

# The Association between Congenital Syphilis and Cocaine/Crack Use in New York City: A Case-Control Study

## ABSTRACT

From 1987 to 1989, an epidemic of congenital syphilis was observed in New York City. A case-control study was done to assess the association between various maternal risk factors and congenital syphilis. Independent of the effect of other factors, the odds of being exposed to cocaine were 3.9 times greater among cases than controls (95% confidence interval, 2.8–5.3). This study suggests that the epidemic of congenital syphilis may be related to the increase in cocaine/crack use among delivering mothers. (*Am J Public Health*. 1991;81:1316–1318)

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### Introduction

The current epidemic of primary and secondary syphilis among women in New York City (NYC) has been characterized by a doubling in the number of cases between 1985 and 1989<sup>1,2</sup> and has contributed to a secondary epidemic of congenital syphilis. Although fewer than 60 congenital syphilis cases per year were reported to the NYC Department of Health (DOH) between 1980 and 1986, 1017 cases were reported in 1989.<sup>2</sup> During this same period, the proportion of delivering mothers in NYC who reported use of cocaine/crack during pregnancy increased dramatically from 1.0 per 1000 live births to 23 per 1000 live births<sup>3</sup> (Figure 1). Because an association between sexually transmitted diseases and cocaine/crack use had been suggested previously,<sup>4–10</sup> we conducted a case-control study to assess the relationship between various maternal risk factors and congenital syphilis in NYC.

### Methods

Congenital syphilis is a reportable disease in NYC, and the NYC DOH maintains a registry of all cases reported from physicians, clinics, and hospitals that meet the revised Centers for Disease Control (CDC) criteria for definite or compatible cases.<sup>11</sup> Additionally, the DOH maintains a birth certificate registry that contains information on all babies born in NYC and on selected characteristics of their mothers.

In the case-control study, all babies reported with congenital syphilis in 1989 were identified from the congenital syphilis registry, and the birth certificate registry was then reviewed to locate their birth certificates. All congenital syphilis babies with available birth certificates were defined as cases. The next two babies born without congenital syphilis on the same day as each case were selected as controls. Cases and controls were also matched on race and hospital of birth. If

controls could not be selected on the same date of birth as a case, the subsequent day's births were reviewed until an appropriate control was located. For each of the 14 twin case sets, two controls were selected. All information collected on the babies (race, gestational age, and birth weight) and on their mothers (use of cocaine/crack, heroin, marijuana, methadone, and alcohol; level of prenatal care; age; marital status; level of education; and insurance status) was obtained from the babies' birth certificates.

A bivariate analysis was done to compare cases and controls for each baby and maternal characteristic. The strength of association was evaluated by the odds ratio with 95% confidence intervals; statistical significance was set at the  $P < .05$  level. Correlations between variables were examined. Conditional logistic regression analysis was performed to assess the independent association of each of the maternal characteristics with congenital syphilis. Data were analyzed using Statistical Analysis System (SAS) version 5.18.<sup>12</sup>

### Results

Of the 987 babies born in NYC listed on the congenital syphilis registry as of March 1990, there were 72 without available birth certificates, 32 stillbirths, and 1 with no available controls. Birth certificates were occasionally not located because of discrepancies in the legal names of the children between the birth certificate and congenital syphilis registries. Of

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the remaining 882 eligible babies, 881 were compatible cases of syphilis and 1 was a definite case.

Cases and controls were matched on race and included non-Hispanic blacks (73%), Hispanics (22%), Whites (4%), and others or unknown (1%). In the bivariate analysis (Table 1), cases had a significantly lower mean birth weight and gestational age than controls (both  $P$ s < .001). Cases were statistically more likely to use cocaine/crack, alcohol, or other drugs; have no prenatal care; be single; and have less than a high school education (all  $P$ s < .001). Cocaine/crack use was significantly correlated with alcohol use and being unmarried, and prenatal care was correlated with education (correlation coefficients of .35524, .1988, and .06817, respectively, all  $P$ s < .001).

