Prevalence of Illicit Drugs Detected in the Urine of Women of Childbearing Age in Alabama Public Health Clinics

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Synopsis

Each year, it is estimated that from 350,000 to 739,000 U.S. infants are exposed in utero *to one or more illicit drugs. To estimate the prevalence of and risk factors for illicit drug use by women of childbearing age in Alabama, during 2 months in 1991 the authors collected patient-reported histories, clinical histories, and urine specimens from 6,195 women statewide attending public health maternity clinics, family planning clinics, and a high-risk referral obstetrical clinic. Blind drug screening of urine specimens for marijuana, cocaine, opiates, barbiturates, and amphetamines was performed with the use of a fluorescent polarization immunoassay.*

The overall prevalence of positive results for drugs tested was 10.1 percent, including 8.4 percent of the 3,554 pregnant and 12.3 percent of the 2,571 nonpregnant women screened. The drugs most frequently detected were marijuana and cocaine.

Characteristics of the subjects associated with a higher prevalence of positive results for any drug tested or for marijuana included white race, older age, being divorced, nonstudent occupation, having 12 or less years of education, attending a clinic located in a suburban county, self-reported substance use, increased risk for human immunodeficiency virus infection, and reproductive history.

Characteristics of women with positive screening for cocaine results were similar to those who tested positive for any drug, except that the prevalence of cocaine was higher among black women and those attending urban county clinics and did not vary by years of education. Patient-reported histories of drug use were insensitive in identifying women who had positive drug screening results (sensitivity, 6.3 percent; specificity, 98.2 percent). Thus, in this study, the use of illicit drugs among women of childbearing age attending public clinics in Alabama was common and emphasizes the need for targeted drug education and interventions to reduce the impact of drug use on this high-risk population.

RECENT REPORTS estimate that 5 million U.S. women of childbearing age use illicit substances (*1*). The effects of maternal substance abuse to both mother and child have become a major medical and public health concern (*1–7*). Recent prevalence studies have reported that substance use during pregnancy ranges from 5 to 16 percent (*8–10*). Populations not described in most studies are the unrecognized early-pregnant and sexually active females at risk of pregnancy.

During 1989, a statewide population-based cross-sectional survey was conducted among 5,010 women of childbearing age enrolled in maternity clinics, family planning clinics, and a high-risk obstetric referral clinic in Alabama to detect marijuana, cocaine, opiates, amphetamines, and barbiturates in their urine (*11*). The overall point prevalence of positive screening results for any substance tested was 12.9 percent, including 11.0 percent of pregnant and 15.6 percent of nonpregnant women. The prevalence of positive screening results for marijuana was higher among white and among nonpregnant women; positive results for cocaine were more prevalent among black and single women. However, the usefulness of patient-reported substance use in predicting urine substance detection was not assessed.

In 1991, a blinded cross-sectional survey was again conducted among women of childbearing age in Alabama to detect substances in their urine. The goals of the study were to (*a*) reassess the prevalence of marijuana, cocaine, opiate, amphetamine, and barbiturate use among women enrolled in the Alabama Department of Public Health (ADPH) maternity and family planning clinics and the high-risk obstetrical clinic of the University of Alabama at Birmingham, and (*b*) to determine demographic and clinical predictors of substance use in women of childbearing age in Alabama to direct prevention efforts.

Background

The ADPH is organized into eight public health areas; public health maternity services are available at 94 clinics in the 67 counties for pregnant women with incomes below 150 percent of the Federal poverty level. The ADPH family planning clinics, while available to all women, are targeted for those with incomes below 150 percent of the Federal poverty level. In 1991, approximately 34,244 women attended ADPH maternity clinics, and 95,309 women attended ADPH family planning clinics. The Division of Maternal-Fetal Medicine Obstetric Complications Clinic (OBCC) at the University of Alabama at Birmingham includes a high-risk and intermediate-risk obstetrical complications clinic and a prematurity prevention clinic. In 1991, 9,218 women attended the OBCC; most were referred from ADPH maternity clinics near Birmingham.

