KIDS NOW Plus (n = 141)
- Comparison group (n = 98)
- General population (n = 113)



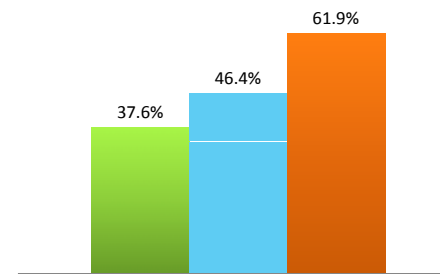
## Percent of babies born with any anomalies

- KIDS NOW Plus (n = 1,616)
- Comparison group (n = 1,616)



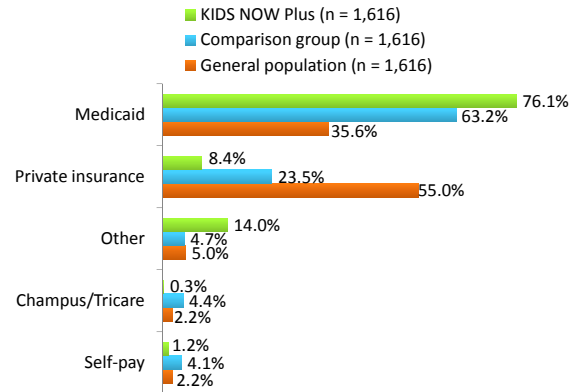
## Percent of mothers breastfeeding\*\*\*

- KIDS NOW Plus (n = 1,616)
- Comparison group (n = 1,616)
- General population (n = 1,616)



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

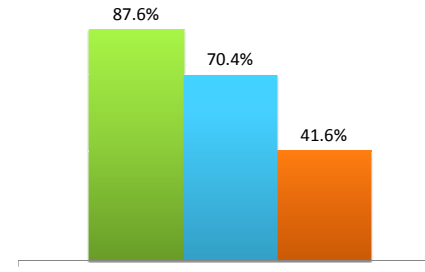
### Source of pay for birth of baby\*\*\*



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

### Percent receiving WIC\*\*\*

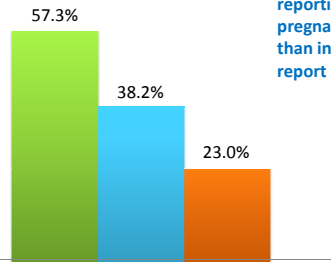
■ KIDS NOW Plus (n = 1,616)  
 ■ Comparison group (n = 1,616)  
 ■ General population (n = 1,616)



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

### Percent smoking during pregnancy\*\*\*

■ KIDS NOW Plus (n = 1,616)  
 ■ Comparison group (n = 1,616)  
 ■ General population (n = 1,616)

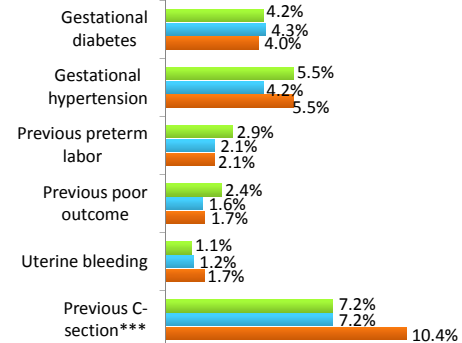


The percent of KN+ reporting smoking during pregnancy slightly lower than in the baseline self-report (59%)

