# SURVEILLANCE OF ILLINOIS INFANTS PRENATALLY EXPOSED TO CONTROLLED SUBSTANCES 1991-1999

Illinois Department of Public Health
Division of Epidemiologic Studies

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**SURVEILLANCE OF ILLINOIS INFANTS PRENATALLY EXPOSED TO CONTROLLED SUBSTANCES, 1991-1999**

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## INTRODUCTION

Adverse pregnancy outcomes are recorded by the Illinois Department of Public Health (IDPH) for infants with congenital anomalies and other serious neonatal conditions. Each year in Illinois, the Department's Adverse Pregnancy Outcomes Reporting System (APORS) obtains information on thousands of such births throughout the state. Among these reports of adverse pregnancy outcomes are those concerning infants who show signs of drug toxicity or withdrawal and reports of infants whose urine tests positive for exposure to controlled substances.

Information about newborn infants' exposure to controlled substances was first collected by APORS in 1991. Each birthing hospital in Illinois sets its own policy about which newborns should be tested for exposure to controlled substances. Some hospitals routinely test every child; others may only test babies showing signs of drug toxicity or withdrawal. If a child is to be tested, a sample of urine or meconium is collected and a panel of tests for controlled substances is performed.

If a positive test result is obtained for any controlled substance, the hospital is required by Illinois law to report that fact to IDPH. However, since negative test results are not reported to IDPH, it is not possible to determine the total number of children tested. Some newborn infants who have been exposed to controlled substances may not be tested, so this report is likely to underestimate the number of exposed newborns in Illinois.

This information is collected for a number of reasons. First, infants prenatally exposed to controlled substances are considered high-risk babies. They are referred to the Illinois Department of Human Services for follow-up services. Second, the data are collected for surveillance purposes. In this capacity, they may help prevent disease, prolong life and promote health by providing the evidence needed to develop education and intervention strategies.

Alcohol and tobacco use during pregnancy are known to cause significant damage to a baby (fetal alcohol syndrome, intrauterine growth retardation, premature labor, delivery problems and increased risk of infant heart and lung disease). However, the APORS program does not collect sufficient information on alcohol and tobacco use to report meaningful information; therefore, this report does not discuss these teratogens.

Detailed information about the effects of heavy use of various illegal drugs during pregnancy is included in each of the subsequent drug-specific sections. However, generally the use of controlled substances during pregnancy may cause intrauterine growth retardation, low birth weight, premature labor and late miscarriage. Heavier usage (several times a week) is more likely to lead to the congenital anomalies described than more moderate drug use (once a week or less). The point at which drug use occurs is also important: use in early pregnancy is more likely to lead to birth defects as the infant's nervous system and organs are developing. Use in

late pregnancy is likely to lead to tremors, breathing difficulties and feeding problems in the newborn as the baby experiences withdrawal from the drug. Many women who abuse drugs during pregnancy use multiple types of drugs, often in association with alcohol and tobacco. In these cases it is very difficult to distinguish between the effects of different drugs.

Injecting drugs also increases a mother's risk of contracting HIV, hepatitis C and other infectious diseases. These may be passed to a baby during pregnancy. Injection drug use has been a factor in an estimated one-third of all HIV and more than half of all hepatitis C cases in the United States (Centers for Disease Control and Prevention, National Institute on Drug Abuse).

The long-term effects of fetal exposure to controlled substances are believed to be small, provided an exposed infant receives appropriate care. However, community services have particular difficulty handling the concerns faced by families with drug abusing members. One study found that – even among children with similar home environments – more drug-exposed infants were placed in adoption or foster care than those who were not exposed.

Poverty, poor housing and similar socioeconomic factors have been associated with higher rates of maternal illegal drug use, as have depression and other psychiatric disorders. A large proportion of substance abusing women experienced physical abuse during childhood and they are often the victims of domestic violence as adults. Prevention programs emphasize case management to integrate social services; residential treatment programs are more successful in reducing drug use when compared to outpatient programs.

This report has uses two time periods for presenting information about prenatal drug exposure. A five-year period, 1995-1999, is used to provide a "snapshot" of current prenatal drug exposure patterns among counties. The second, 1991-1999, is used to examine trends in prenatal drug exposure.

Table 1 shows the numbers and incidence rates of infants born prenatally exposed to any drug, by their county of residence at birth, between 1995 and 1999. In Illinois as a whole, more than 100 infants in every 10,000 born alive are known to have been prenatally exposed to at least one drug (other than alcohol and tobacco). Figure 1 (on page 4) illustrates the data graphically for the counties with 16 or more cases observed between 1995 and 1999. An explanation of the how rates and confidence intervals were calculated and should be interpreted is provided on page 5.

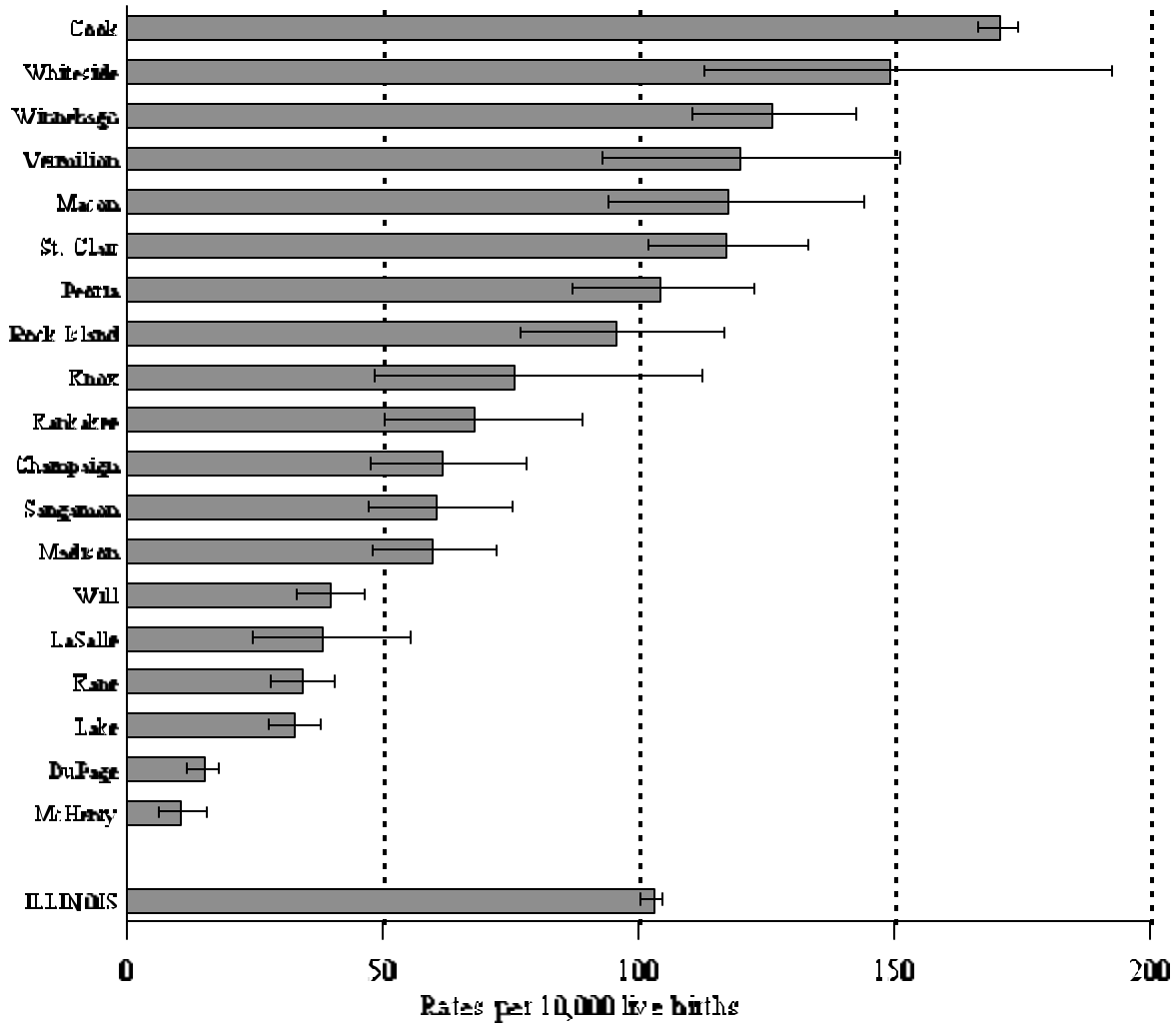
# Table 1. Total Number and Incidence Rates of Infants Prenatally Exposed to Any Drug, By County of Residence, Illinois, 1995-1999

| | | | 95% CI[2] | | | | | 95% CI[2] | |
|---|---|---|---|---|---|---|---|---|---|
| County | Cases | Rate[1] | Lower | Upper | County | Cases | Rate[1] | Lower | Upper |
| ILLINOIS | 9,399 | 102.7 | 100.6 | 104.8 | Lee | 9 | 45.9 | 21.0 | 87.1 |
| Adams | 14 | 33.5 | 18.3 | 56.3 | Livingston | 8 | 34.8 | 15.0 | 68.5 |
| Alexander | 1 | 14.8 | 0.4 | 82.4 | Logan | 2 | 11.9 | 1.4 | 43.1 |
| Bond | 0 | 0.0 | 0.0 | 37.7 | Macon | 90 | 117.1 | 94.2 | 144.0 |
| Boone | 5 | 18.1 | 5.9 | 42.2 | Macoupin | 6 | 22.2 | 8.2 | 48.4 |
| Brown | 0 | 0.0 | 0.0 | 135.6 | Madison | 99 | 59.4 | 48.3 | 72.3 |
| Bureau | 3 | 14.7 | 3.0 | 43.1 | Marion | 10 | 36.9 | 17.7 | 67.9 |
| Calhoun | 0 | 0.0 | 0.0 | 155.0 | Marshall | 0 | 0.0 | 0.0 | 51.7 |
| Carroll | 3 | 33.7 | 7.0 | 98.6 | Mason | 3 | 32.1 | 6.6 | 93.7 |
| Cass | 0 | 0.0 | 0.0 | 41.9 | Massac | 0 | 0.0 | 0.0 | 41.8 |
| Champaign | 67 | 61.6 | 47.7 | 78.2 | McDonough | 3 | 20.5 | 4.2 | 59.8 |
| Christian | 2 | 9.6 | 1.2 | 34.5 | McHenry | 20 | 10.3 | 6.3 | 15.9 |
| Clark | 0 | 0.0 | 0.0 | 38.5 | McLean | 15 | 15.5 | 8.7 | 25.6 |
| Clay | 1 | 11.6 | 0.3 | 64.8 | Menard | 0 | 0.0 | 0.0 | 53.1 |
| Clinton | 0 | 0.0 | 0.0 | 18.4 | Mercer | 2 | 21.9 | 2.7 | 79.0 |
| Coles | 9 | 30.5 | 13.9 | 57.9 | Monroe | 0 | 0.0 | 0.0 | 23.6 |
| Cook | 7,383 | 170.2 | 166.3 | 174.1 | Montgomery | 2 | 11.6 | 1.4 | 42.0 |
| Crawford | 1 | 9.1 | 0.2 | 50.6 | Morgan | 2 | 9.8 | 1.2 | 35.5 |
| Cumberland | 0 | 0.0 | 0.0 | 54.2 | Moultrie | 0 | 0.0 | 0.0 | 40.4 |
| DeKalb | 7 | 13.3 | 5.4 | 27.5 | Ogle | 3 | 10.0 | 2.1 | 29.2 |
| DeWitt | 1 | 10.1 | 0.3 | 56.4 | Peoria | 138 | 103.8 | 87.2 | 122.6 |
| Douglas | 4 | 27.9 | 7.6 | 71.3 | Perry | 1 | 8.5 | 0.2 | 47.5 |
| DuPage | 100 | 14.8 | 12.0 | 18.0 | Piatt | 3 | 32.2 | 6.6 | 94.0 |
| Edgar | 1 | 9.0 | 0.2 | 49.9 | Pike | 0 | 0.0 | 0.0 | 37.8 |
| Edwards | 0 | 0.0 | 0.0 | 104.5 | Pope | 0 | 0.0 | 0.0 | 189.2 |
| Effingham | 2 | 8.5 | 1.0 | 30.6 | Pulaski | 0 | 0.0 | 0.0 | 73.8 |
| Fayette | 1 | 7.7 | 0.2 | 42.8 | Putnam | 0 | 0.0 | 0.0 | 107.5 |
| Ford | 3 | 33.6 | 6.9 | 98.3 | Randolph | 1 | 5.3 | 0.1 | 29.6 |
| Franklin | 1 | 4.4 | 0.1 | 24.4 | Richland | 1 | 9.6 | 0.2 | 53.7 |
| Fulton | 3 | 14.6 | 3.0 | 42.7 | Rock Island | 93 | 95.3 | 76.9 | 116.7 |
| Gallatin | 1 | 31.1 | 0.8 | 173.0 | Saline | 3 | 19.6 | 4.0 | 57.4 |
| Greene | 0 | 0.0 | 0.0 | 40.4 | Sangamon | 75 | 60.3 | 47.5 | 75.6 |
| Grundy | 4 | 16.7 | 4.6 | 42.8 | Schuyler | 2 | 47.6 | 5.8 | 172.0 |
| Hamilton | 0 | 0.0 | 0.0 | 83.6 | Scott | 0 | 0.0 | 0.0 | 114.6 |
| Hancock | 0 | 0.0 | 0.0 | 34.6 | Shelby | 1 | 7.6 | 0.2 | 42.4 |
| Hardin | 1 | 40.8 | 1.0 | 227.4 | St. Clair | 222 | 116.8 | 101.9 | 133.2 |
| Henderson | 2 | 49.0 | 5.9 | 177.1 | Stark | 0 | 0.0 | 0.0 | 94.3 |
| Henry | 0 | 0.0 | 0.0 | 12.8 | Stephenson | 12 | 39.0 | 20.1 | 68.1 |
| Iroquois | 2 | 11.3 | 1.4 | 40.9 | Tazewell | 15 | 19.0 | 10.7 | 31.4 |
| Jackson | 12 | 35.2 | 18.2 | 61.6 | Union | 1 | 9.6 | 0.2 | 53.6 |
| Jasper | 0 | 0.0 | 0.0 | 61.8 | Vermilion | 69 | 119.6 | 93.0 | 151.3 |
| Jefferson | 12 | 51.7 | 26.7 | 90.3 | Wabash | 0 | 0.0 | 0.0 | 56.2 |
| Jersey | 1 | 8.3 | 0.2 | 46.0 | Warren | 1 | 9.2 | 0.2 | 51.2 |
| JoDaviess | 1 | 8.3 | 0.2 | 46.4 | Washington | 0 | 0.0 | 0.0 | 46.0 |
| Johnson | 0 | 0.0 | 0.0 | 63.8 | Wayne | 0 | 0.0 | 0.0 | 38.7 |
| Kane | 120 | 34.2 | 28.4 | 40.9 | White | 0 | 0.0 | 0.0 | 44.9 |
| Kankakee | 51 | 67.7 | 50.4 | 89.1 | Whiteside | 58 | 148.9 | 113.0 | 192.5 |
| Kendall | 1 | 2.7 | 0.1 | 15.2 | Will | 140 | 39.4 | 33.2 | 46.5 |
| Knox | 24 | 75.5 | 48.4 | 112.4 | Williamson | 2 | 5.7 | 0.7 | 20.7 |
| Lake | 168 | 32.7 | 27.9 | 38.0 | Winnebago | 245 | 125.8 | 110.5 | 142.6 |
| LaSalle | 26 | 38.0 | 24.8 | 55.7 | Woodford | 2 | 9.6 | 1.2 | 34.6 |
| Lawrence | 0 | 0.0 | 0.0 | 43.9 | Unknown (Ill.) | 2 | 909.1 | 110.1 | 3,283.9 |

[1] Per 10,000 births [2] 95% confidence interval for rate

Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, 6/28/2001

**Figure 1. Incidence Rates[1] and 95% Confidence Intervals for Infants Prenatally Exposed to Any Drug By County of Residence,[2] Illinois, 1995-1999**




[1] Rates per 10,000 live births

[2] Only counties with 16 or more cases are presented

Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, 6/28/2001

## TECHNICAL ISSUES

### Determination of infants' exposure to controlled substances

Information about newborn infants' exposure to controlled substances is documented by the hospitals on the APORS report form in two ways.