Methods

Study population and design. The study was approved by the Institutional Review Board of the ADPH. It was conducted at ADPH clinics from October 28 to December 21, 1991, and at the University of Alabama at Birmingham OBCC November 11–23, 1991. The study period was divided into four consecutive 2-week periods. During each 2-week period, urine specimens and demographic information were collected from all pregnant and nonpregnant women enrolled in ADPH maternity and family planning clinics in two of the eight Alabama public health areas. A study coordinator was self-designated at each site. Statewide, 87 (92 percent) of 94 ADPH clinics participated. Reasons for nonparticipation included six clinics with an insufficient number of patients (less than 10 per month) and one with no study coordinator.

An anonymous cross-sectional study design was used. Each encountered patient was assigned a unique, randomly generated five-digit identification number from a list maintained by the study coordinator. The assigned identification number was transcribed onto a data collection form, urine test result form, and a 10-milliliter (ml) red-topped blood collection tube. No identifying information was used, and subject consent was not obtained.

Data collection. After each patient visit, demographic and clinical information was collected from routinely completed information from maternity, family planning, and OBCC clinic medical records and transcribed onto the data collection form. Medical charting is uniform for all the ADPH clinics.

After collecting information about each patient, clinic staff placed a removable sticker on the patient's medical record to prevent collection about the same patient more than once. All stickers were removed at the end of the 2-week collection period, and all data collection forms and identification number lists were forwarded to ADPH, Division of Epidemiology. Identification number lists were destroyed upon receipt to ensure the anonymity of individual patients and clinics. There was no way to link any particular patient or clinic to a urine test result.

Demographic information routinely collected on all patients included age, race, marital status, years of education, and occupation. Clinical information collected on all patients included the type of clinic (maternal, family planning, or OBCC) and obstetrical history. Among pregnant patients, gestational age and information about whether the pregnancy was planned were also collected. Risk status for human immunodeficiency virus (HIV) was determined by a positive response to any high-risk HIV behavior question asked routinely during clinic evaluation. Current drug, alcohol, and tobacco use and historical alcohol and tobacco use were determined using routinely collected information.

To maintain clinic anonymity, the clinic location was designated only by category (that is, as urban, suburban, rural mining and manufacturing, or rural agricultural, based upon the county's population density) (*12*). For purposes of analysis, we combined data from clinics located in rural mining and manufacturing or rural agricultural counties.

Urine samples for the study were taken from the specimens obtained for routine clinical testing procedures during each patient visit. After all diagnostic testing was completed, 5 ml of what remained was poured or injected into a labelled blood collection tube containing no anticoagulant. Urine specimens

Table 1. Prevalence of substance use detected among women of childbearing age by demographic characteristics, Alabama, 1991

Characteristic	Total screened (N = 6,195)[1]		Percentages					
	Number	Percent	Any drug (N = 627)	Marijuana (N = 455)	Cocaine (N = 82)	Opiates (N = 60)	Barbiturates (N = 55)	Amphetamines (N = 21)
Race (N = 6,174):								
Black	3,245	52.6	7.4	4.1	2.1	0.7	0.8	0.4
White	2,884	46.7	13.4	11.2	0.5	1.3	1.0	0.3
Other	45	0.7	0.0	0.0	0.0	0.0	0.0	0.0
Age, years (N = 5,848):								
17 or younger	874	14.9	4.2	3.0	0.2	0.7	0.3	0.1
18–24	3,161	54.1	9.9	7.4	1.0	1.0	0.9	0.3
25–34	1,565	26.8	13.8	9.7	2.3	1.3	1.1	0.5
35 or older	248	4.2	11.3	7.7	2.0	0.0	1.6	0.0
Pregnant (N = 6,125):								
Yes	3,554	58.0	8.4	6.2	1.3	0.6	0.6	0.1
No	2,571	42.0	12.3	9.4	1.4	1.4	1.2	0.7
Marital status (N = 6,144):								
Divorced	482	7.8	15.1	11.4	1.5	1.9	1.2	0.4
Married	1,983	32.3	10.4	8.0	0.8	0.9	0.9	0.4
Single	3,656	59.5	9.2	6.5	1.6	0.9	0.8	0.3
Widowed	23	0.4	4.3	0.0	0.0	0.0	4.3	0.0
Occupation (N = 5,724):								
Works outside home	1,634	28.5	11.3	8.1	1.8	0.9	0.9	0.1
Homemaker	2,949	51.5	10.8	7.9	1.6	0.9	1.0	0.6
Student	1,141	19.9	5.0	3.2	0.2	0.8	0.8	0.2
Education, years (N = 5,577):								
8 or less	277	5.0	10.8	7.9	0.4	1.1	1.1	0.4
9–12	4,541	81.4	10.2	7.5	1.4	0.9	0.9	0.3
More than 12	759	13.6	7.4	4.5	1.4	1.1	0.8	0.3
County clinic (N = 6,132):								
Urban	3,607	38.8	10.1	7.1	1.8	0.9	1.0	0.2
Suburban	1,311	21.4	11.7	9.5	0.7	1.0	0.5	0.5
Rural	1,214	19.8	8.9	6.1	0.6	1.1	1.1	0.7

