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The Effect of Race on Provider Decisions to Test for Illicit Drug Use in the Peripartum Setting

HILLARY VEDA KUNINS, M.D., M.P.H., M.S., **ERAN BELLIN, M.D.**, **CYNTHIA CHAZOTTE, M.D.**, **EVELYN DU, Ph.D.**, and **JULIA HOPE ARNSTEN, M.D., M.P.H.**
Albert Einstein College of Medicine/Montefiore Medical Center Bronx, New York

Abstract

Background—Testing for illicit drugs may expose women who test positive to severe legal and social consequences. It is unknown whether racial disparities in drug testing practices underlie observed disparities in legal and social consequences of positive tests.

Methods—Using administrative hospital and birth certificate data, we analyzed factors associated with both receipt and results of illicit drug testing among women with live births during 2002–2003. We assessed the independent association of race and other sociodemographic factors with both receipt of a drug test by the mother or her newborn infant and positive maternal or neonatal toxicology results, after controlling for obstetrical conditions and birth outcomes associated with maternal substance abuse.

Results—Of the 8487 women with live births, 244 mother-newborn pairs (3%) were tested for illicit drug use. Black women and their newborns were 1.5 times more likely to be tested for illicit drugs as nonblack women in multivariable analysis. However, race was not independently associated with a positive result.

Conclusions—We identified racial differences in rates of testing for illicit drug use between black and nonblack women. We found equivalent positivity rates among tested black and nonblack women. The prevalence of drug use among untested women is unknown, however, so although tested women had equivalent rates of substance use detected, whether black and nonblack substance users are equally likely to be identified in the course of peripartum care remains uncertain.

INTRODUCTION

Testing for illicit drug use is an accepted clinical practice in healthcare settings. Testing women or their newborn infants for illicit drug use in the peripartum setting, however, is a special case that may expose women who test positive for illicit drugs to severe legal and social consequences, including loss of parental rights and criminal prosecution.[1,2] In particular, black women have been the disproportionate recipients of these adverse consequences. Several studies have demonstrated the existence of racial disparities in infant referral to and action by child protective services agencies[3,4] despite federal policy requiring that all healthcare providers "involved in the delivery or care of … infants (affected by illegal substance abuse …) notify the child protective services system."[5] Although legal experts and policymakers have contended that minority women are more likely than other women to be tested for illicit drugs,[6] there is a paucity of empirical evidence to support or

Address reprint requests to: Hillary Veda Kunins, M.D., M.P.H., M.S. Montefiore Medical Center Division of General Internal Medicine 111 East 210th Street Bronx, NY 10467 hkunins@montefiore.org.

refute the existence of racially biased patterns in testing for illicit drug use. One investigation to examine this issue found that black women were more likely to be tested for illicit drugs during prenatal care and at delivery.7

The overall goal of this study was to examine practice patterns in testing for illicit drugs in the peripartum setting and to examine factors associated with a positive toxicology result among tested women and newborns. We hypothesized that black women and their newborns would be more likely than others to be tested for illicit drug use in the peripartum setting after accounting for potential confounders, including socioeconomic factors, lack of prenatal care, obstetrical diagnoses related to substance abuse, and HIV infection. We hypothesized that lower rates of positive toxicologies among tested black women and their newborns than among tested white or Hispanic women would indicate that a disproportionate number of black women were being selected for testing. We also assumed that an equivalent positivity rate among black and nonblack women would suggest that providers selected women with equivalent likelihoods of having used illicit drugs.

MATERIALS AND METHODS

Data sources

We used data from the clinical information system of a 1000-bed urban medical center to examine rates and results of testing for illicit drugs among women admitted with pregnancy-related diagnoses during the years 2002 and 2003 and among the infants born to these women. For each mother-newborn pair, we integrated sociodemographic, administrative, clinical, and laboratory data from the hospital clinical information system, the United States census, and electronic birth certificates (EBCs). The Institutional Review Boards of Albert Einstein College of Medicine and Montefiore Medical Center approved the study and waived the requirement for informed consent because analyses were conducted on a dataset without identifying patient information.

