Why Does Perinatal HIV Transmission Persist in Georgia?

Characteristics of Perinatal HIV Exposures in Georgia, 2016

Georgia Department of Public Health
HIV/AIDS Epidemiology Section

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Mother to Child Transmission of HIV

Risk of transmission from mother to infant\(^1\)
- Range of 15-45% during pregnancy, labor & delivery
  - Without any antiretroviral therapy/interventions
- Can be reduced to < 1%
  - With proper preventative measures

Preventative measures must occur during pregnancy, labor, delivery, and the post-partum period

\(^1\)World Health Organization, Mother to Child Transmission of HIV; http://www.who.int/hiv/topics/mtct/en/
Perinatal HIV infections by year and location of birth, Georgia, 2009-2018*

*Preliminary data as of March 2019

**Metro vs. non-metro category is determined by mother’s residence
Objectives

Among HIV-exposed live births in Georgia in 2016, we:

1. Described maternal and infant characteristics, birth details, and implementation of recommended measures for prevention of mother-to-child transmission of HIV.

2. Compared implementation of prevention measures by location of birth (metro Atlanta vs. elsewhere in the state)

To understand population-level gaps in perinatal HIV prevention measures in Georgia.
Prevention of Mother to Child Transmission of HIV: Prenatal Period

**Maternal HIV Diagnosis**
- Before pregnancy (or as early as possible if infected during pregnancy)

**Ongoing HIV Care**

**Viral Suppression**
- Starting before pregnancy, or as soon as possible after diagnosis if maternal infection occurs during pregnancy

**Coordination of HIV care with prenatal care**
Prevention of Mother to Child Transmission of HIV: Delivery and Post-Partum

Labor and delivery:
• Maternal HIV status known by labor & delivery providers
• Recent viral load known by labor & delivery providers
• Prevention measures based on maternal viral load

Post-partum
• 4-6 weeks infant prophylaxis
• No breastfeeding
Prevention Measures Based on Maternal Viral Load at Delivery

Maternal viral load at delivery

**Suppressed**
(≤ 1000 copies/mL)
- Infant ZDV (4-6 weeks)
- No breastfeeding

**Not Suppressed**
(> 1000 copies/mL) or VL Unknown
- Infant ZDV (4-6 weeks)
- No breastfeeding
- Maternal IV-ZDV (3+ hours pre-delivery)
- Cesarean delivery
- Infant NVP
Methods: Identifying Women Living with HIV who delivered a live infant

**Birth Certificate**
- HIV+ maternal status indicated

**Pharmacy Alert System**
- Notification sent when infant-dose of ZDV ordered
- 6 metro-area hospital pharmacies one in Columbus

**Reports of infant exposures and infections from providers**
- Perinatal HIV Exposure Reporting – by providers or birth hospital (not complete)
- Reported transmissions from providers

Compiled “Master List” of HIV-exposed births in Georgia in 2016
Methods: Data Collection

Chart review
- Mother’s labor & delivery chart
- Infant’s birth chart
- Prenatal care records when included

Birth certificate data
- Prenatal care (number of visits, date started)

HIV Surveillance data (eHARS)
- Mother’s HIV diagnosis date
- CD4 and viral load (VL) labs (labs = proxy for HIV care)
Methods: Total Perinatal HIV Exposures

Women living with HIV who delivered a live infant in Georgia in 2016:
  • N=192

Live infants delivered:
  • N=196

Location of birth
  • Based on the location where the infant was delivered:
    o Metropolitan Atlanta: n=123
    o Non-metro Atlanta (Elsewhere in Georgia): n=69
Demographic characteristics of women living with HIV who delivered a live infant in Georgia (n=192)