[1] Column totals are <6,195 because of missing values.

were stored at –20° centigrade and were shipped frozen to the ADPH Bureau of Clinical Laboratories (BCL) via overnight courier each week along with the laboratory data collection forms.

At BCL, urine specimens were tested for marijuana, cocaine, opiates, barbiturates, and amphetamines-methamphetamines with fluorescent polarization immunoassay (*A*). The manufacturer's recommended cutoff levels were used for designation of test results. A urine sample was determined to be positive if it tested positive twice and was determined to be negative if it tested negative once. Specimens that were positive for amphetamines or methamphetamines were retested with a monoclonal immunoassay (*B*) at the University of Alabama at Birmingham. Only amphetamine-confirmed specimens were included as positive. It was assumed that positive findings for any of the drugs indicated illicit use.

Data analysis. All patient demographic data and urine drug data were entered into a microcomputer using Epi-Info computer software (*C*). The prevalence of substance use was calculated for the independent variables. Prevalence rate ratios (RR) and 95 percent confidence intervals (CI) were used to compare prevalence rates. Trends were compared using the Mantel-Haenszel chi-square test. Means and standard deviations (SD) of continuous variables were compared using the Student's *t*-test. All *P* values were two-tailed tests of significance; a *P* value of less than 0.05 was considered significant.

Results

Statewide population. The 6,195 women evaluated ranged in age from 10–60 years (mean age, 22.7 years); 98.1 percent were of childbearing age (15–44 years). Overall, 3,442 women (55.6 percent) were screened at ADPH maternal clinics, 2,615 women (42.2 percent) at ADPH family planning clinics, and 121 (2.0 percent) at the OBCC; clinic designation was not assigned for 17 women (0.3 percent). Of the women tested, 627 (10.1 percent) tested positive for at least one of the drugs, including 455 (7.3 percent) for marijuana, 82 (1.3 percent) for cocaine, 60 (1.0

percent) for opiates, 55 (0.9 percent) for barbiturates, and 21 (0.3 percent) for amphetamines.

Overall, there were 673 positive drug tests among the 627 women who had positive results (range, 1–3 positive tests). Forty-five of 627 women (7.0 percent) tested positive for two drugs and one woman (0.2 percent) tested positive for three drugs. The drugs most frequently detected were marijuana (67.6 percent), cocaine (12.2 percent), and opiates (8.6 percent). Of these 45 women, 38 (84.4 percent) tested positive for marijuana, including 22 (48.9 percent) who tested positive for both marijuana and cocaine.

The prevalence of substance use by selected demographic characteristics of all women screened is shown in table 1. Compared with black women, white women were more likely to have a positive drug screening result for any drug (13.4 percent versus 7.4 percent; RR = 1.8; 95 percent CI = 1.6–2.1), marijuana (11.2 percent versus 4.1 percent; RR = 2.8; 95 percent CI = 2.3–3.4), or opiates (1.3 percent versus 0.7 percent; RR = 1.7; 95 percent CI = 1.0–2.8). However, black women were four times more likely to test positive for cocaine compared with white women (2.1 percent versus 0.5 percent; RR = 4.0; 95 percent CI = 2.3–6.9).

The prevalence of positive test results for any drug, marijuana, cocaine, or opiates increased with increasing age among those women 34 years or younger (chi-square test for trend, $P < 0.001$ for all comparisons). The mean age of women with positive screening results for any drug was significantly higher than for women with a negative drug screen (24.2 years [SD, ± 5.5 years] versus 22.6 years [SD, ± 5.7]; $P < 0.001$).