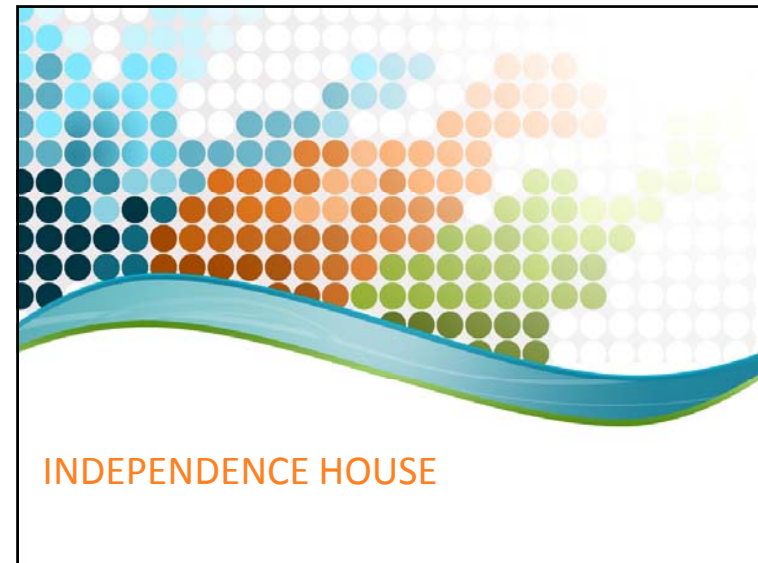
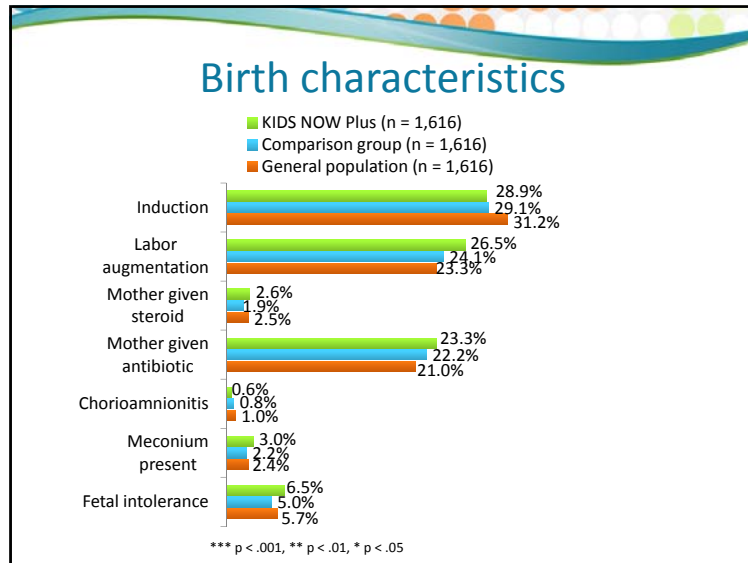
\*\*\* p < .001, \*\* p < .01, \* p < .05

### Maternal health factors

■ KIDS NOW Plus (n = 1,616)  
 ■ Comparison group (n = 1,616)  
 ■ General population (n = 1,616)



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



### Independence House

Thanks to:  
 Bill Thompson, Mary Burnette, Samantha Sowders, and Danny Jones  
 of Cumberland River Comprehensive Care Center

Funded by Center for Substance Abuse Treatment TI-19568

And,  
 Diane Parrish of UK CDAR  
 And  
 Allison Scrivner



## Program design

- Independence House is a 14-bed residential program for pregnant and postpartum women.
- Directed by Cumberland River Comprehensive Care Center in Corbin, KY.
- Program is linked to the health department, and a wide range of other community services.
- Has close connection with Drug Court and family courts in the region.
- Clients' home is an average 85 miles from the program.
- Comprehensive wrap-around residential services.

