

Ten-Year Epidemiologic Review of Congenital Syphilis in New York State, Excluding New York City, 2003-2012

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ABSTRACT

Background: Elimination of congenital syphilis (CS) is a top national and New York State (NYS) priority. The study describes epidemiologic characteristics of CS cases which have been reported in NYS, excluding New York City (NYC) during the last decade. It also examines association of maternal prenatal care with syphilitic stillbirth for CS cases reported during 2003-2012.

Methods: A retrospective review of surveillance information was conducted. STD case report data are collected and maintained in Communicable Disease Electronic Surveillance System (CDESS). For cases with incomplete electronic surveillance information, data were extracted from CS case investigation and report forms.

Results: During 2003-2012, a total of 86 CS cases were reported to CDESS. Of these, 12 CS cases (14.0%) were adopted and were lacking information on biologic mothers for most of the variables.

The majority of CS cases were born to black non-Hispanic (27, 31.8%) or Hispanic (19, 22.4%) mothers and ranged 0-28 years old at diagnosis. While all administrative regions reported CS cases, the majority (63, 74.1%) of CS cases were reported in the three counties surrounding NYC. With exception of a set of twins, all other term deliveries resulted in singletons. Eight (9.3%) CS cases were reported with classic signs of CS on physical examination. Six of the cases (6.9%) were syphilitic stillbirths. Among these 6 cases, half of women did not have prenatal care compared to 8.8% of mothers who delivered at term. Overall, 10 (11.8%) mothers did not have any prenatal care.

Conclusions: Additional studies are needed to establish specific barriers to seeking timely and adequate prenatal care among women who deliver CS cases. In jurisdictions with high burden of CS, strategies to scale up antenatal screening programs to prevent adverse perinatal outcomes need to be considered.

INTRODUCTION

- Congenital syphilis occurs due to transplacental transmission of *Treponema pallidum* from an infected mother to a fetus during pregnancy or possibly at birth.
- Prevention of this condition is a top priority, both nationally and in New York State excluding New York City (NYS).
- Congenital syphilis is reportable by all 50 states and the District of Columbia to the Centers for Disease Control and Prevention (CDC).
- Congenital syphilis occurs among all racial and ethnic groups, however it disproportionately affects African Americans and Hispanics.
- Overall, trends for congenital syphilis typically reflect the rate of syphilis among women of childbearing age.

METHODS

- A retrospective review of STD case report data, collected and maintained in the NYS Department of Health Communicable Disease Electronic Surveillance System (CDESS) was conducted.
- Reported cases of CS and their mothers during 2003- 2012 were identified.
- For cases with incomplete surveillance information, data were extracted from CS case investigation and report and merged with CDESS data.
- A match with HIV surveillance data was conducted to identify mothers with comorbid HIV infection.
- For all CS cases and their mothers, descriptive (univariate) analysis was used to assess demographic, testing and treatment characteristics.
- Multivariate logistic regression was used to identify factors associated with newborn outcomes at birth using variables assessed in bivariate analyses (Fisher's exact test).
- Analysis was conducted using Statistical Analysis Software (SAS), version 9.3.

RESULTS

- During 2003-2012, there was a total of 86 CS cases reported (Figure 1).
- Six (7%) of the cases were syphilitic stillbirths and all of them were females (Table 1).
- A notable proportion of neonates were missing recommended evaluation: 28.6% did not have a long bone x-ray and 23.0% did not have a CSF test done.
- Eight (9.3%) CS cases had physical signs of CS.