The hospital clinical information system (CIS) includes information on all patients receiving care in the medical center. Variables obtained from the CIS included race, age, payer for the admission, number of hospital admissions for each patient, diagnostic related group (DRG) assignation for each admission, ICD-9-coded clinical diagnoses, prenatal laboratory test results, HIV antibody and viral load test results, newborn receipt of zidovudine, birth outcome, and newborn and maternal toxicology test results. In addition, the hospital CIS maps patient addresses to census blocks using commercially available geocoding software, allowing United States Census-based neighborhood-level poverty data to be attached to individual patients (Sagent Dataflow Server, version 5.0, Mountain View, CA). All information used by clinicians to provide care for patients is contained within CIS. The data it contains are highly accurate and complete, owing to multiple quality checks and validation strategies.

The EBC database is used to submit vital statistics to the health department. The EBC includes sociodemographic and medical data captured by maternal self-report and clinical data captured from the hospital record. Variables obtained from the EBC included marital status, employment status, level of maternal education, number of prenatal visits, date of prenatal care initiation, and newborn's estimated gestational weight.

Study sample

Women with pregnancies resulting in a live birth were eligible for inclusion in the study. The study sample was drawn from pregnancy-related admissions during the years 2002 and 2003. Pregnancy-related admissions were selected by DRGs and included cesarean section-related codes, vaginal delivery-related codes, and antepartum diagnoses groups. For woman

with more than one pregnancy during the study period, only the final pregnancy was included.

Definition of outcome variables

The major outcome variable was the receipt by the mother or newborn of a screening test for illicit drugs on any admission during the pregnancy. The second outcome was a positive maternal or neonatal toxicology result. Illicit drug testing was defined as any urine or serum panel test for illicit drugs, which included cocaine, opiates, cannabinoids, amphetamines, barbiturates, and phencyclidine. No hospital protocol or policy for illicit drug testing existed during the study period. The decision to conduct a toxicology test was made by the attending or resident physician caring for the woman or newborn.

Major independent variables

For each included pregnancy, we derived the main independent variables of interest from the final admission of the observation period. Maternal race, maternal age, and admission payer were taken from the CIS, and marital, educational, and employment status was captured from the EBC.

Patient-level income was estimated using an area-level measure of poverty using census block-level data from the United States 2000 Census, available publicly from the Public Health Disparities Geocoding project.[8,9] This area-level poverty measure, the proportion of persons in a census block living below the federally defined poverty level, has been demonstrated to have external validity and robustness in predicting socioeconomic inequalities across a number of health indicators and outcomes.[10]

Maternal HIV status was determined using the following hierarchy of evidence: positive maternal HIV antibody, presence of maternal HIV viral load test, positive newborn HIV antibody test, or newborn receipt of zidovudine, an antiretroviral medication used to prevent vertical transmission of HIV. Maternal HIV test results from any admission during the pregnancy were considered.

Potential confounders

The major confounders we considered were lack of adequate prenatal care, a common marker of maternal substance use, and obstetrical conditions associated with maternal substance abuse. Prenatal care was measured in several ways. The presence in the CIS of laboratory tests associated with pregnancy-related care (e.g., rubella, hepatitis B, and syphilis antibody testing, pregnancy-related blood typing) within 9 months of delivery was considered an indicator of prenatal care. The self-reported number of prenatal visits was captured in the EBC. The receipt of five or fewer prenatal visits was defined clinically as insufficient prenatal care.[11] Using EBC data, we also created a categorical variable for whether prenatal care began in the first, second, or third the trimester of pregnancy. Each prenatal care indicator was analyzed as a distinct independent variable.