The difference in the prevalence of positive drug screens by age was especially marked for cocaine detection: women 25 years or older were 2.6 times more likely to test positive for cocaine compared with younger women (2.3 percent versus 0.9 percent; RR = 2.6; 95 percent CI = 1.7–4.1).

Of 3,554 pregnant women screened, 300 (8.4 percent) tested positive for at least one drug, compared with 315 (12.3 percent) of the 2,571 nonpregnant women (table 1). Compared with pregnant women, nonpregnant women were more likely to have a positive result for any drug (12.3 percent versus 8.4 percent; RR = 1.4; 95 percent CI = 1.2–1.7), and for four of the five drugs tested, including marijuana (9.4 percent versus 6.2 percent; RR = 1.4; 95 percent CI = 1.2–1.6), opiates (1.4 percent versus 0.6 percent; RR = 2.2; 95 percent CI = 1.3–3.7), barbiturates (1.2 percent versus 0.6 percent; RR = 1.9; 95 percent CI = 1.1–3.2), or amphetamines (0.7 percent versus 0.1 percent; RR = 8.3; 95 percent CI = 2.3–28.2). Only the prevalence of positive tests for cocaine was similar between nonpregnant and pregnant women (1.4 percent versus 1.3 percent; RR = 1.1; 95 percent CI = 0.7–1.8).

'Of the women tested, 627 (10.1 percent) tested positive for at least one of the drugs, including 455 (7.3 percent) for marijuana, 82 (1.3 percent) for cocaine, 60 (1.0 percent) for opiates, 55 (0.9 percent) for barbiturates, and 21 (0.3 percent) for amphetamines.'

The prevalence of positive drug screening results also varied by marital status and occupation (table 1). Compared with women of other marital status, divorced women were more likely to test positive for any drug (15.1 percent versus 9.6 percent; RR = 1.6; 95 percent CI = 1.2–2.0) or for marijuana (11.4 percent versus 7.0 percent; RR = 1.6; 95 percent CI = 1.3–2.1). However, single women and divorced women were equally likely to test positive for cocaine (1.6 percent and 1.5 percent, respectively).

The prevalence of positive drug tests was similar for homemakers and women who worked outside the home. Compared with students, women who were homemakers or worked outside the home were more likely to test positive for any drug (11.0 percent versus 5.0 percent; RR = 2.2; 95 percent CI = 1.7–2.9), marijuana (8.0 percent versus 3.2 percent; RR = 2.5; 95 percent CI = 1.8–3.4), or cocaine (1.7 percent versus 0.2 percent; RR = 9.5; 95 percent CI = 2.3–38.5).

The prevalence of positive drug screening results was similar among women with 8 years or less and 9–12 years of education (table 1). Compared with their more highly educated counterparts, women with 12 or less years of schooling had a higher prevalence of positive results for any drug (10.3 percent versus 7.4 percent; RR = 1.4; 95 percent CI = 1.1–1.8) or marijuana (7.5 percent versus 4.5 percent; RR = 1.7; 95 percent CI = 1.2–2.4).

Among all women screened, the prevalence of positive urine drug results varied by parity, frequency of abortions (both induced and spontaneous), and frequency of premature births (table 2). Compared with nulliparous women, women with a history of one birth or more were more likely to have a positive result for any drug (11.6 percent versus 8.0 percent; RR = 1.4; 95 percent CI = 1.2–1.7), marijuana (8.3

Table 2. Prevalence of drug use detected among women of childbearing age by obstetrical history, Alabama, 1991