Table 1: Infant Characteristics by Newborn Birth Outcome

| Infant Characteristics | Total N=86 | | CS case n=80 | | Syphilitic Stillbirth n=6 | | P value* | |
|----------------------------------|---------------------------------|----|--------------|----|---------------------------|---|----------|---------|
| | # | % | # | % | # | % | | |
| Birthweight (grams) | <2500 | 14 | 16.3 | 10 | 12.5 | 4 | 66.7 | .0011** |
| | >=2500 | 56 | 65.1 | 56 | 70.0 | 0 | 0.0 | |
| | Unknown/Missing | 16 | 18.6 | 14 | 17.5 | 2 | 33.3 | |
| | | | | | | | | |
| Gestational age at birth (weeks) | <37 | 17 | 19.8 | 12 | 15.0 | 5 | 83.3 | .0005** |
| | >=37 | 53 | 61.6 | 53 | 66.3 | 0 | 0.0 | |
| | Unknown/Missing | 16 | 18.6 | 15 | 18.8 | 1 | 16.7 | |
| | | | | | | | | |
| Race/Ethnicity | Hispanic | 30 | 34.9 | 27 | 33.8 | 3 | 30.0 | .7426 |
| | White, Non-Hispanic | 19 | 22.1 | 17 | 21.3 | 2 | 33.3 | |
| | Black, Non-Hispanic | 27 | 31.4 | 26 | 32.5 | 1 | 16.7 | |
| | Other, Non-Hispanic | 4 | 4.7 | 4 | 5.0 | 0 | 0.0 | |
| | Unknown/Missing | 6 | 7.0 | 6 | 7.5 | 0 | 0.0 | |
| Sex | Female | 39 | 45.4 | 33 | 41.3 | 6 | 100.0 | .0069** |
| | Male | 47 | 54.7 | 47 | 58.8 | 0 | 0.0 | |
| Signs of CS | Yes | 8 | 9.3 | 7 | 8.8 | 1 | 16.7 | .0988 |
| | No | 73 | 84.9 | 73 | 91.3 | 0 | 0.0 | |
| | Unknown/Missing | 5 | 5.8 | 0 | 0.0 | 5 | 83.3 | |
| | | | | | | | | |
| Long Bone X-Ray | Yes, Changes Consistent with CS | 3 | 3.5 | 3 | 3.9 | 0 | 0.0 | .3333 |
| | Yes, No Signs of CS | 52 | 60.5 | 52 | 67.5 | 0 | 0.0 | |
| | No x-rays | 23 | 26.7 | 22 | 28.6 | 1 | 16.7 | |
| | Unknown/Missing | 8 | 9.3 | 3 | 3.8 | 5 | 83.3 | |
| | | | | | | | | |
| CSF VDRL Test*** | Yes, Nonreactive | 55 | 64.0 | 55 | 74.3 | 0 | 0.0 | .2667 |
| | Yes, Reactive | 2 | 2.3 | 2 | 2.7 | 0 | 0.0 | |
| | No Test | 18 | 20.9 | 17 | 23.0 | 1 | 16.7 | |
| | Unknown/Missing | 11 | 12.8 | 6 | 7.5 | 5 | 83.8 | |
| | | | | | | | | |
| HIV Status | Negative | 86 | 100 | 80 | 100 | 6 | 100.0 | N/A |
| | Positive | 0 | 0 | 0 | 0 | 0 | 0.0 | |

*P values obtained from Fisher's exact test; missing values were excluded from bivariate calculations
 ** Indicates statistical significance, p value <.05
 ***CSF VDRL-Cerebrospinal fluid Venereal Disease Research Laboratory test

- The majority of mothers were black (31.8%) or Hispanic (22.4%) (Table 2).
- 63 (74.1%) mothers resided in the counties surrounding NYC.
- Lack of prenatal care was significantly associated with delivering a syphilitic stillbirth in multivariate analysis (Table 3).
- Two (2.4%) mothers had documented history of HIV infection. However, no cases of vertical HIV transmission were identified among infants.