<table>
<thead>
<tr>
<th>DEMOGRAPHICS</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Maternal Age at Delivery</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 25 yrs</td>
<td>52</td>
<td>27.1</td>
</tr>
<tr>
<td>25-34 yrs</td>
<td>104</td>
<td>54.2</td>
</tr>
<tr>
<td>35 + yrs</td>
<td>36</td>
<td>18.8</td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black, non-Hispanic</td>
<td>162</td>
<td>84.4</td>
</tr>
<tr>
<td>White, non-Hispanic</td>
<td>11</td>
<td>5.7</td>
</tr>
<tr>
<td>Hispanic</td>
<td>9</td>
<td>4.7</td>
</tr>
<tr>
<td>Other or unknown</td>
<td>10</td>
<td>5.2</td>
</tr>
<tr>
<td><strong>Transmission Category</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heterosexual contact</td>
<td>113</td>
<td>58.9</td>
</tr>
<tr>
<td>Injection drug use</td>
<td>3</td>
<td>1.6</td>
</tr>
<tr>
<td>Perinatal Exposure</td>
<td>9</td>
<td>4.7</td>
</tr>
<tr>
<td>Missing*</td>
<td>67</td>
<td>34.9</td>
</tr>
</tbody>
</table>

*The distribution of risk among these likely reflects those with complete risk information.
Prenatal Care

Prenatal Care Beginning in the First Trimester, Georgia 2016:

- Among women living with HIV in Georgia: 54%*
- Among all women in Georgia: 70-75% ²

*Note: 10% of mothers were missing data on time of prenatal care start.

Number of prenatal care visits among women living with HIV who delivered a live infant, Georgia 2016

<table>
<thead>
<tr>
<th>Number of Prenatal Care Visits</th>
<th>Percent of Mothers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zero</td>
<td>4%</td>
</tr>
<tr>
<td>1 to 3</td>
<td>7%</td>
</tr>
<tr>
<td>4 to 7</td>
<td>18%</td>
</tr>
<tr>
<td>&gt;= 8</td>
<td>66%</td>
</tr>
<tr>
<td>Missing</td>
<td>6%</td>
</tr>
</tbody>
</table>

**Inadequate Prenatal Care*: 38%**

*Inadequate prenatal care defined by the Missouri Index (which accounts for number of prenatal care visits and start of prenatal care during pregnancy) as less than five visits for gestational age at delivery <37 weeks, less than 8 visits for gestational age ≥37 weeks, or prenatal care started after fourth month of pregnancy.*
Time of Maternal HIV Diagnosis Among Women who Delivered a Live Infant, Georgia 2016

**Time of Maternal HIV Diagnosis (n=191*)**
- 74%: During Pregnancy
- 23%: Before Pregnancy
- 3%: At or After Infant Delivery

*One mother was missing information on time of HIV diagnosis.

**Trimester of HIV Diagnosis, among Women Diagnosed During Pregnancy (n=44)**
- 39%: 1st trimester
- 34%: 2nd trimester
- 27%: 3rd trimester

*One mother was missing information on time of HIV diagnosis.*
Maternal Viral Suppression by Time of Delivery Among Women who Delivered a Live Infant, Georgia 2016

Maternal viral suppression at delivery (n=192)

Maternal viral load unsuppressed at delivery 22%
Maternal viral load suppressed at delivery 78%

Time of maternal HIV diagnosis, among women with unsuppressed viral load at delivery (n=42*)

- Before Pregnancy 60%
- During Pregnancy 29%
- At or After Delivery 12%

*The 42 women considered unsuppressed at delivery include women (n=12) missing viral load data around the time of infant delivery.
Receipt of HIV care and viral suppression before, during and after pregnancy, Georgia 2016

*Definitions: Any care - at least one HIV-related lab (CD4 or viral load) in the specified time period; Viral suppression (before and after pregnancy) - viral load < 200 copies/mL; Viral suppression (during pregnancy) - viral load < 1000 copies/mL by infant delivery.