Characteristic	Total screened (N = 6,195)[1]		Percentages					
	Number	Percent	Any drug (N = 627)	Marijuana (N = 455)	Cocaine (N = 82)	Opiates (N = 60)	Barbiturates (N = 55)	Amphetamines (N = 21)
Parity (N = 6,017):								
0	2,487	41.3	8.0	5.9	1.0	0.8	0.9	0.3
1–3	3,284	56.6	11.7	8.4	1.5	1.2	0.9	0.2
4 or more	246	4.1	10.6	6.9	2.4	1.7	1.2	0.0
Number of abortions (N = 6,073):								
0	4,772	78.6	9.2	6.4	1.1	1.0	0.9	0.4
1	978	16.1	12.1	9.6	1.9	1.1	0.8	0.1
2 or more	323	5.3	18.3	13.9	3.1	0.9	1.5	0.0
Number of premature births (N = 6,019):								
0	5,633	93.6	9.8	7.2	1.2	0.9	0.9	0.3
1	300	5.0	13.0	8.0	3.0	2.0	0.0	0.3
2 or more	86	1.4	24.2	15.1	4.7	4.7	2.3	0.0

[1] Column totals are <6,195 because of missing values.

Table 3. Prevalence of substance use detected among women of childbearing age by self-reported use of substances and human immunodeficiency virus (HIV) risk, Alabama, 1991

Characteristic	Total screened (N = 6,195)[1]		Percentages					
	Number	Percent	Any drug (N = 627)	Marijuana (N = 455)	Cocaine (N = 82)	Opiates (N = 60)	Barbiturates (N = 55)	Amphetamines (N = 21)
Tobacco use (N=6,106):								
Current	1,526	25.1	21.3	17.6	2.6	1.4	1.2	0.3
Former	458	7.5	12.9	9.8	1.5	0.9	1.1	0.4
Never	4,102	67.4	5.8	3.3	0.9	0.8	0.8	0.3
Alcohol use (N = 5,989):								
Current	764	12.8	20.2	15.1	3.1	1.4	1.3	1.1
Former	492	8.2	13.6	11.2	2.2	0.4	0.4	0.0
Never	4,733	79.0	8.2	5.7	1.0	0.9	0.8	0.2
Current drug use (N = 6,070):								
Yes	135	2.2	28.9	20.0	8.1	1.5	0.0	0.7
No	5,935	97.8	9.8	7.1	1.2	0.9	0.9	0.3
HIV risk factor (N = 6,122):								
Yes	627	10.2	15.6	12.6	2.2	1.4	0.5	0.5
No	5,495	89.8	9.5	6.8	1.2	0.9	0.9	0.3

[1] Column totals are <6,195 because of missing values.

percent versus 5.9 percent; RR = 1.4; 95 percent CI = 1.2–1.7), or cocaine (1.6 percent versus 1.0 percent; RR = 1.6; 95 percent CI = 1.0–2.5). The prevalence of positive findings for any drug, marijuana, or cocaine increased with an increasing number of abortions (chi-square for trend, $P < 0.01$ for all comparisons). Also, the prevalence of positive tests for any drug, marijuana, cocaine, or opiates increased with an increasing number of premature births (that is, before 37 weeks' gestation) (chi-square for trend, $P < 0.01$ for all comparisons). Of note, women reporting two or more premature births were almost four times more likely to test positive for cocaine (4.7 percent versus 1.2 percent; RR = 3.8; 95 percent CI = 1.4–10.3) and were 5.3 times more likely to test positive for opiates (4.7 percent versus 0.9 percent; RR = 5.3; 95 percent CI = 2.0–14.4) compared with women with no history of premature birth.

Among all women screened, the prevalence of positive drug results varied by self-reported use of tobacco, alcohol, and illicit drugs (table 3). Overall, the prevalence of current tobacco use was 25.1 percent, and it was similar for pregnant and nonpregnant women (24.8 percent and 25.3 percent, respectively). Table 3 shows that, compared with never smokers, the prevalence of positive drug screening results was higher among current smokers for any drug (21.3 percent versus 5.8 percent; RR = 3.7; 95 percent CI = 3.2–4.3), marijuana (17.6 percent versus 3.3 percent; RR = 5.3; 95 percent CI =

Table 4. Prevalence of substance use detected among pregnant women by selected demographic characteristics, Alabama, 1991