The obstetrical conditions we included as potential confounder variables were low birth weight, third-trimester bleeding, eclampsia, abrupted placenta, intrauterine growth restriction, preterm labor, and placenta previa. Low birth weight was defined as a newborn weight of <2500 g reported in the EBC. The other obstetrical conditions were constructed using ICD-9 codes associated with the admission. The ICD-9 codes for each diagnosis were identified *a priori*, and the CIS database was then searched for the presence of specific codes.

Statistical analysis

First we performed bivariable analyses to examine the association between the major independent variables and both receipt by the mother or newborn of a screening test for illicit drugs (major outcome) and a positive maternal or neonatal toxicology result (second outcome). For these analyses, we used chi-square or Fisher exact tests to examine differences in proportions and *t* tests to evaluate differences in means between groups. We then created multivariable logistic regression models for both outcomes using all independent variables significant at a *p*-value of <0.25 in bivariable analyses.[12] Nonsignificant variables were omitted from the full model to create the final parsimonious model, except for race, age, and HIV status, which were considered primary variables of interest. Data analyses were conducted using SAS version 8.2. (SAS Institute Inc, Cary, NC) and SPSS version 11.5 (SPSS Inc, Chicago, IL). Based on our sample size and findings, we calculated that we had 80% power to detect a 14% difference in positive toxicologies between black and other women.

RESULTS

From January 2002 through December 2003, there were 9699 admissions of 8976 unique women with pregnancy-related DRGs. The majority of women (n = 8372, 93.3%) were admitted once during the study period, but 516 (5.7%) were admitted twice, and 88 (1.0%) were admitted more than twice (range 3–8 times). One hundred thirty-six women had two distinct pregnancies during the time period. Of the 8976 unique women, 8487 (95%) had pregnancies that resulted in live births. Of the remainder, 47 had either a stillbirth or intrauterine death or did not have an observed terminal event in this time period and were not included in this analysis.

The 8487 women comprising the study sample are described in Table 1. No single racial group comprised the majority of the sample. The greatest proportion of participants identified as Hispanic (43.2%), followed by black (33.9%). Of the 8487 women in our sample, a total of 244 mother-newborn pairs (3.0%) were tested for illicit drug use in the parturient period. As shown in Table 2, maternal or newborn testing for illicit drug use was significantly associated in bivariable analysis with black maternal race, single or widowed marital status, lower educational status, unemployment, public or absent health insurance, and living in a neighborhood in the poorest quartile. Clinical variables associated with mothers or newborns being tested for illicit drugs included more than one hospitalization during the pregnancy, fewer prenatal visits, low birth weight, and maternal HIV infection. There were also significant differences in testing for illicit drugs among women with and without each of the obstetric diagnoses related to substance abuse, with higher odds of testing among women with each of these diagnoses except intrauterine growth restriction. There was no difference in the mean age of women who were and were not tested (30 vs. 31 years old, p = 0.8).

In multivariable analysis (Table 2), black race was independently associated with maternal or newborn testing for illicit drugs. Black women and their newborns, as compared with nonblack women, were 1.5 times more likely to be tested for illicit drugs. Other sociodemographic factors independently associated with testing for illicit drug use included older age, single marital status, lower educational status, unemployment, and public or absent health insurance. Clinical variables independently associated with testing included more than one hospitalization during the pregnancy, maternal HIV infection, and low birth weight. Obstetrical diagnoses independently associated with testing for illicit drug use included placenta previa, abrupted placenta, third-trimester bleeding, and eclampsia. Of the markers of prenatal care, only the absent prenatal laboratory results were associated with testing.

Our second outcome was a positive toxicology result among the 244 tested mother-newborn pairs. As shown in Table 3, women with public health insurance, less than a high school education, insufficient prenatal care, and a low birth weight baby had a higher odds of testing positive for illicit drug use. There were no significant differences in testing positive for illicit drugs among women with and without each of the obstetrical diagnoses related to substance abuse.

