

Poster # 602: The Comparison of Current Health Status and Selected Baseline Characteristics of Perinatally and Behaviorally HIV-infected Children and Adolescents, through 24 Years of Age in the United States, the CDC LEGACY Cohort Study, 2006-7

Kenneth L Dominguez^{S1}, Beverly Bohannon¹, Jenine Milum² and the CDC LEGACY Consortium

Centers for Disease Control and Prevention, Atlanta, GA, US¹ and Ginn Group Inc., Atlanta, GA, US²



Abstract

Background. The CDC instituted a new cohort study in HIV-infected subjects from birth through 24 years of age as of 2004 to describe clinical and psychosocial aspects of HIV infection.

Methods. Twenty-two hospital/clinic sites were selected using a population proportional-to-size sampling method. This observational longitudinal cohort study is limited to HIV-infected subjects from birth to 25 years of age at enrollment in U.S. states. We included subjects with ≥ 1 abstracted clinic visit during or after 2006 in this analysis.

Results. As of 12/31/07, 1,480 HIV-infected (69%) of approximately 2160 eligible youth had been enrolled and met inclusion criteria, including 794 (54%) females, 1,016 (69%) non-Hispanic Blacks, and 343 (23%) Hispanics. Participants were nearly equally divided into 3 age groups (years): <13 (34%), 13-18 (36%) and >19 (30%) and had an overall median age of 14.8 years. Their mode of HIV transmission was classified as perinatal (70.3%), behavioral (12.3%), and other (transfusion, transplant, breastfeeding, sexual abuse) (17.4%); with respective median ages (years) of 13.2, 21.9, and 16.5. Most subjects (77%) were being treated with ARVs, and mainly PI-based regimens (53%), however, perinatal subjects were much more likely to be on ARVs compared to behavioral subjects (OR=8.74, p<0.0001). Thirty-two percent of subjects overall had an HIV viral load (VL) <400 copies/mL (c/mL) and 40% had a VL between 400-9,999 c/mL. While perinatal subjects were about twice as likely to have a VL<400 c/mL and no immunosuppression compared to behavioral subjects, they were also 1.9 times as likely to have severe immunosuppression (p<0.005) and 2.3 times as likely to have an AIDS-defining condition (ADC) during their last visit (p<0.05). Less than 8% of subjects had a VL $\geq 100,000$ c/mL (range 6.6%-9.7%). Sex was discussed by health care providers with 65.7% of subjects ≥ 13 years of age; 32.8% of these subjects reported being sexually active in 2006-7; and behavioral subjects were >5 times as likely as perinatal subjects to be sexually active (OR=5.51, p<0.0001).

Conclusions. Most LEGACY subjects were ≥ 13 years of age, receiving ARV therapy (mainly PI-based HAART), and experiencing no or moderate immunosuppression, VLs <10,000 c/mL, and a lack of ADCs. A significant proportion of all subjects ≥ 13 years of age reported being sexually active. Urgent follow-up is recommended to prevent secondary HIV transmission from this population.

Introduction

- Today's HIV-infected youth in the United States are a mixture of mainly perinatally and behaviorally HIV-infected youth.
- Although they are both young and HIV-infected, and are affected by similar psychosocial pressures, perinatally and behaviorally HIV-infected youth represent distinct clinical subpopulations.
- The primary objective of LEGACY is to better understand the factors related to HIV disease progression that may help us to improve the health of HIV-infected children and adolescents, and to provide data that will assist in strengthening primary and secondary prevention activities for HIV-infected adolescents. We plan to provide data that will:
 - Further define trends in pediatric adolescent HIV morbidity and survival
 - Elucidate long term consequences of HIV infection/ARV treatment in the HAART era.
- This represents a first look at the LEGACY cohort focusing on describing key demographic, clinical and psychosocial characteristics, including ARV use, viral loads, and documentation of sexual activity among youth ≥ 13 years of age.