## Method

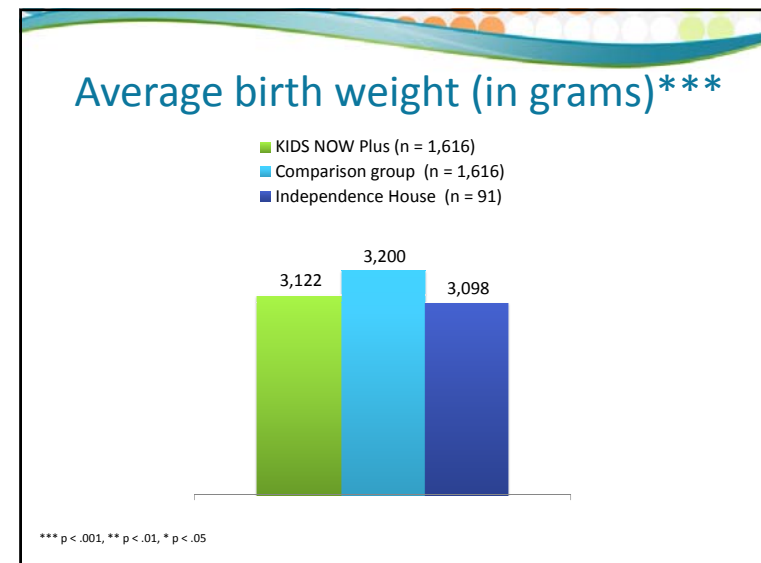
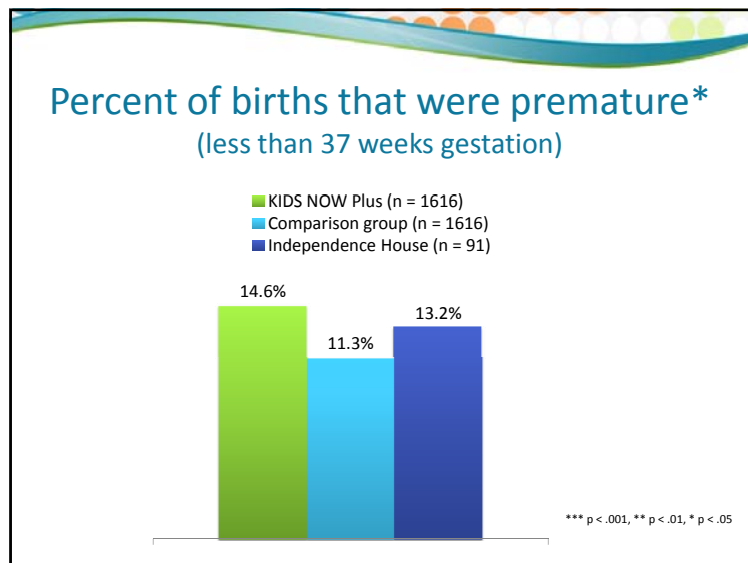
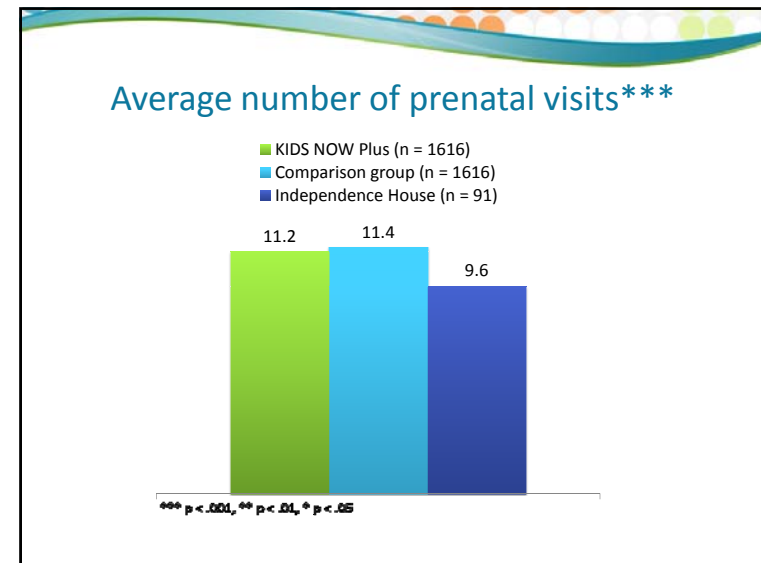
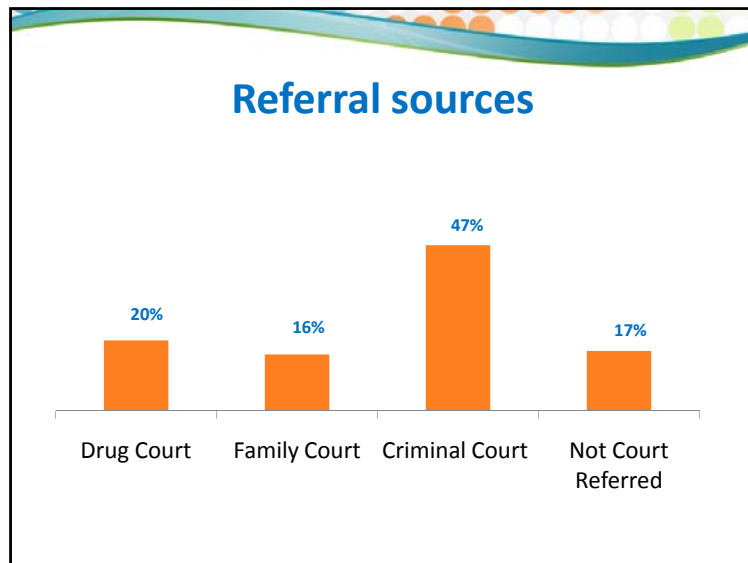
- Expanded GPRA to include ASI measures
- Tjaden & Thoennes measures of partner violence
- M.I.N.I. mental health measures.
- KIDS NOW Plus pregnancy and other child measures.
- Early on – several other CSAT measures on mothers and kids – discontinued when cross-site stopped.
- Baseline, discharge, 6-months post discharge data collection – paper/pencil.
- 92% follow-up rate!
- Data entered at CSAT and in local database (SPSS) by UK CDAR.