1. There is a check box indicating a positive urine or meconium test result, and a list of drug types (opioid, barbiturate, cocaine, cannabis, other, mixed and not stated), one of which should be selected if a test is positive.

2. Drug exposure may also be included as a diagnosis – ICD-9-CM codes of 760.72 (narcotics), 760.73 (hallucinogenic agents), 760.75 (cocaine) and 779.5 (drug withdrawal syndrome in newborn, drug type unspecified).

There are inevitable disagreements between these different reporting fields, since APORS staff does not verify every report received. Therefore, the algorithm in Table 2 has been created to determine whether infants are considered exposed.

### Calculating and interpreting rates and confidence intervals

County-specific data are aggregated into five-year groups in order to improve statistical stability, and to assure confidentiality of the infants. Annual data for the whole of Illinois were used for examining trends. Incidence rates (per 10,000 live births) were calculated for each time interval and county as

$$10{,}000 \times \frac{\text{number of prenatally exposed infants}}{\text{number of live births}}$$

Prenatal exposure to controlled substances is assumed to be a rare event, therefore following a Poisson distribution. Exact confidence intervals were calculated for each rate (Armitage and Berry, page 134). Where there is a large number of events, the confidence intervals are narrow, indicating that the rate is stable. Where there are few events, the confidence intervals become very wide, indicating that the rate is not very stable and a small change in the number of infants prenatally exposed to controlled substances could result in a large change in the rate. Charts illustrating the data for the more commonly found drugs only include counties where 16 or more cases were observed in the five-year interval.

To compare two rates, it is important to look not just at their value, but also their confidence intervals. As a conservative approximation, if two confidence intervals overlap, then there is no statistical evidence that the two rates are really different. If two confidence intervals do not overlap, then the rates are said to be statistically different. In this report, 95 percent confidence intervals are used; where the confidence intervals do not overlap, the rates are different at the 5 percent level ($p < 0.05$).

## Table 2. Algorithm for Determining Presence and Type of Drug Exposure

| Positive Result | Drug Type | ICD-9 Code[1] | Designation |
|---|---|---|---|
| *Any Drug Exposure* | | | |
| Yes | Any/none | Any/none | Drug exposure |
| No/missing | Any/none | Any | Drug exposure |
| No/missing | Any/none | None | No drug exposure |
| *Exposure to Cocaine*[2] | | | |
| Yes | Cocaine | none or 760.75 | Cocaine exposure |
| Yes | Not stated/unknown | 760.75 | Cocaine exposure |
| Yes | Other than cocaine/not stated/unknown | Any/none | No cocaine exposure |
| No/missing | None/not stated/unknown | 760.75 | Cocaine exposure |
| No/missing | Any/none | Not 760.75 | No cocaine exposure |
| *Exposure to Barbiturates*[3] | | | |
| Yes | Barbiturate | None | Barbiturate exposure |
| Yes | Other than barbiturate | Any/none | No barbiturate exposure |
| No/missing | Any/none | Any/none | No barbiturate exposure |
| *Exposure to Mixed Drugs* | | | |
| Yes | Mixed | Any/none | Mixed drug exposure |
| Yes | Cocaine | 760.72 and/or 760.73 | Mixed drug exposure |
| Yes | Opioid | 760.73 and/or 760.75 | Mixed drug exposure |
| Yes | Other | 760.72 and/or 760.75 | Mixed drug exposure |
| Yes | Barbiturate/Cannabis | 760.72, 760.73 and/or 760.75 | Mixed drug exposure |
| Yes | Unknown/Not stated | Single ICD9 Code | No mixed drug exposure |
| Yes/no/missing | Any/none | More than one ICD9 code | Mixed drug exposure |
| No/Missing | Any/none | Any/none | No mixed drug exposure |

[1] Any ICD-9 code refers to any among 760.72 (opioid), 760.73 (hallucinogenic), 760.75 (cocaine) or 779.5 (withdrawal; unspecified)

[2] Similar logic is used for opioids (ICD9 code 760.72) and for other drugs (ICD9 code 760.73)

[3] Similar logic is used for cannabis

**Examining Trends**

Trends in reported prenatal drug exposure (pages 25-29) were modeled using a log-linear regression model (which is appropriate for data following a Poisson distribution). Analyses were performed using Joinpoint Regression Software (Version 2.5, March 2000, National Cancer Institute). This software compares a linear model with a single slope to models with straight lines with different slopes joined by one or more join points. The model tests whether the slope(s) are significantly different from 0 (whether there is a change over time) and whether any change in slope between two segments is statistically significant.

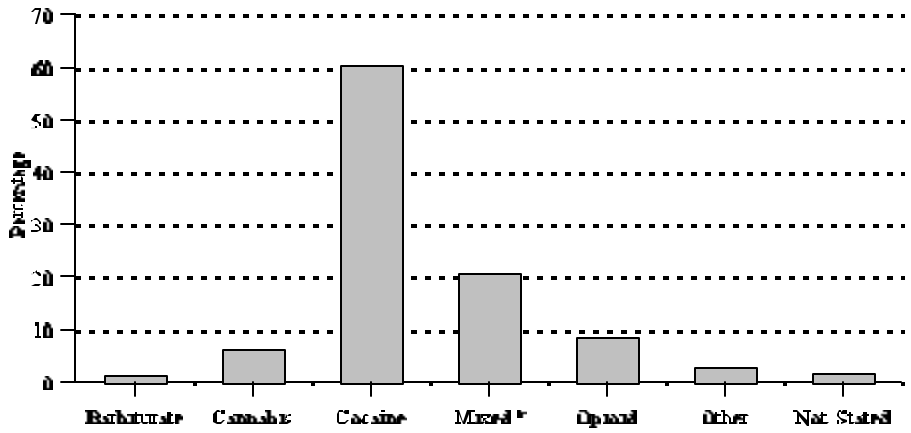
**Creating Map Illustrations**

The maps in this report (pages 30 and 31) were created using MapInfo (version 6.5, MapInfo Corporation). The categories were determined by the program using natural break-points in the data. The maps are used to create a visual representation of prenatal drug exposure and do not have any statistical significance associated with them.

## TYPES OF DRUGS USED IN ILLINOIS

Cocaine is the drug most frequently reported to APORS as being used by pregnant women in Illinois: 60.1 percent of all children born with known exposure to controlled substances have been exposed to cocaine. An additional 20.4 percent of the children born with known exposure have been exposed to more than one drug. The APORS program does not collect information about what type of drugs were used, and so this category cannot be broken down any further. Opioids (primarily heroin and methadone) and cannabis make up most of the rest of the exposure (8.2 percent and 6.2 percent respectively).

**Figure 2. Percentage of Infants with Different Types of Drug Exposure Among Illinois Children Prenatally Exposed to Controlled Substances 1995-1999**




* Mixed refers to children prenatally exposed to more than one type of controlled substance

Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, 6/28/2001

This distribution looks rather different from that reported by the United States Department of Health and Human Services, (DHHS), Substance Abuse and Mental Health Services Administration. Table 3 shows the Illinois rates of marijuana and other illicit drug use reported in the DHHS Summary of findings from the 1999 National Household Survey on Drug Abuse.

**Table 3. Estimates of Past Use of Selected Drugs in Illinois By Age Group, 1999**

| Drug | Total | Age Group (years) | | |
|---|---|---|---|---|
| | | 12-17 | 18-25 | 26+ |
| Marijuana | 5.3 | 10.0 | 15.4 | 2.9 |
| Any illicit drug other than marijuana | 2.9 | 5.1 | 5.5 | 2.2 |

Source: SAMHSA, Office of Applied Studies, summary of findings from the 1999 National Household Survey on Drug Abuse, 1999

In the 1999 National Household Survey on Drug Abuse, cannabis (marijuana) use was almost twice that of all other illicit drug use combined. The pattern of use among pregnant women, however, is different from the population as a whole. Just as women give up alcohol and tobacco consumption during pregnancy, so they may give up use of illicit drugs. The National Institute on Drug Abuse (NIDA, 1997) reported that, of the 4 million women who gave birth nationally in 1992/3, about 3.0 percent used cannabis and 1.1 percent used cocaine during their pregnancies.

The most likely explanation is that the pattern of infant testing and reporting of drug exposure induces the difference between these reports and the distribution of drug types observed in the APORS data. Karp highlighted some of the differences in testing for infant drug exposures in Cook County in an article for *The Chicago Reporter*. She argued that poor, black infants were more likely to be tested than others.

The data that follow must therefore be interpreted carefully since they are not necessarily representative of all Illinois prenatally drug-exposed infants. The number and rates of prenatal drug exposure is probably lower than the true rate for all types of drugs, perhaps particularly for cannabis. If reporting patterns have not changed over time, then the trend analyses that follow should have some validity.

## EXPOSURE TO SPECIFIC DRUGS

## COCAINE TOXICITY

The data reported in this section included all forms of cocaine (including crack). Cocaine is a powerful stimulant of the central nervous system, with an apparent dose-response relationship: the greater the exposure to cocaine, the more significant the effects.

During the early months of pregnancy, cocaine use can cause a miscarriage. When it is used late in pregnancy, it may trigger premature labor or cause placental abruption which can be fatal for both the mother and the baby (Blatt *et al.*). It may also cause an unborn baby to die or to have a stroke, which might result in irreversible brain damage (March of Dimes). Cocaine causes vasoconstriction, reducing the level of nutrients and oxygen to the fetus, leading to intrauterine growth retardation reducing birth weight, birth length and head circumference. Such babies are more likely to die in their first month, and they are at risk of life-long disabilities including mental retardation, cerebral palsy, visual and hearing impairment.

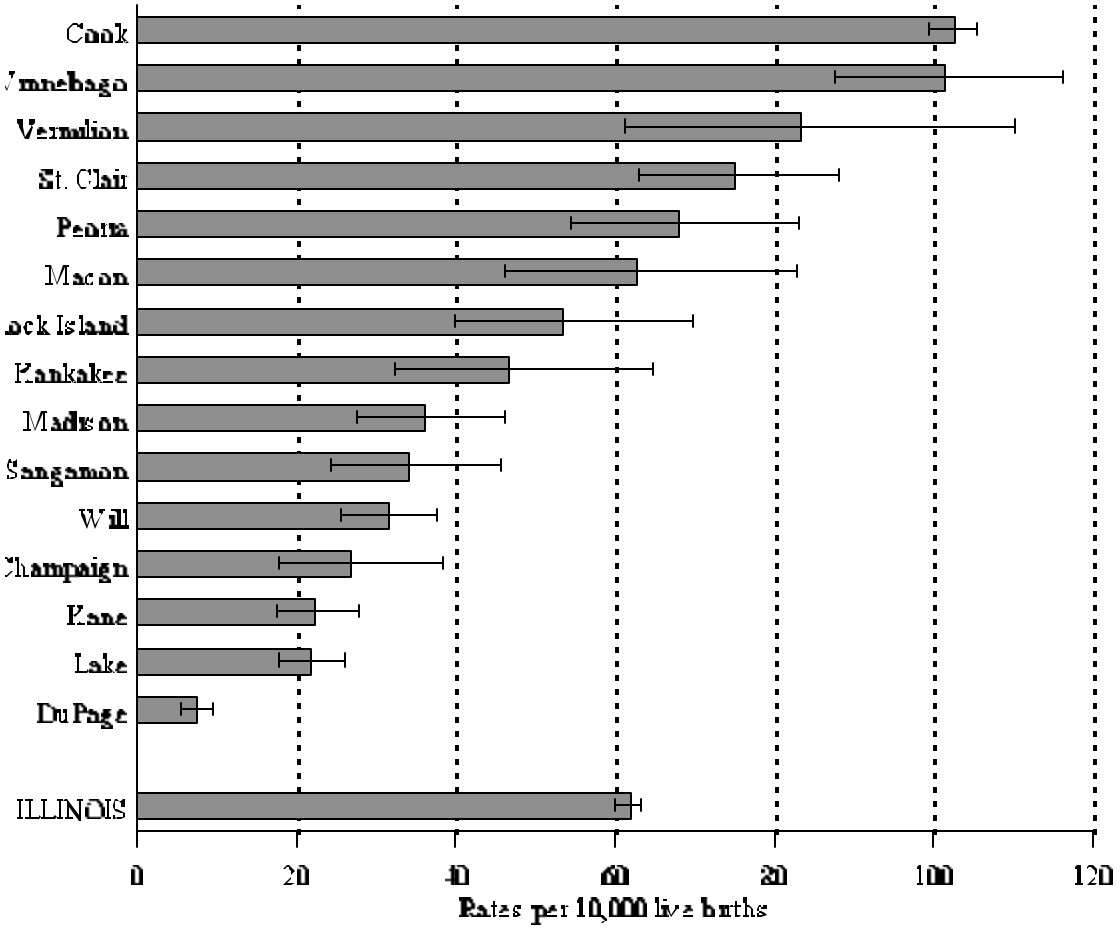
Some studies have suggested that cocaine-exposed babies are at increased risk of birth defects. Chavez *et al.* reported that mothers who used cocaine early in pregnancy were five times as likely to have a baby with a malformation of the urinary tract as mothers who do not use cocaine. Optic nerve anomalies, retinal dysgenesis and coloboma (missing portions of eye structures) have a higher incidence in infants born to cocaine-using mothers (Bingol *et al.*). Little *et al.* report an increase in the likelihood of a baby having abdominal wall defects and genitourinary anomalies with exposure to cocaine.