In multivariable models examining factors associated with maternal or newborn testing positive for illicit drug use, we included race, age, HIV status, and additional independent variables significant ($p < 0.25$) in the bivariable analysis. Because having few prenatal visits and low birth weight were correlated, two different models were constructed, one containing number of prenatal visits as an independent variable and one with low birth weight as an independent variable. In both models, lower educational status and public insurance were independently associated with the outcome. Fewer prenatal visits and low birth weight were each independently associated with testing positive for illicit drugs in the two separate models, and the substitution of birth weight for prenatal visits did not appreciably affect the odds ratios of the other variables. Therefore, only the model with prenatal visits is shown (Table 3).

DISCUSSION

We found evidence of racial differences in substance use testing in the peripartum setting in a large, urban hospital serving a largely minority population. Black women and their newborns were more likely than other, predominantly Hispanic, women to be tested for illicit drugs after controlling for important sociodemographic and clinical factors. There was no association between race and a positive toxicology result; approximately 19% of black, and nonblack women and newborns tested positive. Our study had 80% power to detect a 14% difference in drug positivity rates between black and other women. We, therefore, believe these findings were not due to insufficient power. Our interpretation of the absent association between black race and a positive drug test in the context of racial differences in testing rates assumes that if black women were tested disproportionately to the prevalence of their drug use, we expect them to have lower rates of drug positivity than other women. Our finding of equivalent rates of positivity among black and nonblack women suggests that black women might not be targeted on the basis of race. Instead, had we been able to control for additional factors, such as substance abuse history or clinical behavior in our model, the association of race with illicit drug testing may have been eliminated. The strength of this conclusion is limited by the fact that we do not know the prevalence of drug use among untested women and, therefore, the detection rate among black and nonblack women.

We also found that markers of lower socioeconomic status, including being unmarried, having less than a high school education, being unemployed, and having Medicaid or no insurance, were independently associated with testing for illicit drugs. We further found that Medicaid, absent insurance, and less education were independently associated with a positive toxicology test. These associations with prenatal substance use may be due to the profound effect that substance abuse has on individuals' ability to maintain employment or stable relationships, complete paperwork and other tasks to maintain insurance eligibility, or finish school.[13–15] Alternatively, failure to maintain employment or complete school may increase vulnerability to addictive disease.

Absent or inadequate prenatal care has also been associated previously with maternal substance abuse.16,[17] Our findings confirm this association. Among the subset of women tested for illicit drugs, women with fewer self-reported prenatal visits (five or less) had greater odds of a positive toxicology test. Maternal and prenatal exposure to drugs is

associated with adverse intrapregnancy and peripartum events, including preterm labor and low birth weight, abrupted placenta, third-trimester bleeding, intrauterine growth restriction, and eclampsia.[18,19] In our analysis, low birth weight, placenta previa, abrupted placenta, third-trimester bleeding, and eclampsia were each independent predictors of illicit drug screening.

To our knowledge, only a single prior investigation has examined racial disparities in testing for illicit drug use in the peripartum setting. In this study of low-income, publicly insured women, investigators found that pregnant black women were more likely than other women to be tested for drug use during the course of obstetrical care.[7] The investigators, however, did not examine the actual results of the toxicology testing. Because of our inclusion of toxicology results, our work may be considered an extension of this prior work.