Table 2: Maternal Characteristics by Newborn Birth Outcome

| Maternal Characteristics | Total N=85 | | CS case n=80 | | Syphilitic Stillbirth n=6 | | P value* | |
|--------------------------|-------------------------|----|--------------|----|---------------------------|---|----------|---------|
| | # | % | # | % | # | % | | |
| Age | <25 | 25 | 29.4 | 23 | 28.8 | 2 | 33.3 | .7198 |
| | 25-29 | 23 | 27.1 | 22 | 27.5 | 1 | 16.7 | |
| | 30-34 | 8 | 9.4 | 7 | 8.8 | 1 | 16.7 | |
| | >=35 | 15 | 17.6 | 13 | 16.3 | 2 | 33.3 | |
| | Unknown/Missing | 14 | 16.5 | 15 | 18.8 | 0 | 0.0 | |
| | | | | | | | | |
| Race/Ethnicity | Hispanic | 19 | 22.4 | 17 | 21.3 | 2 | 33.3 | .2597 |
| | White, Non-Hispanic | 11 | 12.9 | 9 | 11.3 | 2 | 33.3 | |
| | Black, Non-Hispanic | 27 | 31.8 | 26 | 32.5 | 1 | 16.7 | |
| | Other | 28 | 32.9 | 28 | 35.0 | 1 | 16.7 | |
| | Unknown/Missing | | | | | | | |
| Syphilis Status | Mother NYS Case | 65 | 76.5 | 59 | 73.8 | 6 | 100.0 | .6463 |
| | Baby is Adopted-No info | 11 | 12.9 | 11 | 13.75 | 0 | 0.0 | |
| | Other | 2 | 2.4 | 2 | 2.5 | 0 | 0.0 | |
| | Unknown/Missing | 7 | 8.2 | 8 | 10.0 | 0 | 0.0 | |
| | | | | | | | | |
| Disease Stage | Early Syphilis | 31 | 36.5 | 27 | 33.8 | 4 | 66.7 | .3540 |
| | Late Syphilis | 30 | 35.3 | 29 | 36.3 | 1 | 16.7 | |
| | Unknown/Missing | 24 | 28.2 | 24 | 30.0 | 1 | 16.7 | |
| | | | | | | | | |
| Prenatal Care | Yes | 59 | 69.4 | 56 | 70.0 | 3 | 50.0 | .0338** |
| | No | 10 | 11.8 | 7 | 8.8 | 3 | 50.0 | |
| | Unknown/Missing | 16 | 18.8 | 17 | 21.3 | 0 | 0.0 | |
| Last treatment | Before Pregnancy | 10 | 11.8 | 10 | 12.5 | 0 | 0.0 | .4059 |
| | During Pregnancy | 25 | 29.4 | 24 | 30.0 | 1 | 16.7 | |
| | No Treatment | 37 | 43.5 | 32 | 40.0 | 5 | 83.3 | |
| | Unknown/Missing | 13 | 15.3 | 14 | 17.5 | 0 | 0.0 | |
| | | | | | | | | |
| HIV Status | Negative | 60 | 70.6 | 55 | 68.8 | 6 | 100.0 | 1.000 |
| | Positive | 2 | 2.4 | 2 | 2.5 | 0 | 0.0 | |
| | Unknown/Missing | 23 | 27.1 | 23 | 28.8 | 0 | 0.0 | |
| | | | | | | | | |
| Marital Status | Married | 19 | 22.4 | 18 | 22.5 | 1 | 16.7 | 1.000 |
| | Separated/Divorced | 4 | 4.7 | 4 | 5.0 | 0 | 0.0 | |
| | Single | 44 | 51.8 | 40 | 50.0 | 4 | 66.7 | |
| | Unknown/Missing | 18 | 21.2 | 18 | 22.5 | 1 | 16.7 | |
| | | | | | | | | |
| Region | Buffalo | 5 | 5.9 | 4 | 5.0 | 1 | 16.7 | .5973 |
| | Capital District | 4 | 4.7 | 4 | 5.0 | 0 | 0.0 | |
| | Central New York | 10 | 11.8 | 9 | 11.25 | 1 | 16.7 | |
| | Metropolitan Area | 63 | 74.1 | 59 | 73.8 | 4 | 66.7 | |
| | Rochester | 3 | 3.5 | 3 | 3.75 | 0 | 0.0 | |

*P values obtained from Fisher's exact test; missing values were excluded from bivariate calculations
 ** Indicates statistical significance, p value <.05