Independent of the effect of other factors, the odds of being exposed to cocaine were 3.9 times greater among cases than among controls (Table 2). Other factors significantly associated with congenital syphilis were being unmarried, alcohol use, number of prenatal visits, and having less than a high school education.

## Discussion

In this investigation, a strong association was found between congenital syphilis and maternal cocaine/crack use. Moreover, the increase in congenital syphilis cases in NYC since 1985 was temporally related to an increase in cocaine/crack use (Figure 1), whereas the use of alcohol and other drugs remained relatively stable during this period.<sup>3</sup>

Several limitations must be considered in interpreting these data. Underreporting may be a serious problem in examining congenital syphilis in NYC.<sup>13</sup> Drug use information tends to be based on self-reports, and collection of information on the birth certificate is not standardized throughout hospitals. Although the possibility exists that drug histories were more actively pursued among mothers of babies with congenital syphilis, questioning for drug usage is a routine part of medical history-taking done immediately after birth and well before syphilis serologic results are available.

Maternal cocaine/crack use might contribute to the occurrence of congenital syphilis in a variety of ways. Cocaine/crack use might increase the frequency of sexual activity because of the exchange of sex for drugs, or might lead to an increase in unprotected sexual activity.

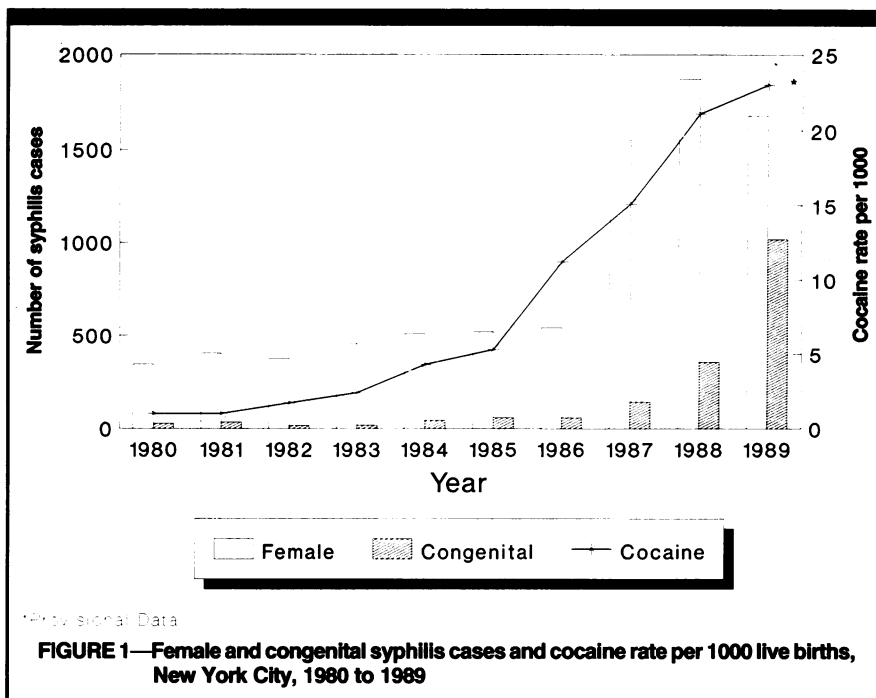


FIGURE 1—Female and congenital syphilis cases and cocaine rate per 1000 live births, New York City, 1980 to 1989

TABLE 1—Comparisons of Cases and Controls: Congenital Syphilis Cocaine/Crack Study, New York City, 1989.