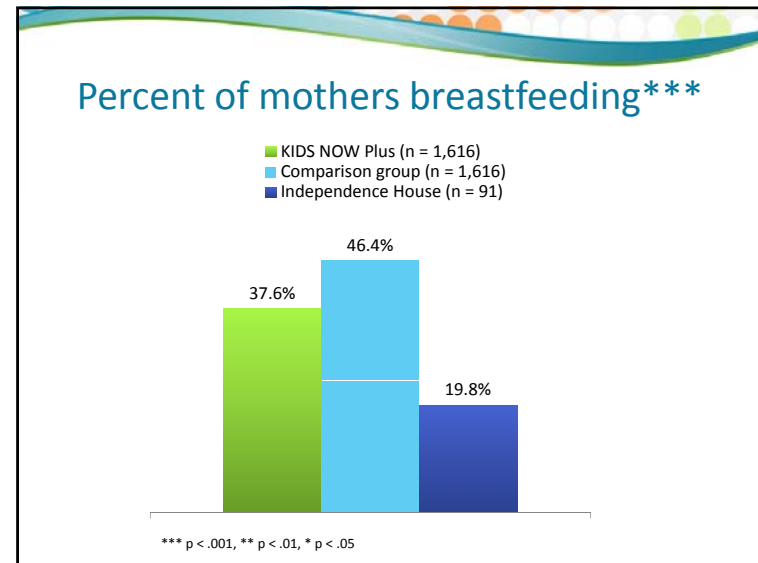
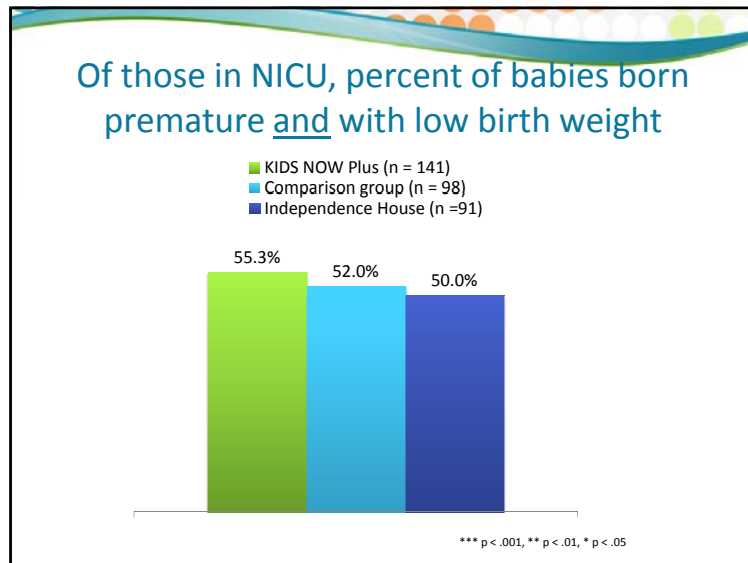
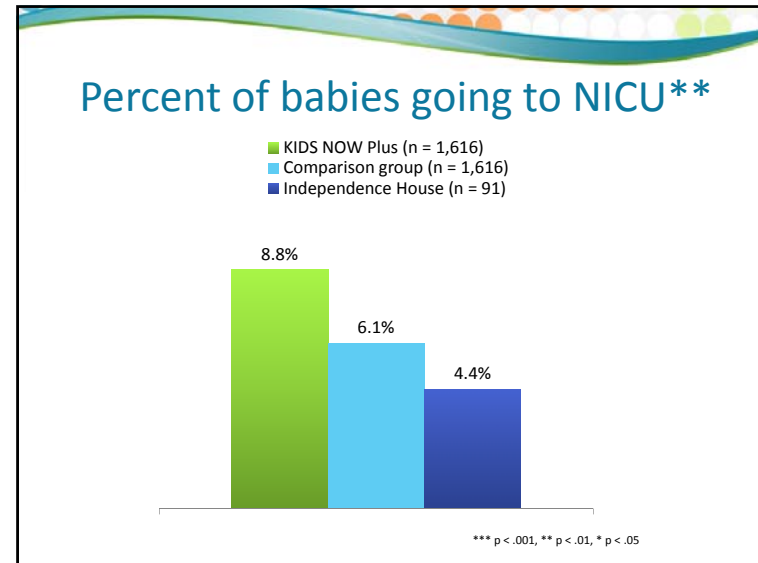
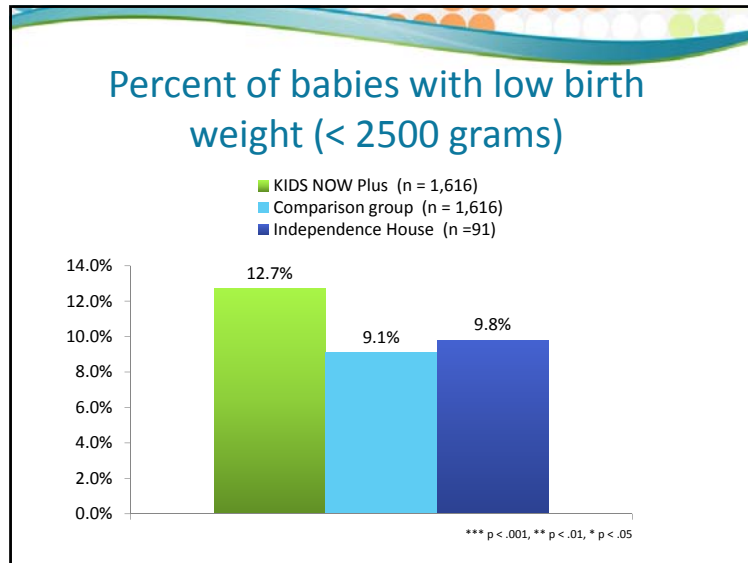
## Demographics