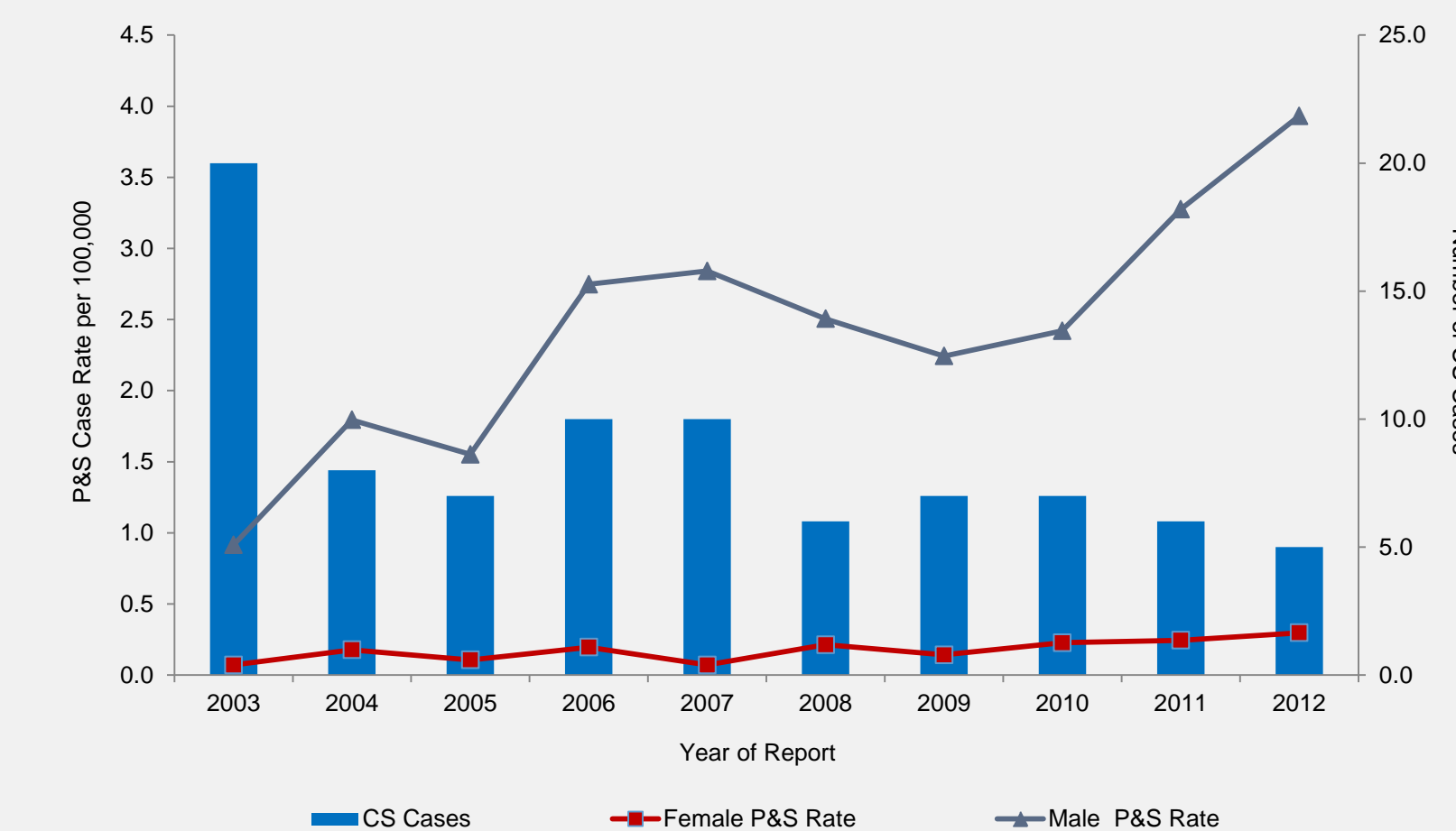
Table 3: Maternal Characteristics Predictive of Stillbirth

| Variable | Point Estimate (95% CI*) | P value** |
|------------------|--------------------------|-----------|
| Prenatal Care | | |
| No Prenatal Care | 7.5 (1.3, 42.0) | 0.0213 |
| Prenatal Care | Reference | |

*CI- Confidence Interval
 **P value obtained from logistic regression

RESULTS

Figure 1: Reported Cases of Congenital Syphilis, Primary and Secondary Syphilis Rates, NYS excluding NYC, 2003-2012



CONCLUSIONS

- Congenital syphilis, including syphilitic stillbirths, has persisted at fairly constant levels since 2004.
- There is notable difference in the proportion of mothers without prenatal care and treatment among those who delivered stillbirths. Lack of maternal prenatal care was predictive of stillbirth in this sample.
- Future studies are needed to establish specific barriers to receiving prenatal care for women of certain sociodemographic characteristics and risk profile.
- This study supports established recommendations for access to early prenatal care and adequate treatment for all pregnant women to prevent delivery of CS cases or syphilitic stillbirths.

LIMITATIONS

The study results are limited due to small sample size. Additionally, a notable proportion of records from earlier years had incomplete information.

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