Drug testing in the peripartum setting carries the risk of exposing women and newborns to adverse consequences from intervention by legal or social service agencies,[20] and this has been shown to be particularly true for black women.[21,22] At least two studies have found racial disparities in the consequences of testing positive for illicit drugs. Florida investigators found that black parturient women and newborns testing positive for illicit drugs were 10 times more likely to be reported to child protective services than white and Hispanic counterparts, despite a state regulation requiring that all babies with positive toxicologies be reported.[4] In another investigation, black children with urine toxicologies positive for cocaine were less likely to be discharged to their mother's care than nonblack (mainly Hispanic) children after adjusting for prior child welfare involvement, absent prenatal care, and homelessness.[3]

We were not able to evaluate whether racial disparities in the consequences of a positive toxicology result existed for our racially diverse sample. Such disparities in the consequences of a positive toxicology result remain important in evaluating the procedure by which substance abuse is diagnosed and treated in medical settings. Some investigators have suggested that hospital protocols for screening, conducting testing, and responses to perinatal substance abuse might promote the delivery of patient-centered care in cases of maternal substance abuse,[23,24] but not all studies have found that such testing protocols have adequate sensitivity and specificity to recommend widespread implementation. For example, one study found that selective infant testing, based on such risk factors as insufficient prenatal care, low birth weight, infant symptoms, and history of substance use, failed to identify nearly one half of exposed neonates.[11] Other studies have found that routine screening via standardized history taking or questionnaires promotes more effective identification of perinatal substance abuse than clinical risk-based toxicology testing.[25,26] Combined with these conflicting data, our finding of racial differences in testing rates points to the need for additional study to determine the impact of specific screening protocols on these observed differences in testing rates and on the previously documented differences in consequences of a substance abuse diagnosis for mothers and newborns.

Racial disparities in health care and health outcomes have been well documented in such diverse areas of health care as treatment of coronary artery disease (CAD), management and control of diabetes, prescription of narcotic analgesics in the emergency department, use of joint replacement in arthritis, and birth outcomes.[27–31] These studies have demonstrated that racial and ethnic minorities do not receive equitable benefits from health services and may be offered fewer health-related tests and interventions.[32,33] However, the disparities literature has largely focused on assessing whether health care has been delivered in sufficient quantity and quality to persons who are from racial and ethnic minority groups. Insights from this literature have rarely focused on the adequacy and equity of care for persons with substance abuse disorders. As one investigation of drug testing among trauma

patients noted,[34] the study of disparities in substance use disorders may reveal that substance abuse is disproportionately diagnosed among racial or ethnic minorities. Disproportionate substance abuse diagnoses may expose persons from minority populations to adverse social consequences, such as family interruption or incarceration, without necessarily offering additional therapeutic interventions. Our study is one of the first to examine testing patterns among peripartum women; our findings of racial differences in testing patterns with equivalent positivity rates needs to be confirmed by examination in other settings and with reference to local underlying substance use prevalence. Furthermore, the development and implementation of clinical protocols have the potential to reduce inequity in healthcare delivery, but such clinical protocols ought to be tested for both their capacity to improve quality of care and their efficacy in reducing disparities in care.

Our study is limited by several factors. The single hospital setting of our study may limit its generalizability to other settings. We believe, however, that the large and heterogeneous population served by our urban hospital may strengthen applicability to other similar sites. Second, patient's race is recorded by clerks entering data into the hospital information system. Our race variable thus may measure health worker perception of race, which may be more closely predictive of treatment in the healthcare system than is self-reported race. In addition, no quality checks were made on the race data, and it is possible that women's race was misclassified. Many clerks are responsible for data entry, so we believe it unlikely that systematic errors that would bias our findings occurred.

Our use of administrative data limited our ability to measure certain variables that may have influenced decisions to test for substance use and, if adequately controlled, may have explained racial differences in testing. Furthermore, we had only limited data about prenatal care. Additional social and clinical information collected during prenatal care was likely available for some, though not all, patients and may have influenced decisions to test for illicit drug use. In particular, we were not able to account for substance abuse screening during prenatal care, substance abuse history, or patient behavior consistent with substance abuse. Such history or clinical observations may be key factors in shaping clinical decisions to screen for illicit drug use in the peripartum setting and may have explained the racial differences in testing rates that we identified. One previous study found, however, that minority women enrolled in prenatal care were more likely to have documentation of a substance abuse history performed; therefore, the notation of the history itself may be racially biased and may amplify racial differences in drug testing.[35]