Characteristic	Total screened (N = 3,554)[1]		Percentages					
	Number	Percent	Any drug (N = 300)	Marijuana (N = 222)	Cocaine (N = 45)	Opiates (N = 23)	Barbiturates (N = 23)	Amphetamines (N = 3)
Planned pregnancy (N = 3,515):								
Yes	651	18.5	8.1	6.8	0.8	0.2	0.6	0.3
No	2,864	81.5	8.5	6.5	1.4	0.7	0.6	0.0
Gestational age, weeks (N = 3,413):								
13 or less	500	14.6	10.6	9.8	0.4	0.2	0.8	0.0
14–27	1,234	36.2	8.1	5.8	1.5	0.7	0.4	0.0
28 or more	1,679	49.2	8.2	5.6	1.3	0.7	0.8	0.2
Race (N = 3,457):								
Black	1,819	51.3	6.2	3.0	2.2	0.6	0.6	0.2
White	1,700	47.9	11.1	9.9	0.3	0.7	0.7	0.0
Other	28	0.8	0.0	0.0	0.0	0.0	0.0	0.0
Age, years (N = 3,394):								
17 or younger	542	16.0	3.9	2.9	0.4	0.7	0.0	0.0
18–24	1,948	57.4	8.0	6.2	0.9	0.6	0.9	0.1
25–34	812	23.9	12.1	8.6	2.1	1.0	0.6	0.2
35 or older	92	2.7	14.1	8.7	5.4	0.0	0.0	0.0
County clinic (N = 3,531):								
Urban	2,341	66.3	8.9	6.3	1.6	0.6	0.8	0.0
Suburban	686	19.4	8.5	7.3	0.3	0.6	0.2	0.0
Rural	504	14.3	6.6	4.8	0.8	0.8	0.8	0.2

[1] Column totals are <3,554 because of missing values.

4.3–6.4), or cocaine (2.6 percent versus 0.9 percent; RR = 3.1; 95 percent CI = 2.0–4.8). Positive results were highest among women who reported both current tobacco and alcohol use (29.5 percent, 22.5 percent, and 4.6 percent, respectively). Among current smokers, positive tests for marijuana were somewhat more frequent among women who smoked a greater number of cigarettes (one or more versus less than one pack per day: 20.4 percent versus 16.4 percent; RR = 1.2; 95 percent CI = 1.0–1.6).

Overall, 764 women (12.8 percent) screened reported current use of alcohol, including 4.9 percent of pregnant and 23.5 percent of nonpregnant women. According to table 3, women who reported current alcohol use were more likely to test positive for any drug (20.2 percent versus 8.2 percent; RR = 2.5; 95 percent CI = 2.0–2.9), for marijuana (15.1 percent versus 5.7 percent; RR = 2.6; 95 percent CI = 2.1–3.2), or for cocaine (3.1 percent versus 1.0 percent; RR = 3.3; 95 percent CI = 2.0–5.4) compared with never drinkers. In addition, among current drinkers, the prevalence of positive tests for any drug was greater among women who drank alcohol more frequently (two drinks or more per week versus less than two drinks per week: 25.6 percent versus 16.9 percent; RR = 1.5; 95 percent CI = 1.0–2.3).

Women who reported any current illicit drug use were three times more likely to have a positive test for any drug compared with those who denied drug use (28.9 percent versus 9.8 percent; RR = 3.0; 95 percent CI = 2.2–3.9) (table 3). Although the specificity of self-reported current illicit drug use in predicting positive test results for any drug was high (98.2 percent), the sensitivity (6.3 percent) and the positive predictive value of self-reported drug use (28 percent) were low. Self-reported cocaine use was somewhat more sensitive (14.7 percent) than self-reported marijuana use (4.8 percent) in detecting women who had positive test results for the respective drug.

Women who reported a risk factor(s) for HIV infection were also more likely to have a positive test for any drug, marijuana, or cocaine than were those women who reported no risk factor (table 3). However, data about the specific HIV risk behaviors were not collected.

Pregnant population. Among 3,554 pregnant women, the prevalence of positive drug screening results was similar among women who planned their pregnancy compared with those who did not (table 4). In addition, the prevalence of tests positive for any drug did not differ significantly when examined by trimester of pregnancy. However, when the prevalence of specific drugs was analyzed by trimester, women in the first trimester of pregnancy were more likely to test positive for marijuana compared with those in the second and third trimesters (9.8 percent

'. . . among current drinkers, the prevalence of positive tests for any drug was greater among women who drank alcohol more frequently . . . .'

versus 5.7 percent; RR = 1.7; 95 percent CI = 1.3–2.3). In contrast, the prevalence of positive cocaine results was more than three times greater in the second and third trimesters compared with the first trimester, although this difference was not statistically significant (1.3 percent versus 0.4 percent; RR = 3.4; 95 percent CI = 0.8–13.8).

