

Incidence and Predictors of Viral Suppression in a Cohort of Perinatally HIV Infected Children and Adolescents

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INTRODUCTION

Measures beyond frequency of reaching undetectable HIV viremia are needed to guide therapeutic decisions, identify social disparities and provide performance benchmarks to compare HIV practices. To these ends we calculate the incidence rate (IR) of viral suppression (VS) and determine predictors of VS for a population of perinatally HIV infected individuals

METHODS

We include patients attending the UTHealth pediatric HIV clinic who were previously ART naïve and subsequently started on cART, maintained on the same cART regimen and followed for ≥ 1 year from the start of cART. Successful viral suppression was defined as maintenance of HIV RNA < 400 copies/ml for 1 year after initial viral suppression was achieved. The incidence of viral load suppression was calculated as the number of individuals who reached viral suppression divided by the number of patient months. Patient months is computed as the time from the date of initiation of cART until the date of viral suppression, loss to follow up or switch to a 2nd cART regimen and was expressed per 100 patient months. A Cox regression model was used to determine predictors of viral suppression.

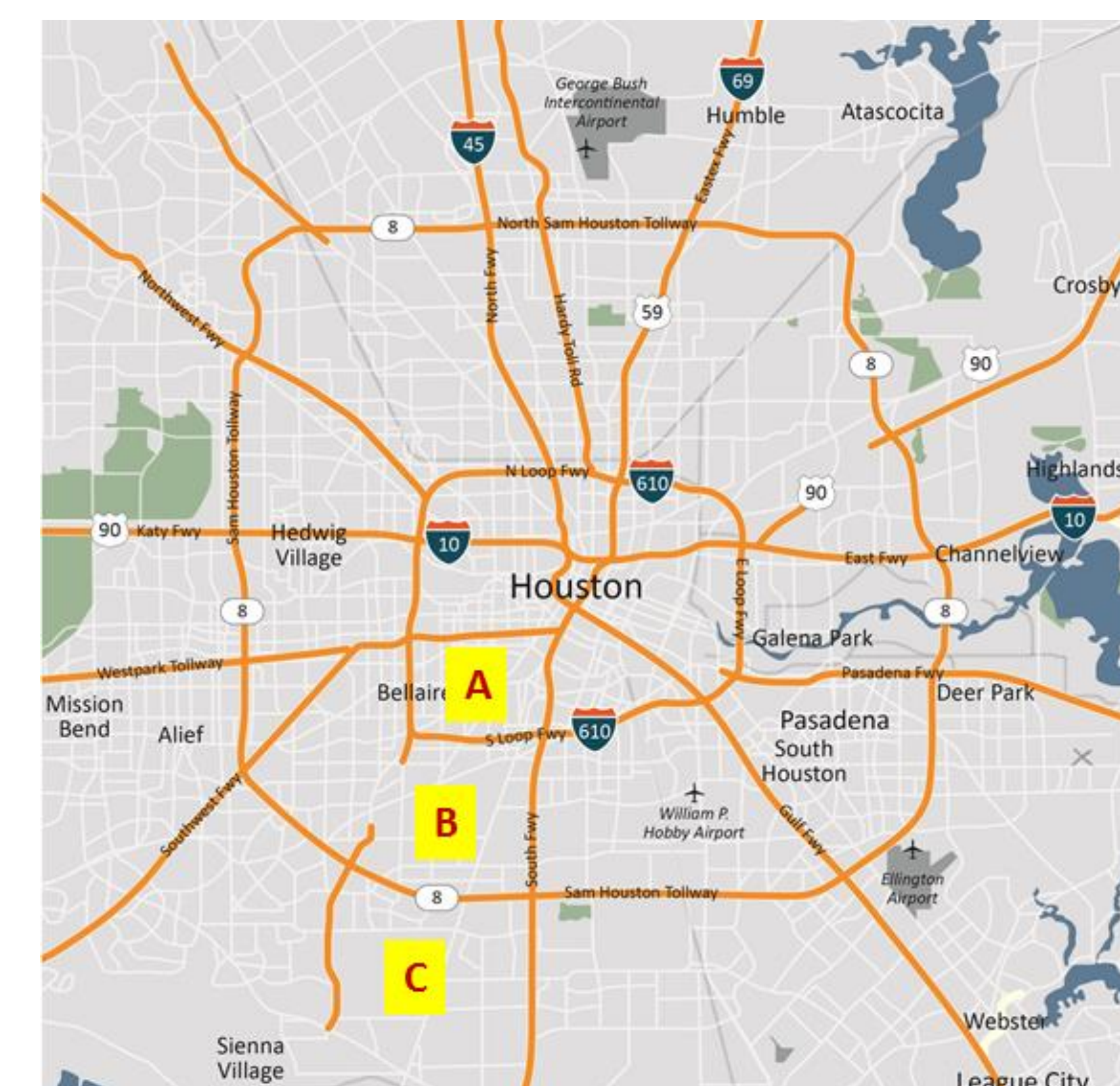
RESULTS

Table 1. Demographics

	All (N=30)	
	N	%
Ethnicity		
Black-non hispanic	23	76.7
Hispanic ‡	7	23.3
Gender		
Male	17	56.7
Birth Cohort		
1996-1999	9	30
2000-2007	21	70
Age at clinical care engagement, months (median, IQR)	0.1	0.0-16.5
Number of clinical visits missed from the date of clinical care engagement		
0	13	43.3
≥ 1	17	56.7
Zip Code area		
Area A	6	20
Area B	10	33.3
Area C	14	46.7
First cART regimen		
PI	24	80
NNRTI	5	16.7
Triple-NRTI	1	3.3
Clinical data before first cART		
Nadir CD4 % (median, IQR)	31.5	21-39
Peak HIV RNA log ₁₀ copies/ml (median, IQR)	5.7	5.3-5.9
Clinical data at cART initiation		
Age, months (median, IQR)	5.1	2.7-27.3
CD4 % (median, IQR)	33	24-39
HIV RNA log ₁₀ copies/ml (median, IQR)	5.5	4.8-5.9
Cumulative HIV RNA through cART initiation, log ₁₀ copies/ml (median, IQR)	7.1	6.8-7.7
Length of cART therapy (months) (median, IQR)	33.8	12.9-55.3

Counts are reported as number (%); continuous variables are reported as median (IQR); cART: combine antiretroviral therapy; ‡ white (n=2) and Hispanics (n=5)