At birth, some cocaine-exposed babies are lethargic and unresponsive (Blatt *et al.*). After a few weeks, the infants may have tremors and strong startle reflexes. At 3 months of age, cocaine-exposed babies show more distress in response to unfamiliar sights or sounds that non-exposed babies (Eyler *et al.*). This over-sensitivity can make caring for these children difficult in early years and may contribute to later learning problems. While most children exposed to cocaine before birth have normal intelligence, they may have learning delays, particularly in areas requiring fine motors skills (Arendt *et al.*).

Research indicates that moderate to light cocaine exposure *in utero* has less long-term effect on children than the disorganized, abusive home lives often experienced by children with drug-abusing caregivers (Blatt *et al.* ). While avoiding cocaine use during pregnancy is the best way to avoid these problems, stopping cocaine use early in pregnancy reduces the risk of having premature or low birth weight babies (March of Dimes).

Table 4 lists the rates of known prenatal cocaine exposure for infants born in Illinois, while Figure 3 illustrates the data graphically for counties with 16 or more cases.

**Figure 3. Incidence Rates[1] and 95% Confidence Intervals for Infants Prenatally Exposed to Cocaine, By County of Residence[2] Illinois, 1995-1999**




[1] Rates per 10,000 live births

[2] Only counties with 16 or more cases are presented.

Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, 6/28/2001

# Table 4. Total Number and Incidence Rates of Infants Prenatally Exposed to Cocaine, By County of Residence, Illinois, 1995-1999

| | | | 95% CI[2] | | | | | 95% CI[2] | |
|---|---|---|---|---|---|---|---|---|---|
| County | Cases | Rate[1] | Lower | Upper | County | Cases | Rate[1] | Lower | Upper |
| ILLINOIS | 5,645 | 61.7 | 60.1 | 63.3 | Lee | 0 | 0.0 | 0.0 | 18.8 |
| Adams | 6 | 14.4 | 5.3 | 31.3 | Livingston | 3 | 13.0 | 2.7 | 38.1 |
| Alexander | 1 | 14.8 | 0.4 | 82.4 | Logan | 0 | 0.0 | 0.0 | 22.0 |
| Bond | 0 | 0.0 | 0.0 | 37.7 | Macon | 48 | 62.5 | 46.1 | 82.8 |
| Boone | 2 | 7.2 | 0.9 | 26.1 | Macoupin | 5 | 18.5 | 6.0 | 43.2 |
| Brown | 0 | 0.0 | 0.0 | 135.6 | Madison | 60 | 36.0 | 27.5 | 46.3 |
| Bureau | 1 | 4.9 | 0.1 | 27.4 | Marion | 6 | 22.1 | 8.1 | 48.2 |
| Calhoun | 0 | 0.0 | 0.0 | 155.0 | Marshall | 0 | 0.0 | 0.0 | 51.7 |
| Carroll | 1 | 11.2 | 0.3 | 62.7 | Mason | 0 | 0.0 | 0.0 | 39.4 |
| Cass | 0 | 0.0 | 0.0 | 41.9 | Massac | 0 | 0.0 | 0.0 | 41.8 |
| Champaign | 29 | 26.6 | 17.8 | 38.3 | McDonough | 0 | 0.0 | 0.0 | 25.1 |
| Christian | 0 | 0.0 | 0.0 | 17.6 | McHenry | 8 | 4.1 | 1.8 | 8.1 |
| Clark | 0 | 0.0 | 0.0 | 38.5 | McLean | 7 | 7.3 | 2.9 | 14.9 |
| Clay | 1 | 11.6 | 0.3 | 64.8 | Menard | 0 | 0.0 | 0.0 | 53.1 |
| Clinton | 0 | 0.0 | 0.0 | 18.4 | Mercer | 0 | 0.0 | 0.0 | 40.4 |
| Coles | 4 | 13.6 | 3.7 | 34.7 | Monroe | 0 | 0.0 | 0.0 | 23.6 |
| Cook | 4,438 | 102.3 | 99.3 | 105.3 | Montgomery | 0 | 0.0 | 0.0 | 21.5 |
| Crawford | 0 | 0.0 | 0.0 | 33.5 | Morgan | 1 | 4.9 | 0.1 | 27.4 |
| Cumberland | 0 | 0.0 | 0.0 | 54.2 | Moultrie | 0 | 0.0 | 0.0 | 40.4 |
| DeKalb | 1 | 1.9 | 0.0 | 10.6 | Ogle | 2 | 6.7 | 0.8 | 24.1 |
| DeWitt | 1 | 10.1 | 0.3 | 56.4 | Peoria | 90 | 67.7 | 54.4 | 83.2 |
| Douglas | 2 | 13.9 | 1.7 | 50.3 | Perry | 0 | 0.0 | 0.0 | 31.4 |
| DuPage | 49 | 7.2 | 5.4 | 9.6 | Piatt | 1 | 10.7 | 0.3 | 59.7 |
| Edgar | 0 | 0.0 | 0.0 | 33.0 | Pike | 0 | 0.0 | 0.0 | 37.8 |
| Edwards | 0 | 0.0 | 0.0 | 104.5 | Pope | 0 | 0.0 | 0.0 | 189.2 |
| Effingham | 0 | 0.0 | 0.0 | 15.6 | Pulaski | 0 | 0.0 | 0.0 | 73.8 |
| Fayette | 0 | 0.0 | 0.0 | 28.3 | Putnam | 0 | 0.0 | 0.0 | 107.5 |
| Ford | 0 | 0.0 | 0.0 | 41.4 | Randolph | 0 | 0.0 | 0.0 | 19.6 |
| Franklin | 0 | 0.0 | 0.0 | 16.2 | Richland | 0 | 0.0 | 0.0 | 35.6 |
| Fulton | 0 | 0.0 | 0.0 | 18.0 | Rock Island | 52 | 53.3 | 39.8 | 69.9 |
| Gallatin | 0 | 0.0 | 0.0 | 114.6 | Saline | 2 | 13.1 | 1.6 | 47.3 |
| Greene | 0 | 0.0 | 0.0 | 40.4 | Sangamon | 42 | 33.8 | 24.4 | 45.7 |
| Grundy | 3 | 12.5 | 2.6 | 36.7 | Schuyler | 1 | 23.8 | 0.6 | 132.7 |
| Hamilton | 0 | 0.0 | 0.0 | 83.6 | Scott | 0 | 0.0 | 0.0 | 114.6 |
| Hancock | 0 | 0.0 | 0.0 | 34.6 | Shelby | 0 | 0.0 | 0.0 | 28.1 |
| Hardin | 0 | 0.0 | 0.0 | 150.6 | St. Clair | 142 | 74.7 | 62.9 | 88.0 |
| Henderson | 0 | 0.0 | 0.0 | 90.4 | Stark | 0 | 0.0 | 0.0 | 94.3 |
| Henry | 0 | 0.0 | 0.0 | 12.8 | Stephenson | 6 | 19.5 | 7.2 | 42.4 |
| Iroquois | 2 | 11.3 | 1.4 | 40.9 | Tazewell | 4 | 5.1 | 1.4 | 13.0 |
| Jackson | 6 | 17.6 | 6.5 | 38.4 | Union | 0 | 0.0 | 0.0 | 35.5 |
| Jasper | 0 | 0.0 | 0.0 | 61.8 | Vermilion | 48 | 83.2 | 61.3 | 110.3 |
| Jefferson | 8 | 34.5 | 14.9 | 67.9 | Wabash | 0 | 0.0 | 0.0 | 56.2 |
| Jersey | 1 | 8.3 | 0.2 | 46.0 | Warren | 0 | 0.0 | 0.0 | 33.9 |
| JoDaviess | 0 | 0.0 | 0.0 | 30.7 | Washington | 0 | 0.0 | 0.0 | 46.0 |
| Johnson | 0 | 0.0 | 0.0 | 63.8 | Wayne | 0 | 0.0 | 0.0 | 38.7 |
| Kane | 78 | 22.2 | 17.6 | 27.8 | White | 0 | 0.0 | 0.0 | 44.9 |
| Kankakee | 35 | 46.5 | 32.4 | 64.7 | Whiteside | 9 | 23.1 | 10.6 | 43.9 |
| Kendall | 0 | 0.0 | 0.0 | 10.0 | Will | 111 | 31.3 | 25.7 | 37.6 |
| Knox | 9 | 28.3 | 12.9 | 53.8 | Williamson | 0 | 0.0 | 0.0 | 10.6 |
| Lake | 111 | 21.6 | 17.7 | 26.0 | Winnebago | 197 | 101.2 | 87.5 | 116.3 |
| LaSalle | 10 | 14.6 | 7.0 | 26.9 | Woodford | 0 | 0.0 | 0.0 | 17.7 |
| Lawrence | 0 | 0.0 | 0.0 | 43.9 | Unknown (Ill.) | 1 | 454.5 | 11.5 | 2,532.6 |

[1]Per 10,000 births [2] 95% confidence interval for rate

Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, 6/28/2001

## OPIOID TOXICITY

Opioids include heroin, methadone, morphine, opium, codeine and pethidine. They are sedative drugs that depress the nervous system.

Mothers who use opioids are likely to experience complications during pregnancy and childbirth. The most common medical problems are anemia, cardiac disease, diabetes, pneumonia and hepatitis. These drugs increase the danger of spontaneous abortion, breech delivery and premature birth with accompanying problems for the infant such as low birth weight, meconium staining, breathing difficulties, hypoglycemia and intracranial hemorrhage (Kaltenbach *et al.*).

However, suddenly stopping use of opioids during pregnancy increases the risk of spontaneous abortion or premature delivery; rather treatment with methadone is strongly advised. Babies are more easily and safely treated after birth when dependent on methadone than heroin. Research has also shown that *in utero* exposure to methadone is relatively benign (Kaltenbach *et al.*).

Infants exposed to potent narcotics may suffer from narcotic abstinence syndrome at birth. Initial signs may be subtle, but may include breathing problems, feeding difficulties, disturbed sleep, vomiting, diarrhea, joint stiffness, sweating and fever. Later, tremors, high-pitched crying and irritability may develop. Narcotic abstinence syndrome has also been reported with less potent narcotics such as codeine (Finnegan).

Infants exposed to narcotics in the womb demonstrate higher-than-normal rates of apnea and abnormal breathing patterns, often tied to sudden infant death syndrome. Ward *et al.* estimate that children of heroin-using mothers have five to 10 times greater risk of sudden infant death syndrome (Ward *et al.*).

Longitudinal studies have been performed to follow children who have had intrauterine exposure to opioids. While these children generally do not perform well in school, if the results are adjusted for background (disorganized, poor households), there is no apparent difference in outcome or function in school (Ornoy *et al.*).

Table 5 provides the number and incidence of infants prenatally exposed to opioids. A graphical display is not provided because only Cook County had 16 or more cases.

# Table 5. Total Number and Incidence Rates of Infants Prenatally Exposed to Opioids, By County of Residence, Illinois, 1995-1999