Methods

- Twenty-two hospital/clinic sites were selected using a population proportional-to-size sampling method; included mix of small, medium and large institutions.
- This observational longitudinal cohort study is limited to HIV-infected subjects from birth to 25 years of age at enrollment followed by a pediatrician or adolescent medicine specialist.
- We included subjects with ≥ 1 abstracted clinic visit during or after 2006 in this analysis.
- Data was abstracted from the medical records, including HIV specialty clinics visits, emergency room visits, hospitalizations, social work notes.
- For this analysis, we characterized demographic, clinical (antiretroviral drug regimens, HIV-1 viral loads, immunologic categories, and history of recent sexual activity).
- We updated the results from the time that abstract was created, to provide the most up-to-date depiction of the cohort

Methods



Results

Table 1: Demographics by Mode of Transmission

| Characteristic | Mode of Transmission (no. and %) | | | |
|------------------------------------|----------------------------------|--------------------------------|---------------------------|-------------------------------|
| | Perinatal N=1040 (70.3%) | Behavioral N=182 (12.3%) | Other N=257 (17.4%) | Overall N=1479 (100.0%) |
| Age: | | | | |
| Birth-12 years | 443 42.8% | 0 0.0% | 50 19.5% | 507 34.3% |
| 13-18 years | 438 42.1% | 16 8.8% | 76 29.5% | 530 35.8% |
| 19-24 years | 159 15.3% | 166 91.2% | 117 45.5% | 442 29.9% |
| Median Age(yrs.) | 13.2 | 21.9 | 16.5 | 14.5 |
| Gender: | | | | |
| Female | 570 54.9% | 102 56.0% | 121 47.1% | 794 53.7% |
| Male | 470 45.2% | 79 43.4% | 136 52.9% | 686 46.3% |
| Race/ethnicity: | | | | |
| Black, NH | 725 69.7% | 118 64.6% | 173 67.3% | 1016 68.7% |
| Hispanic | 242 23.3% | 46 25.3% | 55 21.4% | 343 23.2% |
| White, NH | 44 4.2% | 9 5.0% | 21 8.2% | 74 5.0% |
| Mixed race | 26 2.5% | 7 3.9% | 6 2.3% | 39 2.6% |
| Asian | 0 0.0% | 0 0.0% | 0 0.0% | 0 0.0% |
| American Indian/ Alaskan Native | 0 0.0% | 0 0.0% | 0 0.0% | 0 0.0% |
| Unknown | 1 0.1% | 1 0.1% | 0 0.0% | 2 0.1% |

- As of 7/31/07, 1,479 HIV-infected (68.5%) of approximately 2160 eligible youth had been enrolled and met inclusion criteria, including 794 (53.7%) females, 1,016 (68.7%) non-Hispanic Blacks, and 343 (23.2%) Hispanics.
- Participants were nearly equally divided into 3 age groups (years) <13 (34.3%), 13-18 (35.8%) and >19-25 (29.9%) and had an overall median age of 14.5 years.
- Their mode of HIV transmission was classified as perinatal (70.3%), behavioral (12.3%), and other (transfusion, transplant, breastfeeding, sexual abuse) (17.4%); with respective median ages (years) of 13.2, 21.9, and 16.5.