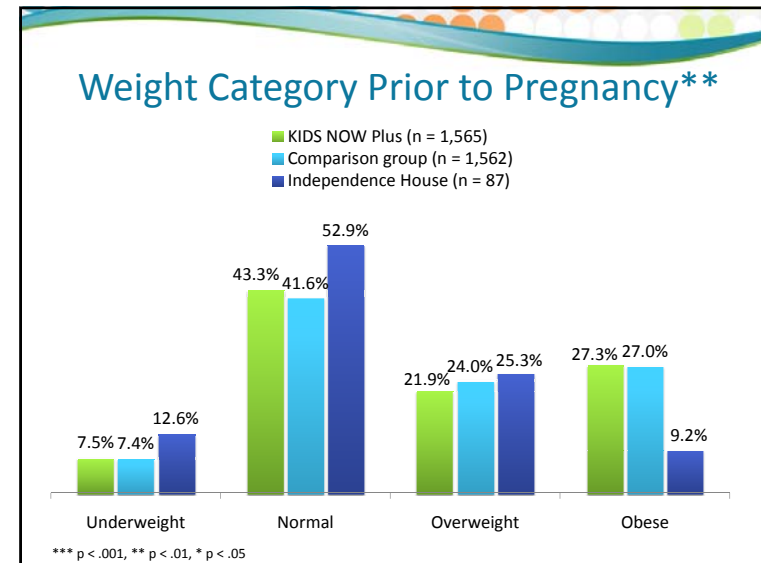
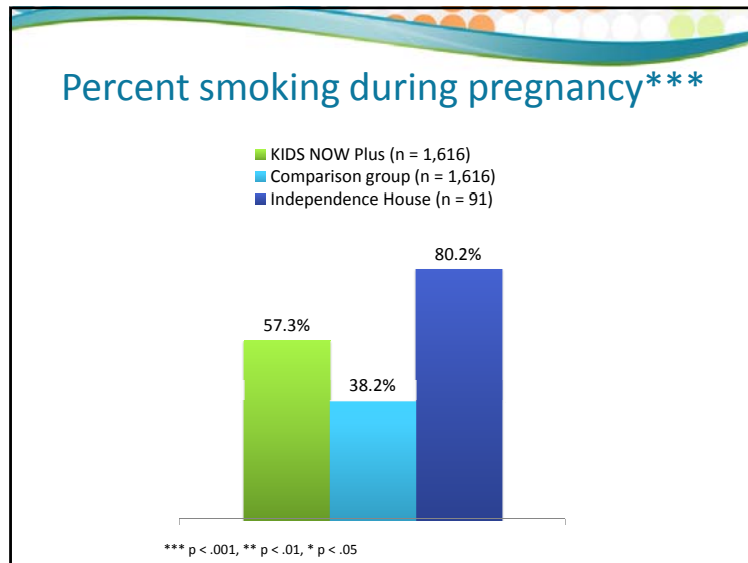
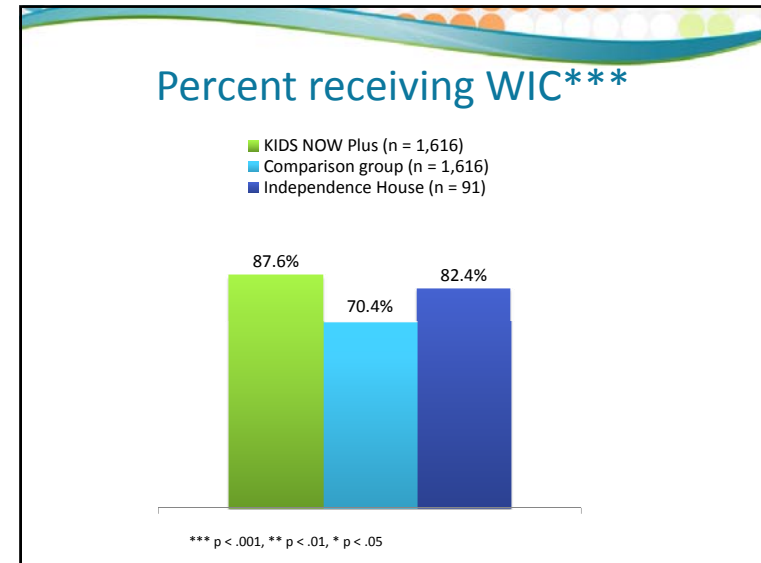
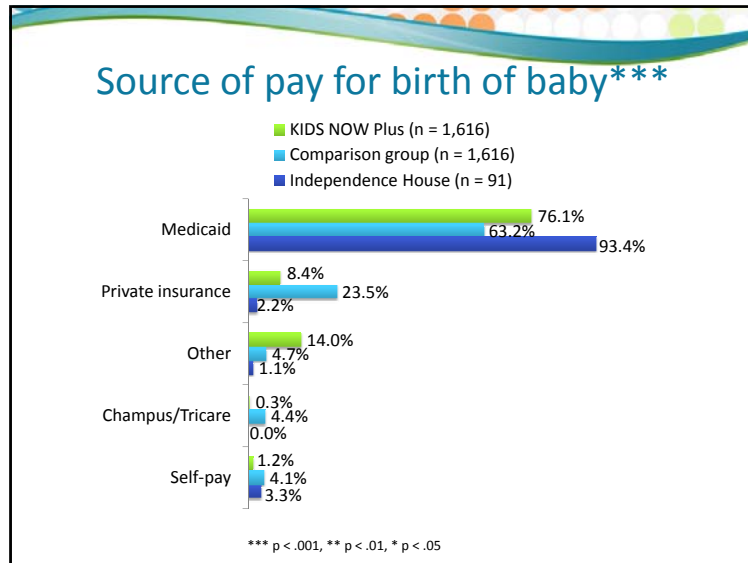
	Kids Now clients (n = 1,616)	Comparison group (n = 1,616)	Independence House (n = 1,616)
<b>Race</b>			
White	90.2%	90.3%	<b>96.7%</b>
Black	8.4%	8.4%	<b>3.3%</b>
Other	1.4%	1.2%	<b>0.0%</b>
<b>Education</b>			
No high school degree	38.5%	38.5%	<b>44.0%</b>
High school graduate/ GED	37.7%	37.8%	<b>33.0%</b>
College	23.5%	23.5%	<b>23.1%</b>
Avg. age	23.2	23.2	<b>24.2</b>
Married***	31.7%	46.6%	<b>31.9%</b>
<b>Urban/rural status***</b>			
Metro	45.9%	45.9%	<b>12.1%</b>
Non metro	39.6%	39.6%	<b>64.8%</b>
Very rural	14.6%	14.5%	<b>23.1%</b>