| | | | 95% CI[2] | | | | | 95% CI[2] | |
|---|---|---|---|---|---|---|---|---|---|
| County | Cases | Rate[1] | Lower | Upper | County | Cases | Rate[1] | Lower | Upper |
| ILLINOIS | 768 | 8.4 | 7.8 | 9.0 | Lee | 1 | 5.1 | 0.1 | 28.4 |
| Adams | 1 | 2.4 | 0.1 | 13.3 | Livingston | 1 | 4.3 | 0.1 | 24.2 |
| Alexander | 0 | 0.0 | 0.0 | 54.6 | Logan | 0 | 0.0 | 0.0 | 22.0 |
| Bond | 0 | 0.0 | 0.0 | 37.7 | Macon | 2 | 2.6 | 0.3 | 9.4 |
| Boone | 1 | 3.6 | 0.1 | 20.1 | Macoupin | 0 | 0.0 | 0.0 | 13.7 |
| Brown | 0 | 0.0 | 0.0 | 135.6 | Madison | 4 | 2.4 | 0.7 | 6.1 |
| Bureau | 0 | 0.0 | 0.0 | 18.1 | Marion | 1 | 3.7 | 0.1 | 20.6 |
| Calhoun | 0 | 0.0 | 0.0 | 155.0 | Marshall | 0 | 0.0 | 0.0 | 51.7 |
| Carroll | 1 | 11.2 | 0.3 | 62.7 | Mason | 0 | 0.0 | 0.0 | 39.4 |
| Cass | 0 | 0.0 | 0.0 | 41.9 | Massac | 0 | 0.0 | 0.0 | 41.8 |
| Champaign | 4 | 3.7 | 1.0 | 9.4 | McDonough | 0 | 0.0 | 0.0 | 25.1 |
| Christian | 0 | 0.0 | 0.0 | 17.6 | McHenry | 3 | 1.5 | 0.3 | 4.5 |
| Clark | 0 | 0.0 | 0.0 | 38.5 | McLean | 1 | 1.0 | 0.0 | 5.8 |
| Clay | 0 | 0.0 | 0.0 | 42.9 | Menard | 0 | 0.0 | 0.0 | 53.1 |
| Clinton | 0 | 0.0 | 0.0 | 18.4 | Mercer | 0 | 0.0 | 0.0 | 40.4 |
| Coles | 0 | 0.0 | 0.0 | 12.5 | Monroe | 0 | 0.0 | 0.0 | 23.6 |
| Cook | 701 | 16.2 | 15.0 | 17.4 | Montgomery | 0 | 0.0 | 0.0 | 21.5 |
| Crawford | 0 | 0.0 | 0.0 | 33.5 | Morgan | 0 | 0.0 | 0.0 | 18.1 |
| Cumberland | 0 | 0.0 | 0.0 | 54.2 | Moultrie | 0 | 0.0 | 0.0 | 40.4 |
| DeKalb | 1 | 1.9 | 0.0 | 10.6 | Ogle | 0 | 0.0 | 0.0 | 12.3 |
| DeWitt | 0 | 0.0 | 0.0 | 37.3 | Peoria | 3 | 2.3 | 0.5 | 6.6 |
| Douglas | 0 | 0.0 | 0.0 | 25.7 | Perry | 1 | 8.5 | 0.2 | 47.5 |
| DuPage | 11 | 1.6 | 0.8 | 2.9 | Piatt | 0 | 0.0 | 0.0 | 39.5 |
| Edgar | 0 | 0.0 | 0.0 | 33.0 | Pike | 0 | 0.0 | 0.0 | 37.8 |
| Edwards | 0 | 0.0 | 0.0 | 104.5 | Pope | 0 | 0.0 | 0.0 | 189.2 |
| Effingham | 0 | 0.0 | 0.0 | 15.6 | Pulaski | 0 | 0.0 | 0.0 | 73.8 |
| Fayette | 0 | 0.0 | 0.0 | 28.3 | Putnam | 0 | 0.0 | 0.0 | 107.5 |
| Ford | 0 | 0.0 | 0.0 | 41.4 | Randolph | 1 | 5.3 | 0.1 | 29.6 |
| Franklin | 0 | 0.0 | 0.0 | 16.2 | Richland | 0 | 0.0 | 0.0 | 35.6 |
| Fulton | 0 | 0.0 | 0.0 | 18.0 | Rock Island | 3 | 3.1 | 0.6 | 9.0 |
| Gallatin | 0 | 0.0 | 0.0 | 114.6 | Saline | 0 | 0.0 | 0.0 | 24.1 |
| Greene | 0 | 0.0 | 0.0 | 40.4 | Sangamon | 1 | 0.8 | 0.0 | 4.5 |
| Grundy | 0 | 0.0 | 0.0 | 15.4 | Schuyler | 0 | 0.0 | 0.0 | 87.8 |
| Hamilton | 0 | 0.0 | 0.0 | 83.6 | Scott | 0 | 0.0 | 0.0 | 114.6 |
| Hancock | 0 | 0.0 | 0.0 | 34.6 | Shelby | 0 | 0.0 | 0.0 | 28.1 |
| Hardin | 0 | 0.0 | 0.0 | 150.6 | St. Clair | 3 | 1.6 | 0.3 | 4.6 |
| Henderson | 0 | 0.0 | 0.0 | 90.4 | Stark | 0 | 0.0 | 0.0 | 94.3 |
| Henry | 0 | 0.0 | 0.0 | 12.8 | Stephenson | 1 | 3.2 | 0.1 | 18.1 |
| Iroquois | 0 | 0.0 | 0.0 | 20.9 | Tazewell | 0 | 0.0 | 0.0 | 4.7 |
| Jackson | 0 | 0.0 | 0.0 | 10.8 | Union | 0 | 0.0 | 0.0 | 35.5 |
| Jasper | 0 | 0.0 | 0.0 | 61.8 | Vermilion | 2 | 3.5 | 0.4 | 12.5 |
| Jefferson | 0 | 0.0 | 0.0 | 15.9 | Wabash | 0 | 0.0 | 0.0 | 56.2 |
| Jersey | 0 | 0.0 | 0.0 | 30.4 | Warren | 0 | 0.0 | 0.0 | 33.9 |
| JoDaviess | 0 | 0.0 | 0.0 | 30.7 | Washington | 0 | 0.0 | 0.0 | 46.0 |
| Johnson | 0 | 0.0 | 0.0 | 63.8 | Wayne | 0 | 0.0 | 0.0 | 38.7 |
| Kane | 5 | 1.4 | 0.5 | 3.3 | White | 0 | 0.0 | 0.0 | 44.9 |
| Kankakee | 0 | 0.0 | 0.0 | 4.9 | Whiteside | 4 | 10.3 | 2.8 | 26.3 |
| Kendall | 0 | 0.0 | 0.0 | 10.0 | Will | 4 | 1.1 | 0.3 | 2.9 |
| Knox | 0 | 0.0 | 0.0 | 11.6 | Williamson | 1 | 2.9 | 0.1 | 16.0 |
| Lake | 0 | 0.0 | 0.0 | 0.7 | Winnebago | 6 | 3.1 | 1.1 | 6.7 |
| LaSalle | 0 | 0.0 | 0.0 | 5.4 | Woodford | 0 | 0.0 | 0.0 | 17.7 |
| Lawrence | 0 | 0.0 | 0.0 | 43.9 | Unknown (Ill.) | 0 | 0.0 | 0.0 | 1,676.8 |

[1]Per 10,000 births [2] 95% confidence interval for rate

Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, 6/28/2001

## CANNABIS TOXICITY

Cannabis is difficult to study since those who use it typically smoke tobacco and drink alcohol. Studies that do not control for these factors are hard to interpret. Failure to account for these factors may explain some of the contradictory results seen in past studies. Studies conducted more recently have been designed to separate the effect of *in utero* cannabis exposure from the effects of *in utero* tobacco and alcohol exposure.

Even studies that adjust for cigarette usage have reported mixed results when considering cannabis use and birth weight. English *et al*. performed meta-analyses combining the results of 10 studies and concluded that there is inadequate evidence that cannabis, at the amount commonly consumed by pregnant women, causes low birth weight.

However, studies have found that heavy cannabis use (six or more times a week during pregnancy) leads to shorter gestation (Fried *et al.*, 1984) and to precipitate labor of less than three hours (Greenland *et al*. 1982a, 1982b).

Fried and Makin report that newborns exposed to cannabis have a reduced response to light, and a high proportion of those whose mothers were heavy cannabis users do not habituate to a change in light level. Exposure to cannabis may delay the maturation of the infants' visual system. Increased levels of myopia, strabismus, abnormal eye movements and unusual optic discs have been reported. The infants also have significantly heightened tremors and startles; this state persists for at least one month.

Several studies have documented performance problems among children exposed *in utero* to cannabis. Fried and Watkinson (1990) found lower performance in verbal and memory domains among exposed 3- to 4-year-olds. Goldschmidt *et al*. showed that prenatal marijuana use was significantly related to increased hyperactivity, impulsivity and inattention symptoms, increased delinquency and externalizing problems among children at age 10. Fried and Watkinson (2000) found that in 9- to 12-year-olds, in contrast to cigarettes, prenatal marijuana exposure was not associated with basic visuoperceptual functioning but it was negatively associated with performance in visual problem solving situations.

Table 6 shows the number and incidence of infants born prenatally exposed to cannabis, by their county of residence at birth, between 1995 and 1999. Figure 4 illustrates the data graphically for the counties with 16 or more cases.

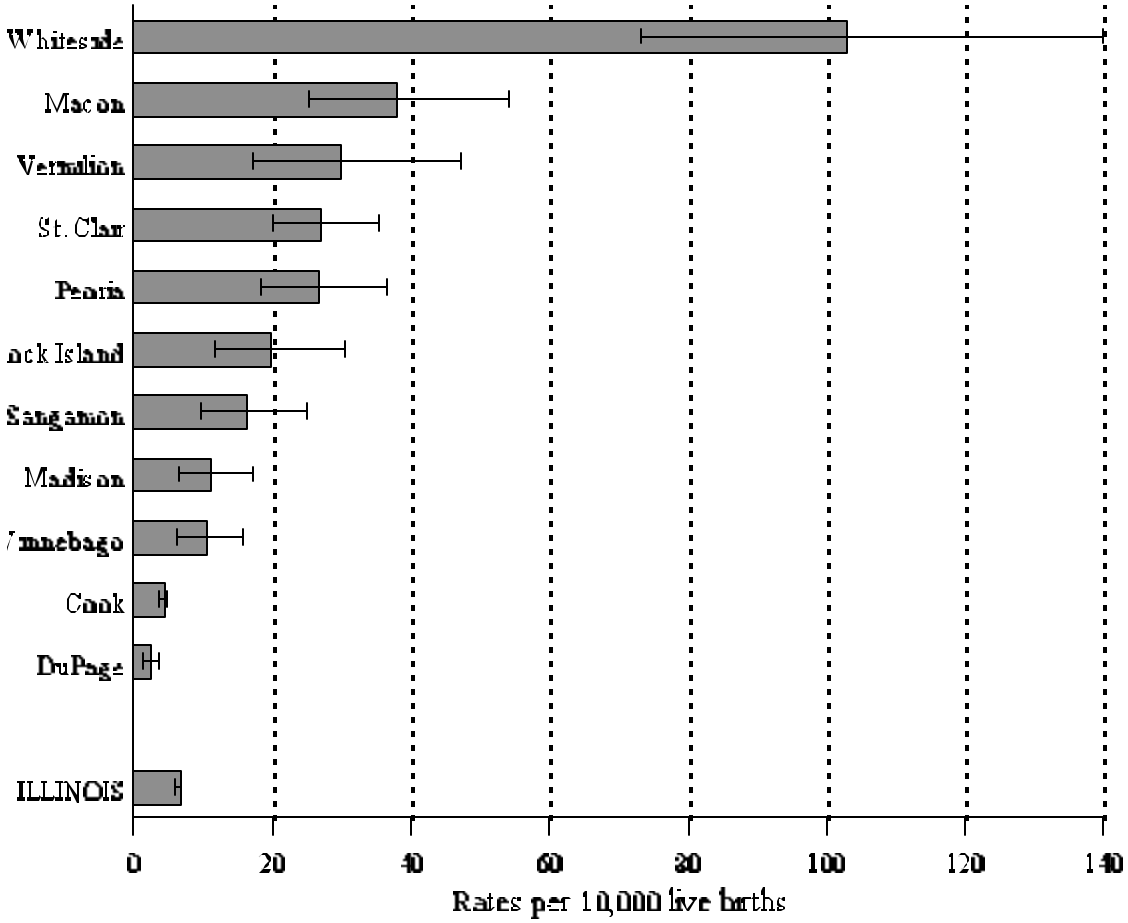
## Table 6. Total Number and Incidence Rates of Infants Prenatally Exposed to Cannabis, By County of Residence, Illinois, 1995-1999

| | | | 95% CI[2] | | | | | 95% CI[2] | |
|---|---|---|---|---|---|---|---|---|---|
| County | Cases | Rate[1] | Lower | Upper | County | Cases | Rate[1] | Lower | Upper |
| ILLINOIS | 582 | 6.4 | 5.9 | 6.9 | Lee | 4 | 20.4 | 5.6 | 52.2 |
| Adams | 2 | 4.8 | 0.6 | 17.3 | Livingston | 2 | 8.7 | 1.1 | 31.4 |
| Alexander | 0 | 0.0 | 0.0 | 54.6 | Logan | 2 | 11.9 | 1.4 | 43.1 |
| Bond | 0 | 0.0 | 0.0 | 37.7 | Macon | 29 | 37.7 | 25.3 | 54.2 |
| Boone | 2 | 7.2 | 0.9 | 26.1 | Macoupin | 1 | 3.7 | 0.1 | 20.7 |
| Brown | 0 | 0.0 | 0.0 | 135.6 | Madison | 18 | 10.8 | 6.4 | 17.1 |
| Bureau | 2 | 9.8 | 1.2 | 35.5 | Marion | 1 | 3.7 | 0.1 | 20.6 |
| Calhoun | 0 | 0.0 | 0.0 | 155.0 | Marshall | 0 | 0.0 | 0.0 | 51.7 |
| Carroll | 0 | 0.0 | 0.0 | 41.5 | Mason | 3 | 32.1 | 6.6 | 93.7 |
| Cass | 0 | 0.0 | 0.0 | 41.9 | Massac | 0 | 0.0 | 0.0 | 41.8 |
| Champaign | 11 | 10.1 | 5.0 | 18.1 | McDonough | 2 | 13.6 | 1.7 | 49.2 |
| Christian | 1 | 4.8 | 0.1 | 26.6 | McHenry | 4 | 2.1 | 0.6 | 5.3 |
| Clark | 0 | 0.0 | 0.0 | 38.5 | McLean | 3 | 3.1 | 0.6 | 9.1 |
| Clay | 0 | 0.0 | 0.0 | 42.9 | Menard | 0 | 0.0 | 0.0 | 53.1 |
| Clinton | 0 | 0.0 | 0.0 | 18.4 | Mercer | 1 | 10.9 | 0.3 | 61.0 |
| Coles | 3 | 10.2 | 2.1 | 29.7 | Monroe | 0 | 0.0 | 0.0 | 23.6 |
| Cook | 180 | 4.1 | 3.6 | 4.8 | Montgomery | 1 | 5.8 | 0.1 | 32.4 |
| Crawford | 0 | 0.0 | 0.0 | 33.5 | Morgan | 0 | 0.0 | 0.0 | 18.1 |
| Cumberland | 0 | 0.0 | 0.0 | 54.2 | Moultrie | 0 | 0.0 | 0.0 | 40.4 |
| DeKalb | 2 | 3.8 | 0.5 | 13.8 | Ogle | 0 | 0.0 | 0.0 | 12.3 |
| DeWitt | 0 | 0.0 | 0.0 | 37.3 | Peoria | 35 | 26.3 | 18.3 | 36.6 |
| Douglas | 1 | 7.0 | 0.2 | 38.8 | Perry | 0 | 0.0 | 0.0 | 31.4 |
| DuPage | 15 | 2.2 | 1.2 | 3.7 | Piatt | 0 | 0.0 | 0.0 | 39.5 |
| Edgar | 0 | 0.0 | 0.0 | 33.0 | Pike | 0 | 0.0 | 0.0 | 37.8 |
| Edwards | 0 | 0.0 | 0.0 | 104.5 | Pope | 0 | 0.0 | 0.0 | 189.2 |
| Effingham | 2 | 8.5 | 1.0 | 30.6 | Pulaski | 0 | 0.0 | 0.0 | 73.8 |
| Fayette | 1 | 7.7 | 0.2 | 42.8 | Putnam | 0 | 0.0 | 0.0 | 107.5 |
| Ford | 0 | 0.0 | 0.0 | 41.4 | Randolph | 0 | 0.0 | 0.0 | 19.6 |
| Franklin | 0 | 0.0 | 0.0 | 16.2 | Richland | 0 | 0.0 | 0.0 | 35.6 |
| Fulton | 2 | 9.7 | 1.2 | 35.2 | Rock Island | 19 | 19.5 | 11.7 | 30.4 |
| Gallatin | 0 | 0.0 | 0.0 | 114.6 | Saline | 1 | 6.5 | 0.2 | 36.5 |
| Greene | 0 | 0.0 | 0.0 | 40.4 | Sangamon | 20 | 16.1 | 9.8 | 24.9 |
| Grundy | 0 | 0.0 | 0.0 | 15.4 | Schuyler | 1 | 23.8 | 0.6 | 132.7 |
| Hamilton | 0 | 0.0 | 0.0 | 83.6 | Scott | 0 | 0.0 | 0.0 | 114.6 |
| Hancock | 0 | 0.0 | 0.0 | 34.6 | Shelby | 1 | 7.6 | 0.2 | 42.4 |
| Hardin | 1 | 40.8 | 1.0 | 227.4 | St. Clair | 51 | 26.8 | 20.0 | 35.3 |
| Henderson | 2 | 49.0 | 5.9 | 177.1 | Stark | 0 | 0.0 | 0.0 | 94.3 |
| Henry | 0 | 0.0 | 0.0 | 12.8 | Stephenson | 4 | 13.0 | 3.5 | 33.3 |
| Iroquois | 0 | 0.0 | 0.0 | 20.9 | Tazewell | 9 | 11.4 | 5.2 | 21.7 |
| Jackson | 1 | 2.9 | 0.1 | 16.4 | Union | 0 | 0.0 | 0.0 | 35.5 |
| Jasper | 0 | 0.0 | 0.0 | 61.8 | Vermilion | 17 | 29.5 | 17.2 | 47.2 |
| Jefferson | 0 | 0.0 | 0.0 | 15.9 | Wabash | 0 | 0.0 | 0.0 | 56.2 |
| Jersey | 0 | 0.0 | 0.0 | 30.4 | Warren | 1 | 9.2 | 0.2 | 51.2 |
| JoDaviess | 1 | 8.3 | 0.2 | 46.4 | Washington | 0 | 0.0 | 0.0 | 46.0 |
| Johnson | 0 | 0.0 | 0.0 | 63.8 | Wayne | 0 | 0.0 | 0.0 | 38.7 |
| Kane | 11 | 3.1 | 1.6 | 5.6 | White | 0 | 0.0 | 0.0 | 44.9 |
| Kankakee | 8 | 10.6 | 4.6 | 20.9 | Whiteside | 40 | 102.7 | 73.3 | 139.8 |
| Kendall | 0 | 0.0 | 0.0 | 10.0 | Will | 9 | 2.5 | 1.2 | 4.8 |
| Knox | 13 | 40.9 | 21.8 | 70.0 | Williamson | 0 | 0.0 | 0.0 | 10.6 |
| Lake | 9 | 1.7 | 0.8 | 3.3 | Winnebago | 20 | 10.3 | 6.3 | 15.9 |
| LaSalle | 11 | 16.1 | 8.0 | 28.8 | Woodford | 2 | 9.6 | 1.2 | 34.6 |
| Lawrence | 0 | 0.0 | 0.0 | 43.9 | Unknown (Ill.) | 0 | 0.0 | 0.0 | 1,676.8 |