*Note: Estimates exclude women diagnosed at or after delivery (n=5) and woman with missing HIV diagnosis time (n=1)
Receipt of HIV care and viral suppression during and after pregnancy by location of birth, Georgia 2016

*Note: viral suppression defined as viral load < 1000 copies/mL by infant delivery for the period during pregnancy and as viral load <200 copies/mL during the 12 months after pregnancy.
Demographic and birth history characteristics of infants born to women living with HIV, Georgia 2016 (n=196)

<table>
<thead>
<tr>
<th>DEMOGRAPHICS</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>104</td>
<td>53.1</td>
</tr>
<tr>
<td>Male</td>
<td>92</td>
<td>46.9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BIRTH DETAILS</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth Type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>186</td>
<td>94.9</td>
</tr>
<tr>
<td>Twins</td>
<td>10</td>
<td>5.1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Delivery Method</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaginal</td>
<td>76</td>
<td>38.8</td>
</tr>
<tr>
<td>Cesarean</td>
<td>120</td>
<td>61.2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Neonatal Status</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full Term (≥ 37 weeks)</td>
<td>143</td>
<td>73.3</td>
</tr>
<tr>
<td>Premature† (&lt; 37 weeks)</td>
<td>52</td>
<td>26.7</td>
</tr>
</tbody>
</table>

*Categories may not add up to total due to missing data
†Infant birth before 37 weeks gestational age
Receipt of recommended labor & delivery prevention measures statewide, Georgia 2016

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>Unknown</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neonatal ZDV</td>
<td>97%</td>
<td>3%</td>
<td></td>
</tr>
<tr>
<td>Intrapartum Maternal ZDV</td>
<td>73%</td>
<td>18%</td>
<td>9%</td>
</tr>
<tr>
<td>C-Section</td>
<td>82%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neonatal NVP</td>
<td>51%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

All infants (n=196)

Infants born to mothers who did not achieve viral suppression by delivery (n=45)
Receipt of recommended labor & delivery prevention measures by location of birth, Georgia 2016

<table>
<thead>
<tr>
<th>Percent of Infants</th>
<th>Metro-Atlanta Births</th>
<th>Non-Metro Births</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neonatal ZDV</td>
<td>100%</td>
<td>93%</td>
</tr>
<tr>
<td>Intrapartum Maternal ZDV</td>
<td>88%</td>
<td>55%</td>
</tr>
<tr>
<td>Cesarean Section</td>
<td>92%</td>
<td>65%</td>
</tr>
<tr>
<td>Neonatal NVP</td>
<td>64%</td>
<td>35%</td>
</tr>
</tbody>
</table>

All Infants (n=196)

Infants born to mothers who did not achieve viral suppression by delivery (n=45)

*4 births in non-metro area were missing intrapartum maternal ZDV information*
Maternal viral suppression by delivery and receipt of all labor & delivery (L&D) interventions, by time of maternal HIV diagnosis, Georgia 2016

- **Diagnosed Before Pregnancy**
  - n = 144
  - 81% Not VS during pregnancy, no L&D gaps
  - 10% VS during pregnancy, no L&D gaps
  - 1% Not VS during pregnancy, >= 1 L&D gap

- **Diagnosed During Pregnancy**
  - n = 46
  - 70% Not VS during pregnancy, no L&D gaps
  - 11% VS during pregnancy, no L&D gaps
  - 2% Not VS during pregnancy, >= 1 L&D gap

- **Dx At or After Delivery**
  - n = 5
  - 100% Not VS during pregnancy, no L&D gaps
  - 0% VS during pregnancy, no L&D gaps
  - 0% Not VS during pregnancy, >= 1 L&D gap

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**Legend**
- Red: Not VS during pregnancy, >= 1 L&D gap
- Light Blue: VS during pregnancy, >= 1 L&D gap
- Dark Blue: Not VS during pregnancy, no L&D gaps
- Light Gray: VS during pregnancy, no L&D gaps
Maternal viral suppression by delivery and labor & delivery (L&D) interventions, by maternal HIV diagnosis time and viral suppression pre-pregnancy, GA 2016