Results

Table 2: Antiretroviral Therapy (ART) Profile by Mode of Transmission

| Characteristic | Mode of Transmission (no. and %) | | | |
|-----------------------|----------------------------------|--------------------------------|---------------------------|-------------------------------|
| | Perinatal N=1040 (70.3%) | Behavioral N=182 (12.3%) | Other N=257 (17.4%) | Overall N=1479 (100.0%) |
| ART: No therapy | 167 16.5% | 112 61.5% | 72 28.0% | 349 23.3% |
| Naive | 14 1.4% | 49 26.9% | 29 11.3% | 92 6.2% |
| Experienced, off ARVs | 147 14.4% | 63 34.6% | 43 16.7% | 253 17.1% |
| Receiving ARVs | 879 84.6% | 70 38.4% | 186 72.0% | 1134 76.7% |
| Number of ARVs | | | | |
| Mono Therapy | 13 1.3% | 0 0.0% | 1 0.4% | 14 1.0% |
| Dual Therapy | 61 5.9% | 0 0.0% | 0 0.0% | 61 4.1% |
| Triple Therapy | 519 49.9% | 47 25.8% | 128 49.8% | 693 46.9% |
| ≥ Quadruple therapy | 267 27.6% | 23 12.6% | 56 21.8% | 366 24.7% |
| Type of ART Regimen | | | | |
| ≥ 2 NRTIs + 1 PI | 604 58.8% | 51 28.0% | 126 49.0% | 781 52.8% |
| ≥ 2 NRTIs + 1 NNRTI | 106 10.2% | 14 7.7% | 35 13.6% | 155 10.5% |
| ≥ 3 NRTIs | 45 4.3% | 5 2.8% | 17 6.6% | 67 4.5% |

- Among the 345 participants not receiving ART therapy, 253 (73.3%) had a previous history of having received ART therapy and behaviorally infected subjects were 8.7 times more likely than perinatal subjects to be off therapy. (95% CI: 6.11,12.49; p<0.01)
- Among the participants being treated with ARVs, 693 of 1134 (61.1%) were receiving triple therapy and 366 (32.3%) were receiving four or more ARVs. There were no significant differences among the participants by mode of transmission in terms of proportions of participants receiving 3 or more ARVs. 75 of 1134 (6.6%) were receiving dual or mono ARV therapy.
- Among those 1059 patients receiving 3 or more ARVs, the vast majority (781 (73%)), were receiving PI-based regimens.

Table 3: Clinical Endpoints by Mode of Transmission

| Characteristic | Mode of Transmission (no. and %) | | | |
|--|----------------------------------|--------------------------------|---------------------------|-------------------------------|
| | Perinatal N=1040 (70.3%) | Behavioral N=182 (12.3%) | Other N=257 (17.4%) | Overall N=1479 (100.0%) |
| CDC Immunologic Category: | | | | |
| 1 No suppression | 380 37.3% | 43 23.6% | 65 25.3% | 488 33.0% |
| 2 Moderate suppression | 396 38.8% | 110 60.4% | 121 47.1% | 627 42.3% |
| 3 Severe suppression | 244 23.9% | 29 15.7% | 70 27.2% | 339 22.9% |
| HIV-1 Viral load: | | | | |
| <400 (copies/mL) | 361 34.7% | 43 23.6% | 67 26.1% | 471 31.8% |
| 400-9999 | 368 35.4% | 42 23.0% | 113 44.0% | 523 35.4% |
| 10K-99,999 | 215 20.7% | 49 26.9% | 50 19.5% | 314 21.2% |
| ≥100K | 80 7.7% | 12 6.6% | 25 9.7% | 117 7.9% |
| No viral load | 16 1.5% | 6 3.3% | 2 0.8% | 24 1.6% |
| AIDS Defining Condition (ADC) diagnosed noted at last visit | 134 12.9% | 11 6.0% | 34 13.2% | 179 12.1% |

- Overall, 1024 of 1479 participants had HIV-1 viral loads (VL) less than 10,000 copies/mL (c/mL), including 553 (31.9%) with VL <400 c/mL and 553 (37.4%) with a VL between 400-10,000 c/mL.
- While perinatal subjects were nearly twice as likely to have a VL <400 c/mL and no immunosuppression compared to behavioral subjects (OR=1.72; p<0.005 and OR=1.86; p<0.005, respectively), they were also 1.93 times as likely to have severe immunosuppression (p<0.005) and 2.3 times as likely to have an AIDS-defining condition (ADC) during their last visit (p<0.05). Overall, 7.9% of subjects had a VL $\geq 100,000$ c/mL (range 6.6%-9.7% by mode).