[1] Per 10,000 births [2] 95% confidence interval for rate

Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, 6/28/2001

**Figure 4. Incidence Rates[1] and 95% Confidence Intervals for Infants Prenatally Exposed to Cannabis, By County of Residence[2] Illinois, 1995-1999**




[1] Rates per 10,000 live births

[2] Only counties with 16 or more cases are presented.

Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, 6/28/2001

## BARBITURATE TOXICITY

Barbiturates are no longer routinely prescribed as a tranquilizer, sleeping aid or for certain pregnancy problems, but they are still important in the treatment of epilepsy. These drugs are addictive and may be abused by women who had previously had barbiturates prescribed, or to ease the unpleasant effects of illicit stimulants. Many sedatives-hypnotics pass through the placenta easily (Coupey). However, suddenly stopping use of barbiturates during pregnancy can be dangerous to the fetus, and medical opinion sometimes deems that it is safer for the mother to continue using until the baby is born.

Some barbiturates (for example, phenobarbital) are folic acid antagonists. Use of these drugs (particularly during the first trimester of pregnancy) therefore leads to an increase in the likelihood of the baby having a neural tube defect, cardiovascular defects, an oral cleft or urinary tract defects (Hernandez-Diaz *et al*. [2000], Hernandez-Diaz *et al*. [2001]). The risk of a defect increases with the number of drugs and total daily dosage (Kaneko *et al*.).

Newborn infants who have been exposed to barbiturates may be physically dependent on the drugs and show withdrawal symptoms shortly after birth. Their symptoms may include breathing problems, feeding difficulties, disturbed sleep, sweating, irritability and fever (Coupey).

Reinisch *et al*. showed that adult men exposed prenatally to a specific barbiturate (phenobarbital) had significantly lower verbal intelligence scores than expected, even after adjusting for their post-natal environment. Exposure in the last trimester had the greatest effect.

Table 7 shows the number and incidence of infants born prenatally exposed to barbiturates, by their county of residence at birth, between 1995 and 1999. There is no associated chart, since the number of these infants is very low and only Cook County had 16 or more cases.

# Table 7. Total Number and Incidence Rates of Infants Prenatally Exposed to Barbiturates, By County of Residence, Illinois, 1995-1999

| | | | 95% CI[2] | | | | | 95% CI[2] | |
|---|---|---|---|---|---|---|---|---|---|
| County | Cases | Rate[1] | Lower | Upper | County | Cases | Rate[1] | Lower | Upper |
| ILLINOIS | 92 | 1.0 | 0.8 | 1.2 | Lee | 0 | 0.0 | 0.0 | 18.8 |
| Adams | 0 | 0.0 | 0.0 | 8.8 | Livingston | 0 | 0.0 | 0.0 | 16.0 |
| Alexander | 0 | 0.0 | 0.0 | 54.6 | Logan | 0 | 0.0 | 0.0 | 22.0 |
| Bond | 0 | 0.0 | 0.0 | 37.7 | Macon | 0 | 0.0 | 0.0 | 4.8 |
| Boone | 0 | 0.0 | 0.0 | 13.3 | Macoupin | 0 | 0.0 | 0.0 | 13.7 |
| Brown | 0 | 0.0 | 0.0 | 135.6 | Madison | 2 | 1.2 | 0.1 | 4.3 |
| Bureau | 0 | 0.0 | 0.0 | 18.1 | Marion | 1 | 3.7 | 0.1 | 20.6 |
| Calhoun | 0 | 0.0 | 0.0 | 155.0 | Marshall | 0 | 0.0 | 0.0 | 51.7 |
| Carroll | 0 | 0.0 | 0.0 | 41.5 | Mason | 0 | 0.0 | 0.0 | 39.4 |
| Cass | 0 | 0.0 | 0.0 | 41.9 | Massac | 0 | 0.0 | 0.0 | 41.8 |
| Champaign | 6 | 5.5 | 2.0 | 12.0 | McDonough | 0 | 0.0 | 0.0 | 25.1 |
| Christian | 0 | 0.0 | 0.0 | 17.6 | McHenry | 1 | 0.5 | 0.0 | 2.9 |
| Clark | 0 | 0.0 | 0.0 | 38.5 | McLean | 0 | 0.0 | 0.0 | 3.8 |
| Clay | 0 | 0.0 | 0.0 | 42.9 | Menard | 0 | 0.0 | 0.0 | 53.1 |
| Clinton | 0 | 0.0 | 0.0 | 18.4 | Mercer | 1 | 10.9 | 0.3 | 61.0 |
| Coles | 1 | 3.4 | 0.1 | 18.9 | Monroe | 0 | 0.0 | 0.0 | 23.6 |
| Cook | 65 | 1.5 | 1.2 | 1.9 | Montgomery | 0 | 0.0 | 0.0 | 21.5 |
| Crawford | 0 | 0.0 | 0.0 | 33.5 | Morgan | 0 | 0.0 | 0.0 | 18.1 |
| Cumberland | 0 | 0.0 | 0.0 | 54.2 | Moultrie | 0 | 0.0 | 0.0 | 40.4 |
| DeKalb | 0 | 0.0 | 0.0 | 7.0 | Ogle | 0 | 0.0 | 0.0 | 12.3 |
| DeWitt | 0 | 0.0 | 0.0 | 37.3 | Peoria | 0 | 0.0 | 0.0 | 2.8 |
| Douglas | 0 | 0.0 | 0.0 | 25.7 | Perry | 0 | 0.0 | 0.0 | 31.4 |
| DuPage | 2 | 0.3 | 0.0 | 1.1 | Piatt | 0 | 0.0 | 0.0 | 39.5 |
| Edgar | 0 | 0.0 | 0.0 | 33.0 | Pike | 0 | 0.0 | 0.0 | 37.8 |
| Edwards | 0 | 0.0 | 0.0 | 104.5 | Pope | 0 | 0.0 | 0.0 | 189.2 |
| Effingham | 0 | 0.0 | 0.0 | 15.6 | Pulaski | 0 | 0.0 | 0.0 | 73.8 |
| Fayette | 0 | 0.0 | 0.0 | 28.3 | Putnam | 0 | 0.0 | 0.0 | 107.5 |
| Ford | 0 | 0.0 | 0.0 | 41.4 | Randolph | 0 | 0.0 | 0.0 | 19.6 |
| Franklin | 0 | 0.0 | 0.0 | 16.2 | Richland | 0 | 0.0 | 0.0 | 35.6 |
| Fulton | 0 | 0.0 | 0.0 | 18.0 | Rock Island | 0 | 0.0 | 0.0 | 3.8 |
| Gallatin | 0 | 0.0 | 0.0 | 114.6 | Saline | 0 | 0.0 | 0.0 | 24.1 |
| Greene | 0 | 0.0 | 0.0 | 40.4 | Sangamon | 2 | 1.6 | 0.2 | 5.8 |
| Grundy | 0 | 0.0 | 0.0 | 15.4 | Schuyler | 0 | 0.0 | 0.0 | 87.8 |
| Hamilton | 0 | 0.0 | 0.0 | 83.6 | Scott | 0 | 0.0 | 0.0 | 114.6 |
| Hancock | 0 | 0.0 | 0.0 | 34.6 | Shelby | 0 | 0.0 | 0.0 | 28.1 |
| Hardin | 0 | 0.0 | 0.0 | 150.6 | St. Clair | 0 | 0.0 | 0.0 | 1.9 |
| Henderson | 0 | 0.0 | 0.0 | 90.4 | Stark | 0 | 0.0 | 0.0 | 94.3 |
| Henry | 0 | 0.0 | 0.0 | 12.8 | Stephenson | 0 | 0.0 | 0.0 | 12.0 |
| Iroquois | 0 | 0.0 | 0.0 | 20.9 | Tazewell | 0 | 0.0 | 0.0 | 4.7 |
| Jackson | 0 | 0.0 | 0.0 | 10.8 | Union | 0 | 0.0 | 0.0 | 35.5 |
| Jasper | 0 | 0.0 | 0.0 | 61.8 | Vermilion | 1 | 1.7 | 11.5 | 2,532.6 |
| Jefferson | 1 | 4.3 | 0.1 | 24.0 | Wabash | 0 | 0.0 | 0.0 | 6.4 |
| Jersey | 0 | 0.0 | 0.0 | 30.4 | Warren | 0 | 0.0 | 0.0 | 56.2 |
| JoDaviess | 0 | 0.0 | 0.0 | 30.7 | Washington | 0 | 0.0 | 0.0 | 33.9 |
| Johnson | 0 | 0.0 | 0.0 | 63.8 | Wayne | 0 | 0.0 | 0.0 | 46.0 |
| Kane | 3 | 0.9 | 0.2 | 2.5 | White | 0 | 0.0 | 0.0 | 38.7 |
| Kankakee | 1 | 1.3 | 0.0 | 7.4 | Whiteside | 0 | 0.0 | 0.0 | 44.9 |
| Kendall | 0 | 0.0 | 0.0 | 10.0 | Will | 1 | 0.3 | 0.1 | 14.3 |
| Knox | 0 | 0.0 | 0.0 | 11.6 | Williamson | 0 | 0.0 | 0.0 | 1.0 |
| Lake | 2 | 0.4 | 0.0 | 1.4 | Winnebago | 2 | 1.0 | 0.7 | 20.7 |
| LaSalle | 0 | 0.0 | 0.0 | 5.4 | Woodford | 0 | 0.0 | 0.0 | 1.9 |
| Lawrence | 0 | 0.0 | 0.0 | 43.9 | Unknown (Ill.) | 0 | 0.0 | 0.0 | 17.7 |

[1]Per 10,000 births [2] 95% confidence interval for rate

Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, 6/28/2001

## OTHER DRUGS

There are a multitude of other drugs that may be abused by women during pregnancy, thereby exposing the baby to the drugs. The impact of some of the more commonly used or better understood drugs is described below. However, since these drugs are less commonly used than the ones discussed earlier in this report, there is relatively little information about their potential to cause birth defects or developmental problems when used during pregnancy.

***Inhalants***. The organic solvent toluene appears to cause malformations (especially microcephaly, abnormal facial features and heart defects), often accompanied by interuterine growth retardation and mental retardation (Pearson *et al.*). Use of inhalants may lead to preterm delivery, neonatal acidosis and acute neonatal withdrawal (Tenenbein).

***LSD***. Lysergic acid diethylamide (LSD) appears to be associated with an increased risk of spontaneous abortion and may be associated with a higher incidence of congenital abnormalities among prenatally exposed babies. Early studies associating the use of LSD with chromosome damage have not been confirmed conclusively (COHIS).

***Methamphetamines***. Methamphetamines are powerful stimulants of the central nervous system and have similar effects on the pregnancy and baby as cocaine. The effects of methamphetamine tend to be severe because it is metabolized slowly. These drugs are believed to lead to intrauterine growth retardation, premature labor, increased risks of some birth defects and withdrawal symptoms in newborn infants.

***PCP***. Phencyclidine taken late in pregnancy appears to cause withdrawal symptoms in newborns. It may also lead to intrauterine growth retardation, pre-term delivery, meconium staining and poor consolability. Studies are generally based on fewer than 10 infants, and the mothers are usually heavy users of other drugs, making interpretation difficult.

***Prescriptions***. Many prescription drugs are known to cause congenital anomalies. Few of these are commonly abused; benzodiazapines form one class that is an exception. Benzodiazapines may lead to congenital malformations, particularly if used in early pregnancy. Their use in late pregnancy may cause respiratory and feeding difficulties and hypothermia. An exposed newborn baby may also experience withdrawal.

Table 8 shows the number and incidence of infants born prenatally exposed to drugs other than cocaine, opioids, cannabis or barbiturates, by their county of residence at birth, between 1995 and 1999.