Despite these limitations, our large sample size and heterogeneous population permitted us to examine the relationship between race and illicit drug testing while controlling for a range of sociodemographic and clinical factors associated with illicit drug use. Like prior studies that examined patterns in screening and referral for illicit drug use, we identified racial differences in screening for illicit drug use. Examination of test results suggests that such differences may be based on clinically appropriate decision making. Further study is needed, however, to determine empirically whether black and nonblack women who are substance users are indeed equally likely to be tested for drug use. We must be vigilant in identifying and then providing treatment to substance abusers across the full spectrum of races and ethnicities.

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Table 1

Characteristics of Women Having Live Births (N = 8487)

Characteristic	**n *(%)***
Mean age (SD)	30.0 (6.4)
Race/ethnicity[a]	
Hispanic	3663 (43.2)
Black	2880 (33.9)
White	1093 (12.9)
Asian	189 (2.2)
Other	334 (4.0)
Marital status[a]	
Married or domestic partner	3525 (41.5)
Single	4575 (53.9)
Divorced or separated	210 (2.5)
Widowed	12 (.1)
Employment status[a]	
Employed	4254 (50.1)
Unemployed	4232 (49.9)
Level of maternal education[a]	
Less than high school diploma	1739 (20.5)
High school diploma	3310 (39.0)
Some college or more	3400 (40.1)
Insurance[a,b]	
Private insurance	6027 (71.0)
Public insurance	1841 (21.7)
Self-pay	567 (6.7)
Median proportion in poverty by neighborhood (range)[a]	26 (0–100)
Hospitalizations during pregnancy	
1	7938 (93.5)
2–8	549 (6.5)
Prenatal care indicators	
Evidence of prenatal laboratory tests	6294 (74.2)
Mean number of prenatal visits (range)	8.8 (2–20)
Initiation of prenatal care[a]	
1st trimester	7711 (90.9)
2nd–3rd trimester	775 (9.1)
Maternal HIV status[c]	
Negative	8411 (99.1)
Positive	76 (0.9)
Birth outcomes	
Singleton gestation	8356 (98.5)

Characteristic	**n *(%)***
Multiple gestation	131 (1.5)
Low birth weight (<2500 gs)	674 (7.9)
Obstetrical diagnoses	
Third-trimester bleeding	23 (0.3)
Eclampsia or convulsions	22 (0.3)
Abrupted placenta	45 (0.5)
Intrauterine growth restriction	48 (0.6)
Preterm labor	481 (5.7)
Placenta previa	45 (0.5)
Maternal or newborn drug testing	244 (2.9)

[a] There were missing values for race (n = 328), marital status (n = 165), employment status (n = 1), maternal education (n = 38), insurance (n = 52), poverty status (n = 27), initiation of prenatal care (n = 1).

[b] Some patients with managed care Medicaid (public insurance) are classified as having private insurance because the payer is the managed care plan.

[c] Maternal HIV status was derived from available results of either maternal HIV testing, newborn HIV testing, or newborn receipt of zidovudine.

Table 2

Associations Between Maternal-Newborn Characteristics and Testing Maternal-Newborn Pairs for Illicit Drug Use