<table>
<thead>
<tr>
<th>Maternal HIV Diagnosis Time</th>
<th>Maternal Viral Suppression by Delivery and Labor &amp; Delivery (L&amp;D) Interventions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnosed Before Pregnancy</td>
<td>VS &lt;200 Before Pregnancy, n = 75</td>
</tr>
<tr>
<td></td>
<td>VS &gt;200 Before Pregnancy, n = 69</td>
</tr>
<tr>
<td>Diagnosed During Pregnancy</td>
<td>Diagnosed During Pregnancy, &gt;= 1 L&amp;D gap, n = 46</td>
</tr>
<tr>
<td></td>
<td>Diagnosed During Pregnancy, no L&amp;D gaps, n = 5</td>
</tr>
<tr>
<td>Diagnosed At or After Delivery</td>
<td>Diagnosed At or After Delivery, &gt;= 1 L&amp;D gap, 100%</td>
</tr>
</tbody>
</table>

- Not VS during pregnancy, >= 1 L&D gap
- VS during pregnancy, >= 1 L&D gap
- Not VS during pregnancy, no L&D gaps
- VS during pregnancy, no L&D gaps
Total number of missed prevention measures among all infants born to women living with HIV in Georgia, 2016

*Missed prevention measures considered in this total count include: late maternal HIV diagnosis (after 7th month of pregnancy), unsuppressed maternal viral load at infant delivery, and the following labor & delivery prevention measures: neonatal ZDV, neonatal NVP, maternal IV ZDV, and cesarean delivery. Unknown or missing values were not counted as a missed opportunity.
Estimated Perinatal HIV Transmission Rate

- 5 perinatal HIV transmissions
- Total known HIV-exposed live births: 228
  - 196 from the “master list” of births (presented here)
  - 32 additional exposed births
    - Match between Georgia Vital Records 2016 birth registry and eHARS
    - Data abstraction not completed

- Estimated transmission rate, Georgia 2016: 2.2%*

*Approximately twice the rate of <1% that can be achieved when all prevention measures in place.
Limitations

• Imperfect systems for capturing HIV-exposed infants
• Women (n=12) with unknown viral suppression at delivery
  • Can’t determine from HIV Surveillance system (or)
  • Not clear in labor & delivery chart
• Incomplete maternal HIV lab data
  • Possible underestimation of proportion of women who received any HIV care and achieved viral suppression during pregnancy
• Missing detailed data regarding labor & delivery medication
  • Time between birth and NVP/ZDV
  • Length of time mother received IV ZDV
• Missing data for birth history variables (prenatal care)
Key Prevention Successes

- 75% of HIV positive women who delivered a live infant in 2016 were diagnosed prior to pregnancy
  - Earlier diagnosis allows for retention in care and viral suppression as early as possible

- 78% of all HIV-exposed births were to mothers with a suppressed viral load at delivery
  - Minimized transmission risk during labor and delivery.

- Almost all (97%) of infants received ZDV at delivery as recommended

- 76% of mother-baby pairs received all recommended prevention measures
Key Prevention Gaps: Before Infant Delivery

HIV Care for Women:
• 60% of women virally unsuppressed by delivery were diagnosed before pregnancy
  o **Key missed opportunity:** minimize transmission risk by ensuring all women diagnosed with HIV are in care and virally suppressed prior to pregnancy

Prenatal Care:
• 38% of women living with HIV who delivered in 2016 received inadequate prenatal care
Key Prevention Gaps: Labor & Delivery

Gaps remain in L&D prevention measures statewide
  • Most prevalent gap was failure to receive neonatal NVP when indicated (55%)
  • Some of these gaps are due to factors out of the hospital’s control, depending on the delivery circumstances

For births outside of metro Atlanta (compared to metro Atlanta births):
  • More gaps in labor & delivery prevention measures
    o Caveat: more missing data in non-metro areas
Work Underway to Address Gaps

HIV Program:

• Awareness and provider training initiatives implemented
• Efforts to coordinate HIV and prenatal care for women living with HIV
• Use of HIV surveillance data to inform progress towards objectives outlined in the HIV Perinatal Strategic Plan

Survey of pharmacies at birthing hospitals in Georgia

• Stocking and inventorying of ART (especially NVP) for perinatally exposed infants

Ongoing perinatal HIV exposure surveillance
Thank you!

Questions?

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pascale.wortley@dph.ga.gov

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