Among pregnant women, white women were more likely to test positive for any drug compared with black women (11.1 percent versus 6.2 percent; RR = 1.8; 95 percent CI = 1.4–2.2) (table 4). Most of this difference was attributable to a higher prevalence of marijuana use among whites (white versus black: 9.9 percent versus 3.0 percent; RR = 3.3; 95 percent CI = 2.5–4.5). However, black women who were pregnant were more than seven times more likely to have positive urine screening results for cocaine than were pregnant white women (2.2 percent versus 0.3 percent; RR = 7.4; 95 percent CI = 3.0–18.9). The prevalence of positive results for any drug, marijuana, and cocaine increased with increasing age (chi-square test for trend, $P < 0.001$ for all comparisons). The mean age of pregnant women who tested positive for any drug was 23.8 years (SD ± 5.4) compared with 21.9 years (SD ± 5.1) for those who tested negative ($P < 0.001$).

Although the prevalence of positive results for any drug tested and marijuana did not differ significantly by clinic location, pregnant women attending clinics in urban counties were more than three times more likely to have positive tests for cocaine compared with those attending nonurban county clinics (1.6 percent versus 0.5 percent; RR = 3.2; 95 percent CI = 1.4–7.6). The prevalence of positive tests for opiates, barbiturates, and amphetamines did not differ significantly when examined by race, age, or clinic location.

Discussion

Each year, it is estimated that from 350,000 to 739,000 U.S. infants are exposed *in utero* to one or more illicit drugs (*13–15*). Studies have documented the harmful effects and cost of illicit drug use on the outcome of pregnancy and delivery (*2–7,16,17*). In this study, the point prevalence of a drug detected in the urine was 10.1 percent among all women attending public maternal and family clinics in Alabama. This prevalence is lower than that reported (12.9 percent) among the same population in a 1989 survey (*11*). The reduction in the prevalence of positive screening results for any drug was similar among both pregnant (from 11.0 percent to 8.4 percent) and nonpregnant women (from 15.6 percent to 12.3 percent). The reasons for this reduction are not known but are consistent with data from the 1989 High School Senior Survey, which showed a significant decline in the percentage of high school seniors reporting use of marijuana or cocaine during the past year compared with 1988 data (*18*).

Among the 6,195 women evaluated, drug detection varied by the patients' demographics, reproductive history, and self-reported substance use patterns. Demographic characteristics associated with a higher prevalence of positive results for any drug or marijuana included white race, being at least 25 years old, divorced, having a nonstudent occupation, 12 years or less of schooling, or attending a clinic located in a suburban county. The demographic characteristics of women with positive cocaine results were similar, except that the prevalence did not vary by years of education and was higher among black women, single women, and those attending urban county clinics. The low prevalence of positive test results for opiates, barbiturates, and amphetamines limited significance testing. However, 20.2 percent of positive drug results (136 of 673) were for one of these three illicit drugs, suggesting that public health interventions should not be targeted exclusively to decreasing the prevalence of marijuana and cocaine use.

The prevalence of positive screening results for any drug, marijuana, and cocaine varied by obstetrical history and was higher among parous women and those with a greater number of abortions or premature births. The association of current drug use and history of premature delivery is of concern. Substance use, especially cocaine use, is a risk factor for preterm delivery (*19–22*). Neonatal complications of preterm births account for the majority of perinatal morbidity and mortality (*23*). In one study, positive urine drug screening results were found for 17 percent of patients with suspected preterm labor, and cocaine was the most frequently identified substance (10 percent of patients) (*18*).

In Alabama, the provisional 1990 infant mortality rate of 10.9 per 1,000 live births remains one of the highest in the United States (*24*). Although the contribution of maternal substance use in pregnancy to neonatal morbidity and mortality has not been

assessed in Alabama, demographic and clinical predictors of women who are at increased risk of substance use could be employed to direct special prenatal interventions.