Characteristic	Number (%) tested for illicit drugs 244 (2.9)	Odds ratio (confidence interval)	Adjusted odds ratio (confidence interval)
Age[a]	30.7 (6.6)	1.02 (1.00–1.04)	1.05 (1.03–1.08)
Race/ethnicity			
Nonblack	124 (2.3)	Reference	Reference
Black	111 (3.9)	1.7 (1.3–2.2)	1.5 (1.1–2.0)
Marital status			
Married/domestic partner	55 (1.6)	Reference	Reference
Single	175 (3.8)	2.5 (1.9–3.4)	2.1 (1.4–3.1)
Divorce/separated	4 (1.9)	1.2 (0.4–3.4)	0.5 (0.2–1.9)
Level of education			
More than high school	67 (2.0)	Reference	Reference
High school diploma	77 (2.3)	1.2 (0.9–1.7)	1.2 (0.9–1.8)
Less than high school	93 (5.3)	2.8 (2.0–3.9)	2.4 (1.6–3.5)
Employment status			
Employed	79 (1.9)	Reference	Reference
Unemployed	165 (3.9)	2.1 (1.6–2.8)	1.8 (1.3–2.6)
Payer for admission			
Commercial insurance	124 (2.1)	Reference	Reference
Medicaid	100 (5.4)	2.7 (2.1–3.6)	1.9 (1.4–2.7)
Self-pay	19 (3.4)	1.7 (1.0–2.7)	1.8 (1.0–3.1)
Proportion in poverty (neighborhood)			
Wealthiest quartile	43 (2.0)	Reference	—
Second wealthiest quartile	56 (2.6)	1.3 (0.9–2.0)	
Third wealthiest quartile	56 (2.7)	1.3 (0.9–2.0)	
Poorest quartile	87 (4.1)	2.1 (1.5–3.0)	
Number of hospitalizations during pregnancy			
1	191 (2.4)	Reference	Reference
More than 1	53 (9.7)	4.3 (3.1–6.0)	4.1 (2.8–5.9)
Prenatal care			
Prenatal testing			
No	70 (3.2)	Reference	Reference
Yes	174 (2.8)	0.9 (0.7–1.1)	0.5 (0.4–0.7)
Number of prenatal visits			
>5	208 (2.6)	Reference	Reference
0–5	36 (6.9)	2.8 (1.9–4.0)	1.5 (1.0–2.4)
Trimester of prenatal care			
First	225 (2.9)	Reference	—
Second–third	19 (2.5)	0.8 (0.5–1.3)	
Low birth weight (<2500 g)			

Characteristic	Number (%) tested for illicit drugs 244 (2.9)	Odds ratio (confidence interval)	Adjusted odds ratio (confidence interval)
No	187 (2.3)	Reference	Reference
Yes	57 (14.8)	5.9 (4.5–7.8)	3.9 (2.8–5.5)
HIV status			
Negative	231 (2.7)	Reference	Reference
Positive	13 (17.1)	7.3 (4.0–13.5)	3.2 (1.5–7.0)
Obstetrical diagnoses			
Third-trimester bleeding			
No	237 (2.8)	Reference	Reference
Yes	7 (30.4)	15.2 (6.2–37.3)	8.3 (2.3–30.0)
Eclampsia or convulsions			
No	240 (2.8)	Reference	Reference
Yes	4 (18.2)	7.6 (2.6–22.7)	6.1 (1.5–25.1)
Abrupted placenta			
No	224 (2.7)	Reference	Reference
Yes	20 (44.4)	29.4 (16.1–53.6)	20.9 (9.3–47.0)
Intrauterine growth restriction			
No	241 (2.9)	Reference	—
Yes	3 (6.3)	2.3 (0.7–7.4)	
Preterm labor			
No	196 (2.4)	Reference	—
Yes	48 (10.0)	4.4 (3.3–6.2)	
Placenta previa			
No	235 (2.8)	Reference	Reference
Yes	9 (20.0)	8.7 (4.2–18.3)	6.1 (2.7–17.7)

[a]Data for age presented as mean years (standard deviation).