## Substance use patterns

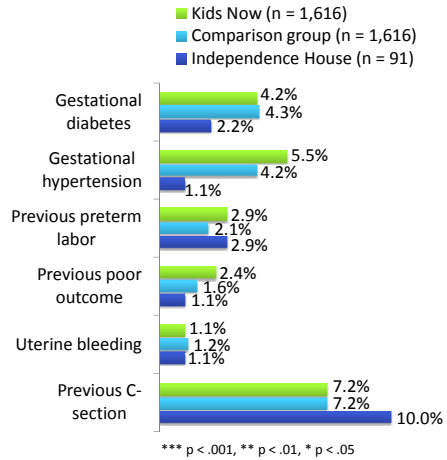
SUBSTANCE USED	PAST 30 DAYS	PAST 12 MONTHS
Prescription opiates (morphine, Dilaudid, Demerol®, Percocet®, Darvon®, codeine, Tylenol, Oxycontin®, hydrocodone)	45.5%	<b>88.6%</b>
Benzodiazepines, barbiturates, other tranquilizers	25.2%	<b>57.7%</b>
Alcohol, any use	8.1%	48.0%
Marijuana	13.0%	45.5%
Illicit methadone and suboxone	5.7%	23.6%
5 or more drinks in one sitting	1.6%	30.9%
Alcohol/drugs same day	4.1%	31.7%
Cocaine, crack	2.4%	22.8%
Methamphetamines and other amphetamines	1.6%	<b>20.3%</b>