The prevalence of positive drug screening results varied by patient-reported history of drug, tobacco, and alcohol use. Although women who reported current substance use were more likely to test positive, the sensitivity was very low (6.3 percent). This finding is consistent with previous reports that patient-provided histories of drug use are unreliable (*25,26*).

In this study, tobacco and alcohol use patterns were more sensitive than self-reported substance use in identifying women who had positive drug screening results (16.4 percent), but most women with this risk factor tested negative (predictive value positive = 29 percent).

Although specific HIV risk factors and HIV serologic status were not determined, women with HIV risk behaviors were more likely to have positive drug screening results. Special educational efforts for this high-risk group might limit the impact on both women and neonates of both drug use and the potential for becoming infected with HIV.

Although the prevalence of screening positive for marijuana decreased significantly after the first trimester, the prevalence of positive cocaine results did not differ significantly by trimester of pregnancy. This finding may reflect the greater addictive potential of cocaine use. In one study, increased preterm delivery and low birth weight have been associated with women who used cocaine throughout pregnancy compared with use in the first trimester only (*19*). Thus, interventions early in pregnancy, especially for women using cocaine, may result in improved obstetric and neonatal outcomes. Our results do not support the hypothesis that the frequency of those drugs detected via urine tests would be lower among women with planned than among women with unplanned pregnancies.

Because urine specimens were analyzed for a limited number of drugs, the true point prevalence of illicit drug use in the population studied is likely somewhat higher. In addition, analysis of a single urine specimen provides only a limited estimate of drug use. Cocaine remains positive in the urine for 8 to 48 hours. In contrast, other drugs remain positive up to 7 days, depending on the dose and chronicity of use (*26*). It was also assumed that drugs detected in the urine represent illicit use. Although we cannot rule out the possibility that opiates or barbiturates were being used therapeutically in some women, the contribution of these substances to the overall point prevalence estimate of any drug use was probably small.

'The prevalence of positive screening results for any drug, marijuana, and cocaine varied by obstetrical history and was higher among parous women and those with a greater number of abortions or premature births. The association of current drug use and history of premature delivery is of concern. Substance use, especially cocaine use, is a risk factor for preterm delivery.'

In this study, we determined the prevalence of positive drug screening results among both pregnant and nonpregnant women of childbearing age attending public health maternal and family planning clinics. In 1991, approximately 125,553 women, or 18.7 percent of the women of childbearing age, received maternity care or family planning services through Alabama public health clinics. Based on 1991 birth certificate data, 26 percent of births in Alabama were to women who received prenatal care in public health clinics, and 44 percent of the births were funded by Medicaid. Although a previous study among public and private patients in one Florida county found little difference in the prevalence of illicit drug use during pregnancy (*10*), we did not attempt to examine the prevalence of illicit drug use among women of childbearing-age attending private clinics in Alabama nor did we assess socioeconomic status.

Although we did not systematically determine the representativeness of the study population, based on 1990 Alabama census data, 71.0 percent of all women of childbearing age are white compared with 46.7 percent of the study population; 33.8 percent are single and 55.4 percent are married compared with 59.5 percent and 32.3 percent, respectively, in the study population. Thus the study population differs substantially from all Alabama women of childbearing age, and the results should not be generalized.

Despite the limitations, our study has important implications for assessing the dimensions of illicit drug use among the large population of women of childbearing age attending Alabama public maternity and family planning clinics and in targeting high-risk groups for drug prevention and treatment services. Based on the 1989 and 1991 surveys, an interagency

Working Group on Perinatal Substance Abuse, the Alabama Department of Mental Health/Mental Retardation (ADMHMR), and ADPH developed new training programs, two self-study courses, and a new screening tool to enable health department and social service personnel to better identify substance abusing women. The ADMHMR now requires its treatment facilities to see or make arrangements for substance abusing pregnant women within 24 hours of referral for comprehensive chemical dependency treatment service. In addition, the ADPH plans to assess annually women of childbearing age, mothers, infants, and children who are affected by substance abuse; these studies will include telephone and school surveys.

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Equipment

A. Abbott Laboratories, North Chicago, IL.
B. Syva Emit™, Syva Co., Palo Alto, CA.
C. Centers for Disease Control and Prevention, Atlanta, GA.