Table 3

Associations Between Maternal-Newborn Characteristics and Positive Illicit Drug Toxicology Among Tested Maternal-Newborn Pairs (N = 244)

Characteristic	Number testing positive for illicit drugs (%) n = 46 (18.9)	Odds ratio (confidence interval)	Adjusted odds ratio (confidence interval)
Overall number with positive toxicology	46 (18.9)	—	—
Mean maternal age, years	31.6	1.0 (0.98–1.1)	1.0 (0.97–1.1)
Race/ethnicity[a]			
Nonblack	26 (19.5)	Reference	Reference
Black	20 (18.0)	0.9 (0.5–1.7)	1.1 (0.5–2.2)
Marital status[a]			—
Married/domestic partner	8 (14.5)	Reference	
Single	34 (19.4)	1.4 (0.6–3.3)	
Divorce/separated	2 (50.0)	5.9 (0.7–47.9)	
Level of education[a]			
More than high school	6 (9.0)	Reference	Reference
High school diploma	15 (19.5)	2.5 (0.9–6.8)	3.0 (1.0–8.6)
Less than high school	21 (22.6)	3.0 (1.1–7.8)	3.7 (1.3–10.3)
Employment			—
Employed	14 (17.7)	Reference	
Unemployed	32 (19.4)	1.1 (0.6–2.2)	
Insurance[a]			
Commercial	15 (12.1)	Reference	Reference
Medicaid	27 (27.0)	2.7 (1.3–5.4)	2.6 (1.2–5.5)
Self-pay	4 (21.1)	1.9 (0.6–6.6)	2.2 (0.6–7.9)
Proportion in poverty (neighborhood)			—
Wealthiest quartile	8 (18.6)	Reference	
Second wealthiest quartile	11 (19.6)	1.1 (0.4–2.9)	
Third wealthiest quartile	10 (17.9)	1.0 (0.3–2.7)	
Poorest quartile	17 (19.5)	1.1 (0.4–2.7)	
Number of hospitalizations during pregnancy			—
1	37 (19.4)	Reference	
More than 1	9 (17.0)	0.9 (0.4–1.9)	
Prenatal care			
Prenatal testing			—
No	16 (22.9)	Reference	
Yes	30 (17.2)	0.7 (0.4–1.4)	
Number of prenatal visits			
Sufficient (>5)	35 (16.8)	Reference	Reference
Insufficient (0–5)	11 (30.6)	2.2 (1.0–4.8)	3.0 (1.2–7.4)
Trimester of prenatal care			—
Initiation			

Characteristic	Number testing positive for illicit drugs (%) *n* = 46 (18.9)	Odds ratio (confidence interval)	Adjusted odds ratio (confidence interval)
2nd or 3rd	1 (5.3)	Reference	
1st	45 (20.0)	0.2 (0.03–1.7)	
Low birth weight (<2500 g)			—
No	26 (15.6)	Reference	
Yes	20 (26.0)	1.9 (1.0–3.7)	
HIV status			
Negative	45 (19.5)	Reference	Reference
Positive	1 (7.7)	0.3 (0.04–2.7)	0.2 (0.02–1.5)
Obstetrical diagnoses			
Any obstetrical diagnosis			
No	31 (17.7)	Reference	
Yes	15 (21.7)	1.3 (0.7–2.6)	
Third-trimester bleeding			—
No	45 (19.0)	Reference	
Yes	1 (14.3)	0.7 (0.1–6.1)	
Eclampsia or convulsions		N/A[b]	—
No	46 (19.2)		
Yes	0 (0)		
Abrupted placenta			—
No	42 (18.8)	Reference	
Yes	4 (20.0)	1.1 (0.3–3.4)	
Intrauterine growth restriction		N/A[b]	—
No	46 (19.1)		
Yes	0 (0)		
Preterm labor			—
No	35 (17.9)	Reference	
Yes	11 (22.9)	1.4 (0.6–2.9)	
Placenta previa			—
No	44 (18.7)	Reference	
Yes	2 (22.2)	1.2 (0.3–6.2)	

[a] There were missing data for race/ethnicity (*n* = 9), education (*n* = 7), insurance (*n* = 1), and marital status (*n* = 7).

[b] Odds ratios could not be calculated due to empty cells. Using a Fisher exact test, there was no association between eclampsia/convulsions or intrauterine growth restriction and the outcome, testing positive.