# Table 8. Total Number and Incidence Rates of Infants Prenatally Exposed to Other Drugs,[1] By County of Residence, Illinois, 1995-1999

| | | | 95% CI[3] | | | | | 95% CI[3] | |
|---|---|---|---|---|---|---|---|---|---|
| County | Cases | Rate[2] | Lower | Upper | County | Cases | Rate[2] | Lower | Upper |
| ILLINOIS | 241 | 2.6 | 2.3 | 3.0 | Lee | 0 | 0.0 | 0.0 | 18.8 |
| Adams | 3 | 7.2 | 1.5 | 21.0 | Livingston | 0 | 0.0 | 0.0 | 16.0 |
| Alexander | 0 | 0.0 | 0.0 | 54.6 | Logan | 0 | 0.0 | 0.0 | 22.0 |
| Bond | 0 | 0.0 | 0.0 | 37.7 | Macon | 1 | 1.3 | 0.0 | 7.3 |
| Boone | 0 | 0.0 | 0.0 | 13.3 | Macoupin | 0 | 0.0 | 0.0 | 13.7 |
| Brown | 0 | 0.0 | 0.0 | 135.6 | Madison | 2 | 1.2 | 0.1 | 4.3 |
| Bureau | 0 | 0.0 | 0.0 | 18.1 | Marion | 0 | 0.0 | 0.0 | 13.6 |
| Calhoun | 0 | 0.0 | 0.0 | 155.0 | Marshall | 0 | 0.0 | 0.0 | 51.7 |
| Carroll | 1 | 11.2 | 0.3 | 62.7 | Mason | 0 | 0.0 | 0.0 | 39.4 |
| Cass | 0 | 0.0 | 0.0 | 41.9 | Massac | 0 | 0.0 | 0.0 | 41.8 |
| Champaign | 6 | 5.5 | 2.0 | 12.0 | McDonough | 0 | 0.0 | 0.0 | 25.1 |
| Christian | 0 | 0.0 | 0.0 | 17.6 | McHenry | 1 | 0.5 | 0.0 | 2.9 |
| Clark | 0 | 0.0 | 0.0 | 38.5 | McLean | 0 | 0.0 | 0.0 | 3.8 |
| Clay | 0 | 0.0 | 0.0 | 42.9 | Menard | 0 | 0.0 | 0.0 | 53.1 |
| Clinton | 0 | 0.0 | 0.0 | 18.4 | Mercer | 0 | 0.0 | 0.0 | 40.4 |
| Coles | 1 | 3.4 | 0.1 | 18.9 | Monroe | 0 | 0.0 | 0.0 | 23.6 |
| Cook | 188 | 4.3 | 3.7 | 5.0 | Montgomery | 0 | 0.0 | 0.0 | 21.5 |
| Crawford | 1 | 9.1 | 0.2 | 50.6 | Morgan | 0 | 0.0 | 0.0 | 18.1 |
| Cumberland | 0 | 0.0 | 0.0 | 54.2 | Moultrie | 0 | 0.0 | 0.0 | 40.4 |
| DeKalb | 0 | 0.0 | 0.0 | 7.0 | Ogle | 0 | 0.0 | 0.0 | 12.3 |
| DeWitt | 0 | 0.0 | 0.0 | 37.3 | Peoria | 2 | 1.5 | 0.2 | 5.4 |
| Douglas | 0 | 0.0 | 0.0 | 25.7 | Perry | 0 | 0.0 | 0.0 | 31.4 |
| DuPage | 7 | 1.0 | 0.4 | 2.1 | Piatt | 0 | 0.0 | 0.0 | 39.5 |
| Edgar | 1 | 9.0 | 0.2 | 49.9 | Pike | 0 | 0.0 | 0.0 | 37.8 |
| Edwards | 0 | 0.0 | 0.0 | 104.5 | Pope | 0 | 0.0 | 0.0 | 189.2 |
| Effingham | 0 | 0.0 | 0.0 | 15.6 | Pulaski | 0 | 0.0 | 0.0 | 73.8 |
| Fayette | 0 | 0.0 | 0.0 | 28.3 | Putnam | 0 | 0.0 | 0.0 | 107.5 |
| Ford | 1 | 11.2 | 0.3 | 62.5 | Randolph | 0 | 0.0 | 0.0 | 19.6 |
| Franklin | 0 | 0.0 | 0.0 | 16.2 | Richland | 0 | 0.0 | 0.0 | 35.6 |
| Fulton | 1 | 4.9 | 0.1 | 27.1 | Rock Island | 1 | 1.0 | 0.0 | 5.7 |
| Gallatin | 1 | 31.1 | 0.8 | 173.0 | Saline | 0 | 0.0 | 0.0 | 24.1 |
| Greene | 0 | 0.0 | 0.0 | 40.4 | Sangamon | 2 | 1.6 | 0.2 | 5.8 |
| Grundy | 0 | 0.0 | 0.0 | 15.4 | Schuyler | 0 | 0.0 | 0.0 | 87.8 |
| Hamilton | 0 | 0.0 | 0.0 | 83.6 | Scott | 0 | 0.0 | 0.0 | 114.6 |
| Hancock | 0 | 0.0 | 0.0 | 34.6 | Shelby | 0 | 0.0 | 0.0 | 28.1 |
| Hardin | 0 | 0.0 | 0.0 | 150.6 | St. Clair | 3 | 1.6 | 0.3 | 4.6 |
| Henderson | 0 | 0.0 | 0.0 | 90.4 | Stark | 0 | 0.0 | 0.0 | 94.3 |
| Henry | 0 | 0.0 | 0.0 | 12.8 | Stephenson | 0 | 0.0 | 0.0 | 12.0 |
| Iroquois | 0 | 0.0 | 0.0 | 20.9 | Tazewell | 0 | 0.0 | 0.0 | 4.7 |
| Jackson | 2 | 5.9 | 0.7 | 21.2 | Union | 0 | 0.0 | 0.0 | 35.5 |
| Jasper | 0 | 0.0 | 0.0 | 61.8 | Vermilion | 0 | 0.0 | 0.0 | 6.4 |
| Jefferson | 3 | 12.9 | 2.7 | 37.8 | Wabash | 0 | 0.0 | 0.0 | 56.2 |
| Jersey | 0 | 0.0 | 0.0 | 30.4 | Warren | 0 | 0.0 | 0.0 | 33.9 |
| JoDaviess | 0 | 0.0 | 0.0 | 30.7 | Washington | 0 | 0.0 | 0.0 | 46.0 |
| Johnson | 0 | 0.0 | 0.0 | 63.8 | Wayne | 0 | 0.0 | 0.0 | 38.7 |
| Kane | 1 | 0.3 | 0.0 | 1.6 | White | 0 | 0.0 | 0.0 | 44.9 |
| Kankakee | 1 | 1.3 | 0.0 | 7.4 | Whiteside | 0 | 0.0 | 0.0 | 9.5 |
| Kendall | 1 | 2.7 | 0.1 | 15.2 | Will | 3 | 0.8 | 0.2 | 2.5 |
| Knox | 0 | 0.0 | 0.0 | 11.6 | Williamson | 1 | 2.9 | 0.1 | 16.0 |
| Lake | 3 | 0.6 | 0.1 | 1.7 | Winnebago | 3 | 1.5 | 0.3 | 4.5 |
| LaSalle | 0 | 0.0 | 0.0 | 5.4 | Woodford | 0 | 0.0 | 0.0 | 17.7 |
| Lawrence | 0 | 0.0 | 0.0 | 43.9 | Unknown (Ill.) | 0 | 0.0 | 0.0 | 1,676.8 |

[1] Drugs other than opioids, cocaine, cannabis, barbiturates [2] Per 10,000 births [3] 95% confidence interval for rates

Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, 6/28/2001

## MORE THAN ONE DRUG

In Illinois, 20.4 percent of the babies identified as having been prenatally exposed to drugs are found to have been exposed to more than one drug (Figure 2). APORS does not collect information about what type of drugs were used, so this category cannot be broken down any further.

Many women who abuse drugs during pregnancy use multiple types of drugs, often in association with alcohol and tobacco. It is therefore very difficult to distinguish between the effects of different drugs. However, the infants born to mothers abusing multiple drugs may experience the same problems as would be experienced by infants exposed to each drug alone. The problems of infants prenatally exposed to multiple drugs may be worse because such women are likely to be heavier users than women using a single drug.

Generally, problems may include intrauterine growth retardation, low birth weight, premature labor and late miscarriage. The point at which drug use occurs is also important: use in early pregnancy is more likely to lead to birth defects as the infant's nervous system and organs are developing. Use in late pregnancy is likely to lead to tremors, breathing difficulties and feeding problems in the newborn as the baby experiences withdrawal from the drugs.

Table 9 shows the number and incidence of infants born prenatally exposed to more than one drug, by their county of residence at birth, between 1995 and 1999. Figure 5 illustrates the data for counties with 16 or more cases.

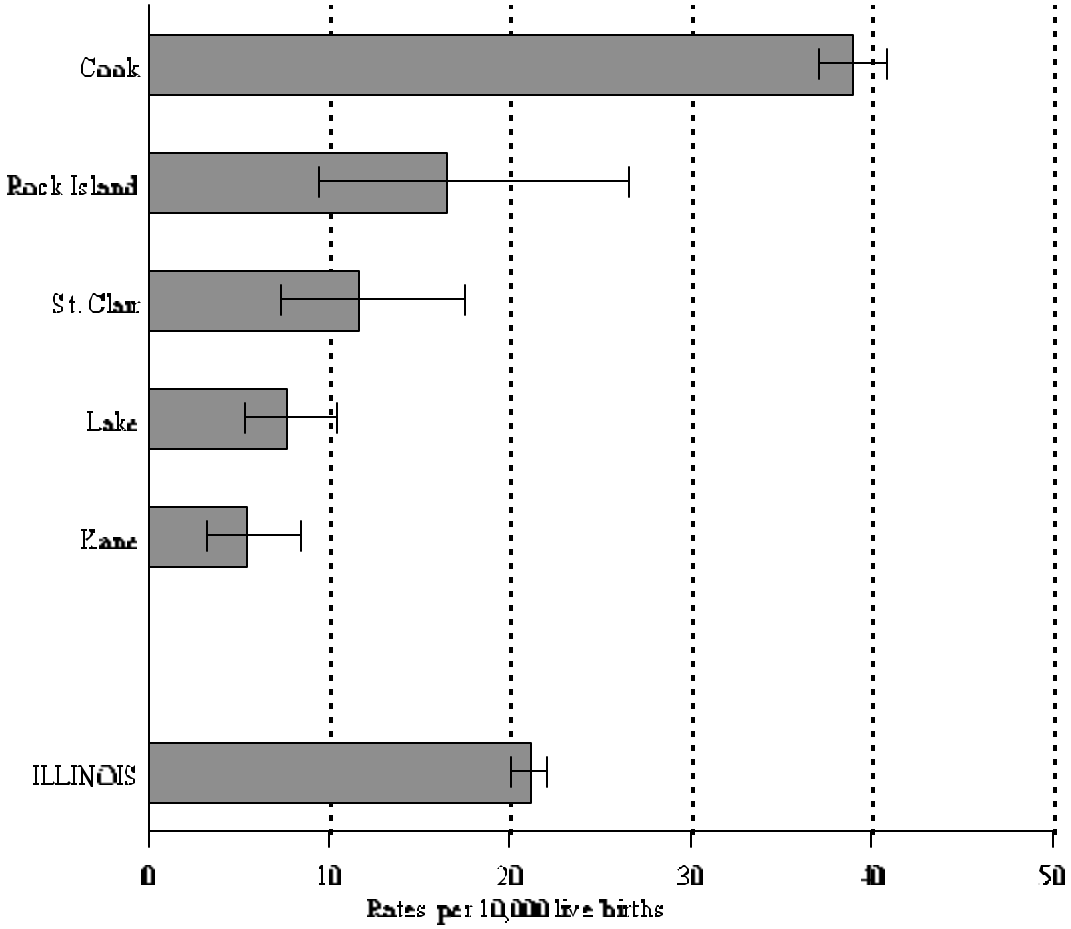
# Table 9. Total Number and Incidence Rates of Infants Prenatally Exposed to More Than One Drug, By County of Residence, Illinois, 1995-1999