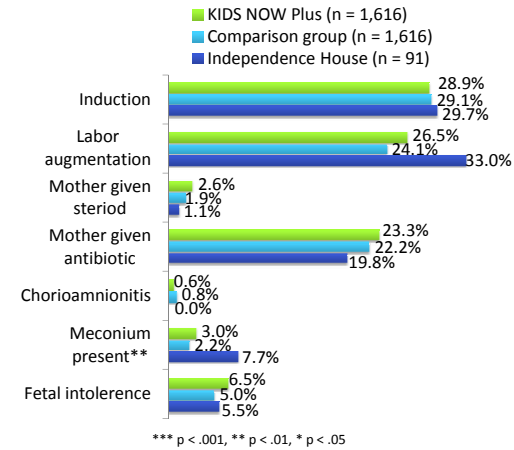




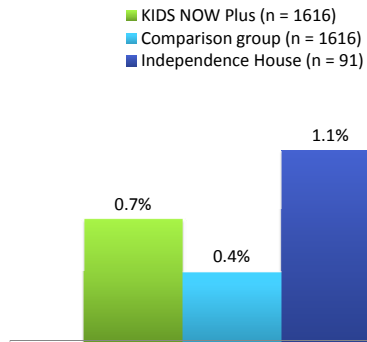
## Maternal health factors



## Birth characteristics



## Percent of babies born with any anomalies



To date, only one drug exposed infant birth – mother fled after 2 weeks.

## What to make of it?

- The KIDS NOW Plus group is clearly clinically different from even a matched comparison group.
- However, it appears that being a Medicaid recipient alone may be a risk factor or contributor to less positive outcomes.
- The birth outcomes are less positive than the general population, but also less negative than commonly believed by the practice community and the public.
- How do we translate these findings into a will for more human capital investment in pregnancy and early development?

## Where the real bang for the buck lies

- As Barry Lester has shown, the substantive contributions to neurodevelopment are in early childhood and in nurture/stimulation.
- If Bruce Perry et al., are correct, the early childhood establishment of basal arousal systems is all important to subsequent development, cognitively and emotionally.
- What about the unresolved disorders of arousal systems among mothers with substance abuse histories?
- How do we see them forming healthy attachments and fostering competent neurodevelopment in the absence of critical supports?

- Continued maternal substance use (particularly cocaine and the opiates) appears to interfere with oxytocin availability in mothers, thus blunting the natural reward experiences associated with nurturing (Churchland, 2011).
- Interestingly, the low rate of breast-feeding tends to support this notion. Consider the low rates among the substance affected mothers in both groups.
- Of concern is the fact that maternal nurture stimulates greater oxytocin among babies, thus showing a neurochemical correlate for attachment process.
  - In the case of reduced oxytocin, less maternal nurture, possibly less secure attachment? And all its attendant neurobehavioral consequences?

## Shift of focus and emphasis

- It would appear critical to develop far more services around the mothers and their infants.
- The critical period of neurodevelopment shows some signs of compromise during fetal development.
- However, the greater worry is about the postnatal period where resources fall off dramatically.
- In Kentucky, Medicaid will not cover substance abuse treatment after 60 days postpartum.

## It would seem that...

- With all the focus on what happens during pregnancy (right to life, prosecution of substance using women, etc.).....
  - perhaps we have missed the critical boat.
- **Where are the resources for early childhood development support?**
- We may have focused public debate well on the ills of fetal abortion but what about postnatal abortion?