Table 4: History of Sexual Activity and Discussion of Sex by Clinician during Clinic Visit by Mode of Transmission in Participants ≥ 13 Years of Age

| Characteristic | Mode of Transmission (no. and %) | | | |
|--|----------------------------------|--------------------------------|---------------------------|-------------------------------|
| | Perinatal N=1040 (70.3%) | Behavioral N=182 (12.3%) | Other N=257 (17.4%) | Overall N=1479 (100.0%) |
| ≥ 13 years of age and sex discussed in clinic visit* | 597 57.4% | 182 100.0% | 193 75.1% | 972 65.7% |
| reported to be sexually active** in 2006 or 2007 | 405 67.8% | 140 76.9% | 150 77.7% | 695 71.5% |
| sex discussed by health care provider | 132 22.1% | 111 61.0% | 76 39.4% | 319 32.8% |

* Percentage is calculated based on the number of participants 13 years of age or older

- Sex was discussed by health care providers with 65.7% of subjects ≥ 13 years of age
- 32.8% of these subjects reported being sexually active in 2006-7
- Behavioral participants were more than 5 times as likely as perinatal participants to be sexually active (OR=5.51, p<0.0001).

Table 5: HIV-1 Viral load levels and Condom Use by Mode of Transmission in Participants >13 years of age, Reporting to be Sexually Active in 2006-7

| Characteristic | Mode of Transmission (no. and %) | | | |
|-------------------|----------------------------------|-------------------------------|--------------------------|------------------------------|
| | Perinatal N=119 (61.4%) | Behavioral N=76 (34.8%) | Other N=76 (23.8%) | Overall N=319 (100.0%) |
| HIV-1 Viral load: | | | | |
| <400 (copies/mL) | 31 23.5% | 29 26.1% | 15 21.1% | 75 23.8% |
| 400-9999 | 48 36.4% | 47 42.3% | 33 43.1% | 128 40.1% |
| 10K-99,999 | 40 30.3% | 25 22.5% | 19 25.0% | 84 26.3% |
| ≥100K | 13 9.9% | 6 7.2% | 8 10.5% | 27 8.1% |
| No viral load | 0 0.0% | 2 1.8% | 0 0.0% | 2 0.6% |
| Condom Use: | | | | |
| Yes | 67 50.8% | 69 62.0% | 44 57.9% | 180 56.4% |
| No | 2 1.5% | 1 0.9% | 3 4.1% | 6 1.9% |
| Missing/Unknown | 63 47.7% | 41 36.9% | 29 38.2% | 133 41.7% |

- 317 of 319 sexually active participants ≥ 13 years of age had documented HIV-1 viral loads.
- 23.8% of these sexually active participants had undetectable HIV-1 viral loads while 35.4% had viral loads >10,000 copies/mL.
- Condom use to the affirmative or negative was documented in 186 or 57.3% of sexually active participants >13 years of age; 180 of 186 (96.8%) such responses documented condoms were being used.
- Lack of condom use was seldom reported, but 5 sexually active participants with detectable viral loads between 400 and 99,999 copies were documented as not using condoms (data not shown)

Conclusions

- Most LEGACY subjects were ≥ 13 years of age, receiving ARV therapy (mainly PI-based HAART), and experiencing no or moderate immunosuppression, VLs <10,000 c/mL, and a lack of ADCs.
- Nearly a third of participants ≥ 13 years of age reported being sexually active and nearly three quarters of providers are documenting having discussed sexual behaviors/prevention with patients on clinic visits.
- Urgent follow-up is recommended to prevent secondary HIV transmission from this population.

Acknowledgement and Disclaimer

We thank the participants and their families for consenting to participate in this CDC-sponsored longitudinal cohort study and thank Westat, Inc. for serving as the monitoring contractor for this project and for developing the remote data capture software used to abstract the data. The findings and conclusions in this paper are those of the authors and do not necessarily represent the views of the Centers for Disease Control and Prevention.