| | | | 95% CI[2] | | | | | 95% CI[2] | |
|---|---|---|---|---|---|---|---|---|---|
| County | Cases | Rate[1] | Lower | Upper | County | Cases | Rate[1] | Lower | Upper |
| ILLINOIS | 1,922 | 21.0 | 20.1 | 22.0 | Lee | 4 | 20.4 | 5.6 | 52.2 |
| Adams | 2 | 4.8 | 0.6 | 17.3 | Livingston | 2 | 8.7 | 1.1 | 31.4 |
| Alexander | 0 | 0.0 | 0.0 | 54.6 | Logan | 0 | 0.0 | 0.0 | 22.0 |
| Bond | 0 | 0.0 | 0.0 | 37.7 | Macon | 10 | 13.0 | 6.2 | 23.9 |
| Boone | 0 | 0.0 | 0.0 | 13.3 | Macoupin | 0 | 0.0 | 0.0 | 13.7 |
| Brown | 0 | 0.0 | 0.0 | 135.6 | Madison | 12 | 7.2 | 3.7 | 12.6 |
| Bureau | 0 | 0.0 | 0.0 | 18.1 | Marion | 1 | 3.7 | 0.1 | 20.6 |
| Calhoun | 0 | 0.0 | 0.0 | 155.0 | Marshall | 0 | 0.0 | 0.0 | 51.7 |
| Carroll | 0 | 0.0 | 0.0 | 41.5 | Mason | 0 | 0.0 | 0.0 | 39.4 |
| Cass | 0 | 0.0 | 0.0 | 41.9 | Massac | 0 | 0.0 | 0.0 | 41.8 |
| Champaign | 11 | 10.1 | 5.0 | 18.1 | McDonough | 1 | 6.8 | 0.2 | 38.0 |
| Christian | 1 | 4.8 | 0.1 | 26.6 | McHenry | 3 | 1.5 | 0.3 | 4.5 |
| Clark | 0 | 0.0 | 0.0 | 38.5 | McLean | 3 | 3.1 | 0.6 | 9.1 |
| Clay | 0 | 0.0 | 0.0 | 42.9 | Menard | 0 | 0.0 | 0.0 | 53.1 |
| Clinton | 0 | 0.0 | 0.0 | 18.4 | Mercer | 0 | 0.0 | 0.0 | 40.4 |
| Coles | 0 | 0.0 | 0.0 | 12.5 | Monroe | 0 | 0.0 | 0.0 | 23.6 |
| Cook | 1,689 | 38.9 | 37.1 | 40.8 | Montgomery | 1 | 5.8 | 0.1 | 32.4 |
| Crawford | 0 | 0.0 | 0.0 | 33.5 | Morgan | 0 | 0.0 | 0.0 | 18.1 |
| Cumberland | 0 | 0.0 | 0.0 | 54.2 | Moultrie | 0 | 0.0 | 0.0 | 40.4 |
| DeKalb | 3 | 5.7 | 1.2 | 16.7 | Ogle | 1 | 3.3 | 0.1 | 18.6 |
| DeWitt | 0 | 0.0 | 0.0 | 37.3 | Peoria | 8 | 6.0 | 2.6 | 11.9 |
| Douglas | 1 | 7.0 | 0.2 | 38.8 | Perry | 0 | 0.0 | 0.0 | 31.4 |
| DuPage | 13 | 1.9 | 1.0 | 3.3 | Piatt | 1 | 10.7 | 0.3 | 59.7 |
| Edgar | 0 | 0.0 | 0.0 | 33.0 | Pike | 0 | 0.0 | 0.0 | 37.8 |
| Edwards | 0 | 0.0 | 0.0 | 104.5 | Pope | 0 | 0.0 | 0.0 | 189.2 |
| Effingham | 0 | 0.0 | 0.0 | 15.6 | Pulaski | 0 | 0.0 | 0.0 | 73.8 |
| Fayette | 0 | 0.0 | 0.0 | 28.3 | Putnam | 0 | 0.0 | 0.0 | 107.5 |
| Ford | 2 | 22.4 | 2.7 | 81.0 | Randolph | 0 | 0.0 | 0.0 | 19.6 |
| Franklin | 1 | 4.4 | 0.1 | 24.4 | Richland | 1 | 9.6 | 0.2 | 53.7 |
| Fulton | 0 | 0.0 | 0.0 | 18.0 | Rock Island | 16 | 16.4 | 9.4 | 26.6 |
| Gallatin | 0 | 0.0 | 0.0 | 114.6 | Saline | 0 | 0.0 | 0.0 | 24.1 |
| Greene | 0 | 0.0 | 0.0 | 40.4 | Sangamon | 5 | 4.0 | 1.3 | 9.4 |
| Grundy | 0 | 0.0 | 0.0 | 15.4 | Schuyler | 0 | 0.0 | 0.0 | 87.8 |
| Hamilton | 0 | 0.0 | 0.0 | 83.6 | Scott | 0 | 0.0 | 0.0 | 114.6 |
| Hancock | 0 | 0.0 | 0.0 | 34.6 | Shelby | 0 | 0.0 | 0.0 | 28.1 |
| Hardin | 0 | 0.0 | 0.0 | 150.6 | St. Clair | 22 | 11.6 | 7.3 | 17.5 |
| Henderson | 0 | 0.0 | 0.0 | 90.4 | Stark | 0 | 0.0 | 0.0 | 94.3 |
| Henry | 0 | 0.0 | 0.0 | 12.8 | Stephenson | 1 | 3.2 | 0.1 | 18.1 |
| Iroquois | 0 | 0.0 | 0.0 | 20.9 | Tazewell | 2 | 2.5 | 0.3 | 9.2 |
| Jackson | 3 | 8.8 | 1.8 | 25.7 | Union | 1 | 9.6 | 0.2 | 53.6 |
| Jasper | 0 | 0.0 | 0.0 | 61.8 | Vermilion | 1 | 1.7 | 0.0 | 9.7 |
| Jefferson | 0 | 0.0 | 0.0 | 15.9 | Wabash | 0 | 0.0 | 0.0 | 56.2 |
| Jersey | 0 | 0.0 | 0.0 | 30.4 | Warren | 0 | 0.0 | 0.0 | 33.9 |
| JoDaviess | 0 | 0.0 | 0.0 | 30.7 | Washington | 0 | 0.0 | 0.0 | 46.0 |
| Johnson | 0 | 0.0 | 0.0 | 63.8 | Wayne | 0 | 0.0 | 0.0 | 38.7 |
| Kane | 19 | 5.4 | 3.3 | 8.5 | White | 0 | 0.0 | 0.0 | 44.9 |
| Kankakee | 5 | 6.6 | 2.2 | 15.5 | Whiteside | 4 | 10.3 | 2.8 | 26.3 |
| Kendall | 0 | 0.0 | 0.0 | 10.0 | Will | 11 | 3.1 | 1.5 | 5.5 |
| Knox | 2 | 6.3 | 0.8 | 22.7 | Williamson | 0 | 0.0 | 0.0 | 10.6 |
| Lake | 39 | 7.6 | 5.4 | 10.4 | Winnebago | 15 | 7.7 | 4.3 | 12.7 |
| LaSalle | 5 | 7.3 | 2.4 | 17.1 | Woodford | 0 | 0.0 | 0.0 | 17.7 |
| Lawrence | 0 | 0.0 | 0.0 | 43.9 | Unknown (Ill.) | 0 | 0.0 | 0.0 | 1,676.8 |

[1] Per 10,000 births [2] 95% confidence interval for rate

Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, 6/28/2001

**Figure 5. Incidence Rates[1] and 95% Confidence Intervals for Infants Prenatally Exposed to More Than One Drug, By County of Residence[2] Illinois, 1995-1999**




[1] Rates per 10,000 live births

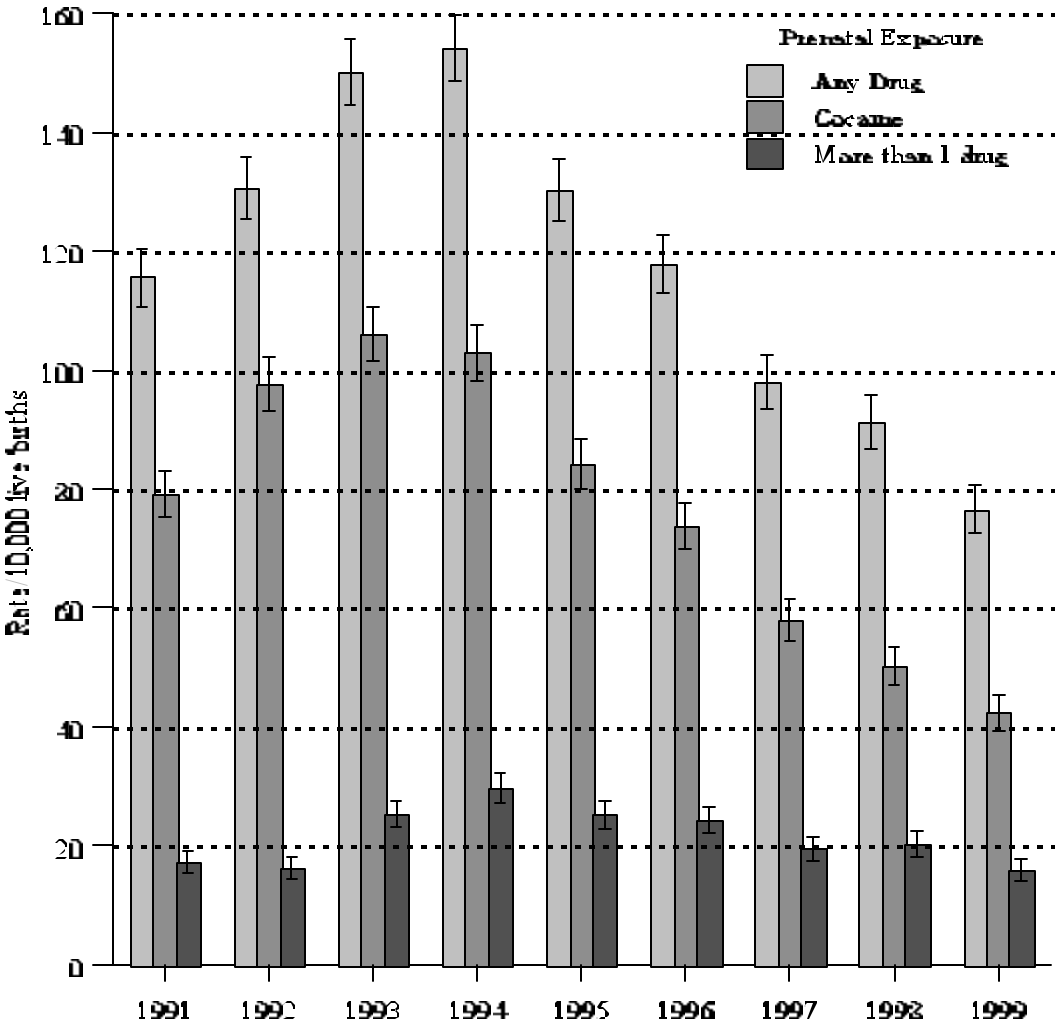
[2] Only counties with 16 or more cases are presented.

Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, 6/28/2001

## TRENDS IN PRENATAL DRUG EXPOSURE

The number of infants reported to the Adverse Pregnancy Outcomes Reporting System with prenatal exposure to controlled substances declined by 25.4 percent between 1991 and 1999 (see Figure 6). A drop in the use of cocaine is the primary contributor to this decline, with the number of babies prenatally exposed to cocaine declining by 39.2 percent in the same time period. However, cannabis use, though less common, increased by 107.8 percent over these years.

**Figure 6. Incidence Rates and Associated 95% Confidence Intervals for Illinois Infants Prenatally Exposed to Controlled Substances, 1991-1999**



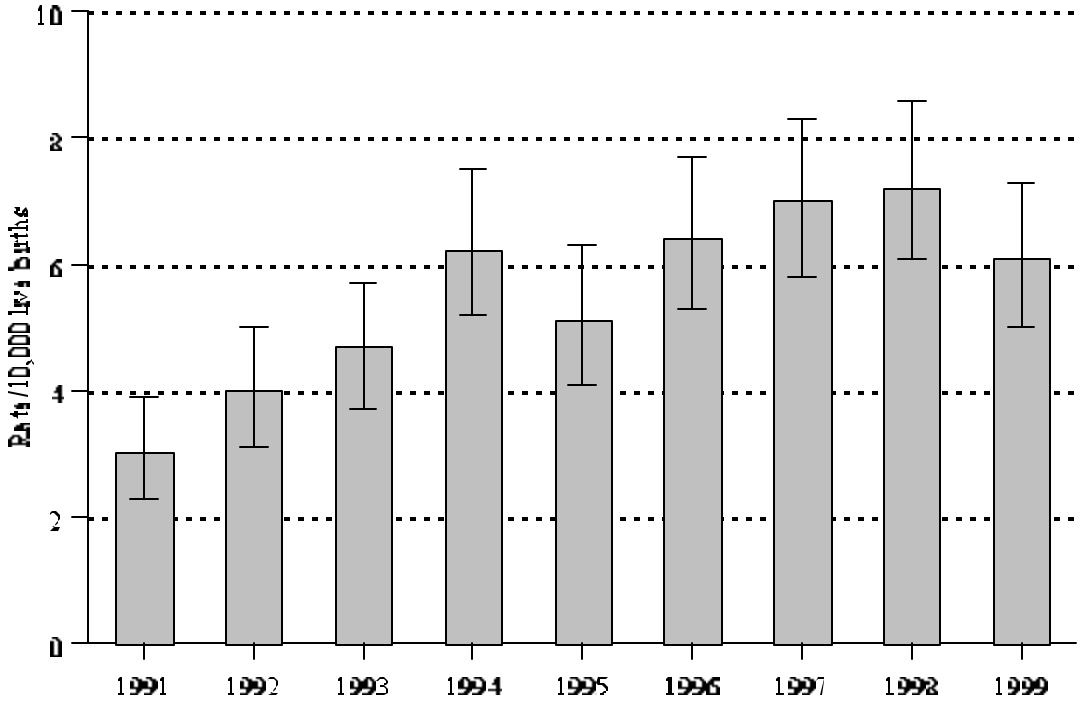

Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, 6/28/2001

Regression analysis indicates that, before 1993, the number of infants reported as having been prenatally exposed to any drug was significantly increasing. During 1993, the trend reversed and through 1999, the rate of infants reported as having been prenatally exposed to any drug significantly decreased by an average of 12 percent each year (Figure 6). A similar pattern was seen with exposure to cocaine; the rate of infants reported as having been prenatally exposed to cocaine decreased by an average of 15 percent each year (Figure 6).

A similar, if less marked pattern is seen with infants reported as having been prenatally exposed to more than one drug (which will often include cocaine). The change to a downward trend seems to have started a little later (during 1994); the rate of infants reported as having been prenatally exposed to cocaine has been significantly decreasing by an average of 10 percent a year (Figure 6).

The pattern for prenatal cannabis exposure is rather different. The best regression model is a single upwards slope, rather than a line with a breakpoint. The regression model indicates that the rate of infants reported as having been prenatally exposed to cannabis significantly increased by an average of 9 percent each year between 1991 and 1999 (Figure 7).

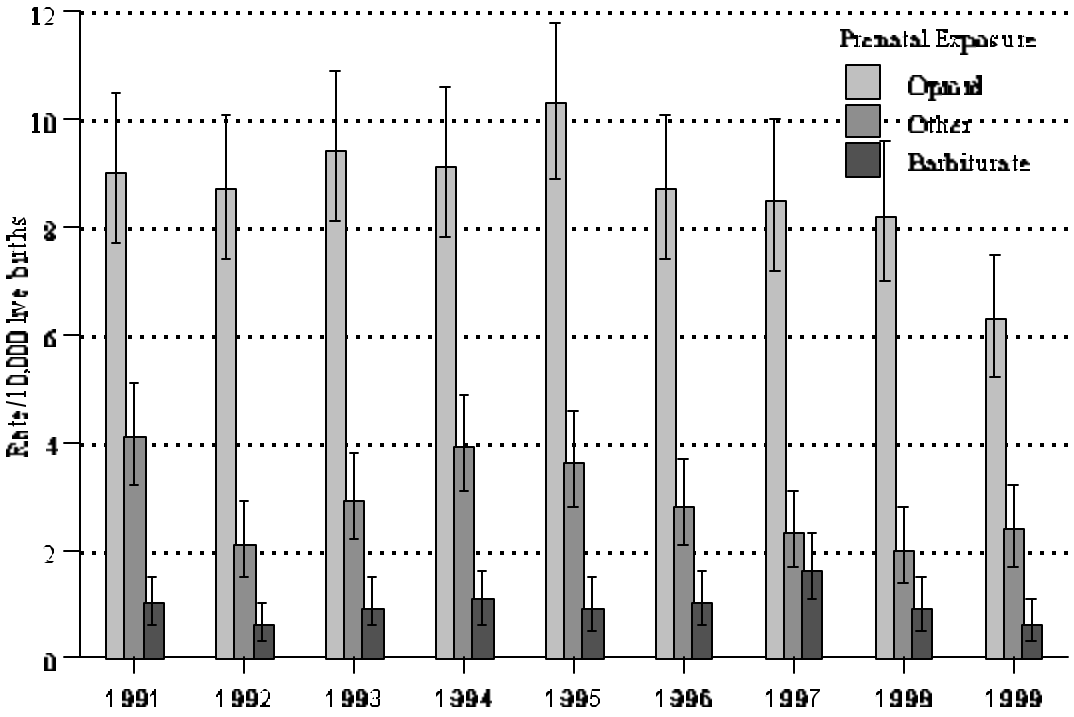
**Figure 7. Incidence Rates[1] and Associated 95% Confidence Intervals for Illinois Infants Prenatally Exposed to Cannabis, 1991-1999**




Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System 6/28/2001

The APORS data contain no evidence that reports of exposure to opioid, barbiturates or drugs other than cocaine, opioids, barbiturates or cannabis are changing (Figure 8). In each case, the rates of exposure are low, so there is not much statistical power to detect small changes.