Characteristics	Cases <sup>a</sup> (n = 882)		Controls <sup>a</sup> (n = 1736)		Crude Odds Ratio	95% Confidence Interval
	No./Total	%	No./Total	%		
<b>Babies</b>						
<2500 grams	308/882	35	211/1736	12	3.9	3.2–4.7
<37 weeks gest.	259/732	35	277/1593	17	2.6	2.1–3.2
<b>Mothers</b>						
Cocaine/crack use	249/865	29	93/1710	5	7.0	5.4–9.2
Alcohol use	86/865	10	36/1710	2	5.1	3.4–7.8
Any drug use	403/865	47	262/1710	15	4.8	4.0–5.8
No prenatal care	224/736	30	150/1601	9	5.3	4.1–6.8
1–5 visits	207/736	28	372/1601	23	2.0	1.6–2.5
>5 visits	305/736	41	1079/1601	67	1.0	Reference
Unmarried	748/882	85	1147/1736	66	2.9	2.3–3.6
Not high school graduate	427/834	52	629/1693	37	1.8	1.5–2.1
Age <20 years	95/881	11	251/1730	15	0.7	0.6–0.9
Medicaid	526/858	61	1050/1707	61	1.0	0.8–1.2

<sup>a</sup>Denominators vary because missing data were excluded.

TABLE 2—Variables Significantly Associated with Congenital Syphilis in the Conditional Logistic Regression Model: New York City, 1989

Variable	Regression Coefficient	Adjusted Odds Ratio	95% Confidence Interval
Cocaine/crack	1.354	3.9	2.8–5.3
Unmarried	0.779	2.2	1.7–2.8
Alcohol use	0.723	2.1	1.2–3.4
No. of prenatal visits	–0.098	0.9 <sup>a</sup>	0.88–0.93
Less than high school education	0.298	1.3	1.1–1.7

<sup>a</sup>When entered as a continuous variable, with each decreasing prenatal visit, the odds of being a case are increased by 1.1.

Cocaine/crack use could also lead to a decreased use of prenatal care, thereby causing missed opportunities for the detection and treatment of syphilis (38% of case mothers who used cocaine/crack had no prenatal care). The lower socioeconomic status of cocaine/crack-using mothers could be associated with a decreased availability of health services for this population, or with inadequate services. Among women who gave birth to babies with congenital syphilis in NYC who were reported in 1989 and who were documented to have received prenatal care, only a small proportion were documented to have received treatment for syphilis during their pregnancy.<sup>14</sup> Since so few delivering women received treatment for syphilis, treatment failure is probably not an important factor in the increase of congenital syphilis cases.

The provision of accessible and adequate prenatal health care, along with ed-

ucation targeted to women who engage in high-risk sexual activities, is needed to confront the epidemic of congenital syphilis in NYC. □

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# Human Papillomavirus, Gonorrhea, Syphilis, and Cervical Dysplasia in Jailed Women

## ABSTRACT

We assessed the prevalence of human papillomavirus (HPV) by cervicovaginal lavage and Southern blot and inquired about behavioral risk factors for cervical disease and sexually transmitted diseases by interview in 114 female detainees at a large New York City jail. Of the women screened, 8% had abnormal Pap smears, 35% had HPV, 7% had gonorrhea, and 22% had serologic syphilis. Given the high rates of HPV infection and cervical cytology, Pap smears should be a routine intake procedure for incarcerated women. (*Am J Public Health*. 1991;81:1318–1320)

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## Introduction

Prisoners have a high prevalence of drug use, psychiatric disorders, trauma, alcohol abuse, and chronic medical conditions such as respiratory diseases and hypertension.<sup>1,2</sup> The number of incarcerated women in the U.S. increased 53% between 1983 and 1987.<sup>3</sup> At our study site the number of female prisoners has more than doubled in the last 5 years (*SS:unpublished data*).

Prevalence rates as high as 10% for cervical carcinoma in situ, 16% for syphilis, and 5% for gonorrhea have been reported in incarcerated adult women.<sup>4–7</sup> No studies of human papillomavirus (HPV) have been published. Because prisoners have high rates of drug use and prostitution,<sup>3</sup> many are likely to have been exposed to the human immunodeficiency virus (HIV) through these routes.<sup>8</sup> Women

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