**Figure 8. Incidence Rates and Associated 95% Confidence Intervals for Illinois Infants Prenatally Exposed to Opioids, Barbiturates and Other Drugs,[1] 1991-1999**




Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System 6/28/2001

A number of factors need to be considered to explain the marked trends seen with infant exposure to cocaine and cannabis.

1. *Change in case definitions and data collection practices*
   There have been no changes in the way APORS defines a case or collects data in the years under consideration. Therefore, there is no reason to assume the trends are artifacts based on program changes.

2. *Changes in the way that data are reported*
   Hospitals are each responsible for determining how cases will be determined and reported to the APORS program. APORS staff are not aware of any statewide changes in the way that hospitals carry out these activities.

3. *Changes in the way that children are selected for testing*
Hospitals also are responsible for determining which newborn infants are tested for exposure to controlled substances. In recent years, law enforcement agencies have been more likely to prosecute mothers whose drug-taking behaviors during pregnancy might have exposed their babies to controlled substances. There has been debate about whether this approach is constructive or not. Physicians and hospitals may have changed their policies on testing infants to avoid prosecutions of these mothers. If infants who appear to have no problems are not being tested then the rate of infants identified as having been exposed to controlled substances would decline. However, this would not explain the increase in infants identified with exposure to cannabis, unless such policy changes occurred only in areas where cocaine was the primary drug used by pregnant women.

4. *The observed changes are a real effect resulting from a change in drug use by pregnant women.*
If this is the case, then data from other sources should reflect the same kind of change. Drug use patterns are not uniform across the United States. Therefore, comparison of APORS data to other sources has been restricted to Illinois or national data.

The National Institute on Drug Abuse reported that teenage cocaine use increased during the 1990s, declining again between 1997-1999. Heroin and morphine use increased as did cannabis use.

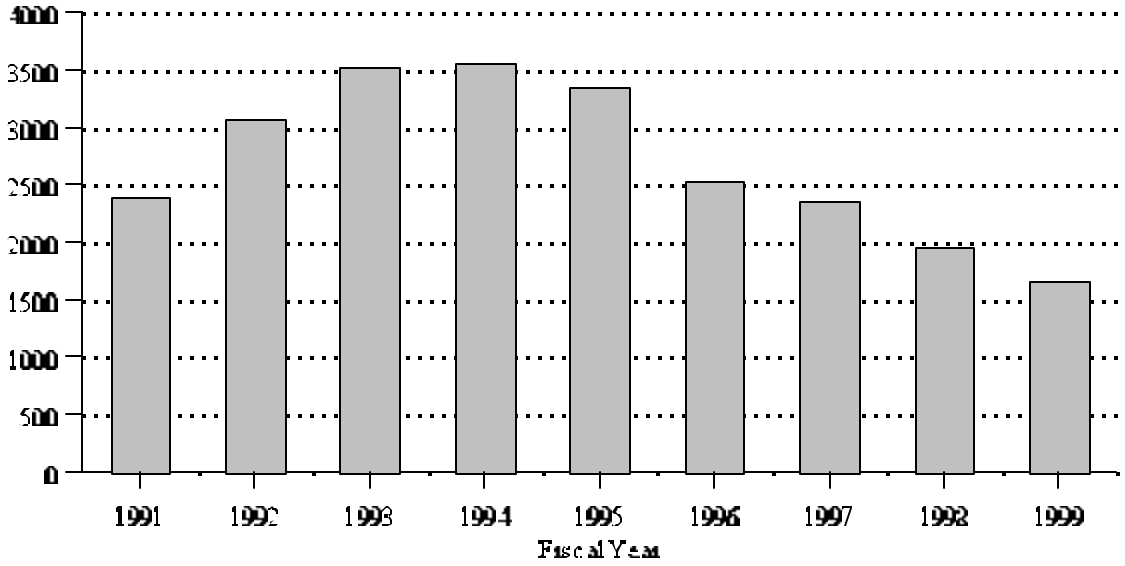
The National Clearing House for Alcohol and Drug Information reported that between 1988 and 1997, hospital emergency department visits resulting from cocaine use rose dramatically, particularly for older users (35+ years old). However, cocaine use led to slightly fewer emergency department visits in the 1990s among younger (18- to 25-year-old) users. The same agency indicated that heroin use rose between 1993 and 1999; users of this drug are getting younger. Inhalant use also rose between 1990 and 1998.

The Illinois Department of Children and Family Services has reported a decline in the number of indicated[1] substance exposed infants in the state (see Figure 9). While these numbers of exposed infants are not adjusted for the slowly declining Illinois birth rate, the decline is too large to be entirely explained by the reduction in the number of births.

[1]Indicated means that the investigation of the suspected child abuse has revealed credible evidence that the abuse occurred.

Only one other state – Oregon – has reported on the number of drug-affected babies born and it, too, has seen a dramatic decrease in the number of drug-affected babies. Although this is not national data, it is interesting because it is a report on newborn infants, the same group studied in this report.

**Figure 9. Number of Indicated[1] Substance Exposed Infants 1991-1999**




[1] Indicated means that the investigation of the suspected child abuse revealed credible evidence that the abuse occurred.

Source: Child Abuse Neglect Statistics, June 2001; Department of Children and Family Services, Division of Quality Assurance

## GEOGRAPHICAL PATTERNS OF DRUG USE

Prenatal cocaine exposure rates in Illinois are highest in and around major cities (Figure 10). (The rate is adjusted for population size, and so the finding is not due to the large number of births. Further, the map is based on county of residence, rather than place of birth, and so the rate is not inflated by high-risk pregnancies being referred to urban facilities.) A description of how the maps are generated is included in the section on technical issues on page 7. Almost every county with a major city falls into the top category. The only exception is Sangamon County (containing Springfield), which falls into the next category. This urban concentration is not seen when prenatal exposure to more than one drug is examined (Figure 11).

**Figure 10. Rates of Prenatal Cocaine Exposure, 1995-1999**

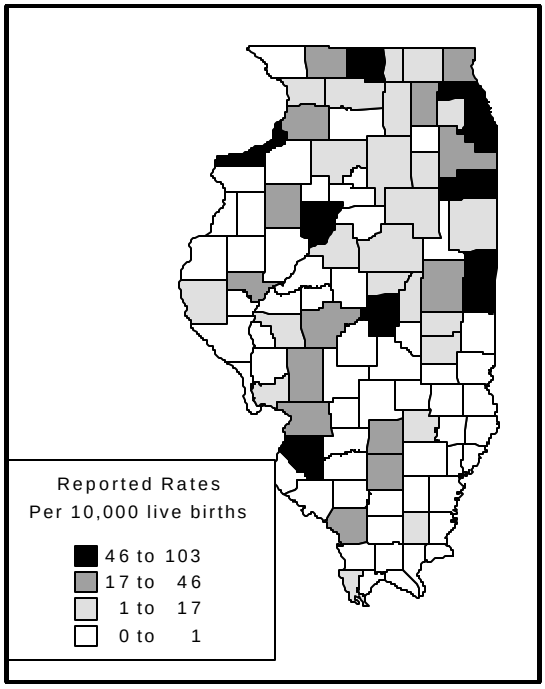
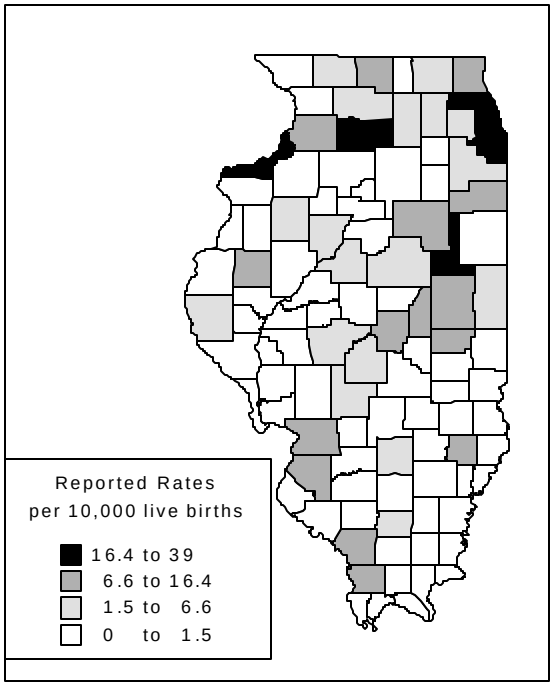



**Figure 11. Rates of Prenatal Exposure to Multiple Drugs, 1995-1999**




There is little published data on geographical patterns of drug use by pregnant women. Several studies have looked at drug use among schoolchildren, which may follow similar patterns as adult use. Cronk *et al*. compared drug use in major cities to rural areas and found that use of cannabis, cocaine and LSD was higher in the cities among high school students between 1976 to 1992. Edwards examined drug use by 12th graders as reported in 1991-1993. When cocaine use was compared in non-metro and metro areas, 12th graders in the Midwest were significantly more likely to have used cannabis, cocaine or LSD in the last month if they lived in metro areas. (The definition of metro areas excluded the biggest cities such as Chicago). Different patterns were seen in other regions of the United States.

However, Edwards points out that even within similar communities in terms of location and population size,
8th and 12th graders use of drugs can be very different, and therefore the metro/non-metro designation is only somewhat useful.

Using more recent data from 1999, the National Center on Addiction and Substance Abuse (CASA), found that, for the United States as a whole, 12th graders in rural areas were more likely to use cocaine, while cannabis use was greater in urban areas (again excluding the biggest cities). Among adults, while cannabis use was significantly greater in urban areas than rural areas, the rates of use for other drugs (including cocaine) were similar for urban and rural areas. Among adults, CASA reported that the use of drugs was generally highest in areas with between 50,000 and 250,000 residents (aside from major cities such as Chicago).

**Figure 12. Rates of Prenatal Exposure to Opioids, 1995-1999**

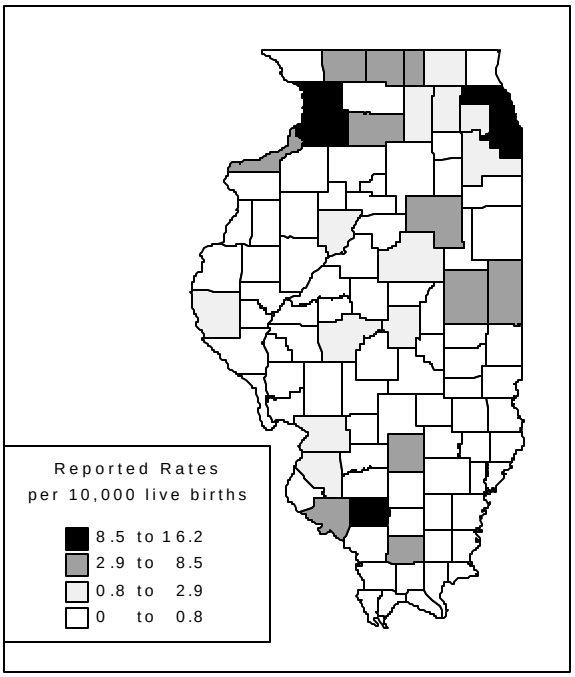
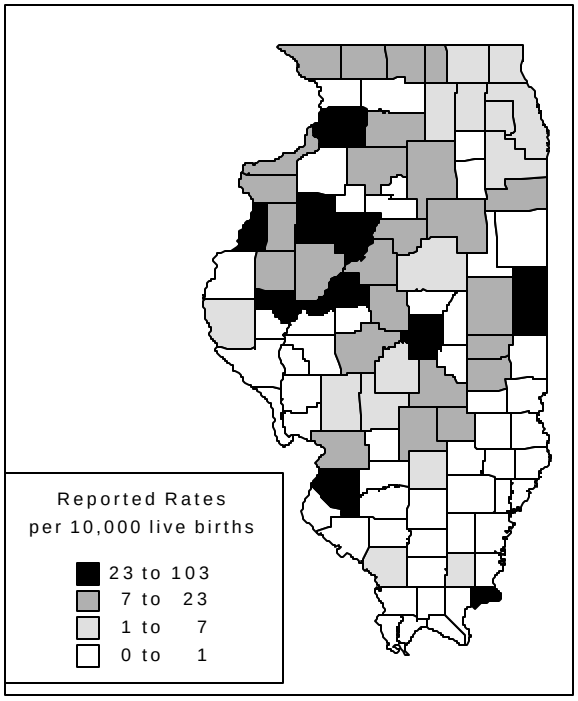



**Figure 13. Rates of Prenatal Exposure to Cannabis, 1995-1999**




The patterns for prenatal exposure to cannabis and opioid use in Illinois are less distinct than that seen for cocaine (Figures 12 and 13). Cook County is the only county where high rates are seen for most drugs (cannabis is the only exception).

It is clear that no community can assume it is exempt from the problems arising from drug use during pregnancy.

## CONCLUSIONS

Babies reported to APORS as prenatally drug exposed are most likely to have been exposed to cocaine. This is in contrast with Illinois and national rates of drug use among the general population, where cannabis is used almost twice as much as all other drugs combined. The observed differences in rates of drug use are so great, it seems unlikely that they are a result of different use patterns among pregnant women and the general population. Thus, a number of questions are raised:

- Are the observed differences in rates of drug use a result of differential testing by physicians?
- Is any differential testing appropriate?

  Until fairly recently, prenatal cocaine exposure was thought to have a devastating effect on a child; however recent research indicates that it is not more significant than exposure to tobacco.
- If the differential testing is not appropriate, can the Illinois Department of Public Health educate physicians and change these patterns?

As a birth defect registry, APORS collects data in order to provide information about the causes of birth defects. However, if the data on drug exposure is very incomplete and biased, then the data at best provide little useful information and, at worst, are misleading. However, APORS also refers children to the Illinois Department of Human Services' High-Risk Follow-up Program. Children living in households where an adult abuses drugs are at higher risk for developmental delays and physical abuse. Therefore, APORS should continue to refer these children. It is of some concern that – since the data on drug exposure appears to underestimate the number of exposed infants – substantial numbers of children may not be receiving the services that would help them reach their full potential.

The observed declines in the number of children prenatally exposed to most drugs is encouraging – but should be considered cautiously, given existing problems with the data. The fact that APORS has seen an increase in the rates of cannabis-exposed infants may indicate that the declines among other types of drugs are not simply a result of declining testing and reporting.

The patterns of prenatal exposure in Illinois are suggestive and interesting. However, without more confidence in the quality of the data reported to the APORS program, these data are suggestive only. Future surveillance activities should focus on increasing consistency in data reporting in order to improve data completeness and quality.

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