Figure Houston urban area map



Area A corresponds to metropolitan area within beltway 610 and forms a 38-mile-long (61 km) loop around the downtown sector of city of Houston, Texas.
Area B is Beltway 8 and corresponds to the intermediate beltway in the Houston area
Area C correspond to the area outside beltway 8 and describe the distant areas of Houston city.

RESULTS

Table 2 Incidence rate of viral suppression

	Person-months	Individuals with viral suppression	Incidence rate ^a	95% CI
Birth cohort				
1996-1999	98.90	3	3.03	0.98-9.41
2000-2003	43.30	3	6.98	2.25-21.63
> 2003	99.40	13	13.08	7.59-22.52
Age at cART initiation				
< 6 months	143.2	9	6.28	3.27-12.08
≥ 6 months	98.10	10	10.19	5.48-18.95
Ethnicity				
Black-non Hispanic	199.03	14	7.03	4.17-11.88
Hispanic	42.27	4	11.83	4.92-28.42
Geographic area of residency				
Area A	24.50	4	16.33	6.13-43.50
Area B	90.20	5	5.54	2.31-13.32
Area C	126.60	10	7.90	4.25-14.68
Missed clinical visits				
0	132.83	15	11.29	6.81-18.73
> 1	108.47	4	3.69	1.38-9.83
Plasma HIV RNA at cART initiation (log₁₀ copies/ml)				
< 6	28.9	8	25.65	13.83-55.29
≥ 6	212.4	11	5.18	2.87-9.35
Cumulative HIV RNA quartiles (log₁₀ copy-years)				
< 6.8	55.07	5	9.08	3.78-21.81
6.8-7.1	69.43	6	8.64	3.88-19.23
7.2-7.7	61.47	4	6.51	2.44-17.34
>7.7	55.33	4	7.23	2.71-19.26

Thirty individuals are included in the analysis; ^a Incidence rates are expressed as the number of individuals who suppress viral replication per 100 person-months.

Table 3 Factors associated with viral suppression among perinatally HIV infected children and adolescents

	Model A			Model B			Model C		
	HR ^a	95 % CI	p ^b	HR ^a	95 % CI	p ^b	HR ^a	95 % CI	p ^b
Sex									
Female	1	Referent		1	Referent		1	Referent	
Male	1.35	0.35 – 5.24	0.66	0.81	0.23 - 3.43	0.86	0.91	0.27 – 3.10	0.88
Ethnicity									
Hispanic	1	Referent		1	Referent		1	Referent	
Black – non Hispanic	1.20	0.27 – 5.37	0.81	0.89	0.23 - 3.43	0.86	0.78	0.18 – 3.27	0.73
Geographic area of residency^c									
Area A	1	Referent		1	Referent		1	Referent	
Area B	1.83	0.14 – 23.92	0.64	0.79	0.10 - 6.41	0.83	1.89	0.16 – 22.30	0.61
Time of engaging individuals in care, (months)^d	0.88	0.80 - 0.97	0.01	0.93	0.87 - 1.00	0.04	0.95	0.89 – 1.01	0.12
Age at cART initiation (months)^e	1.15	1.05 - 1.25	0.002	1.10	1.03 - 1.17	0.003	1.09	1.03 – 1.15	0.005
Therapy cohort									
1996-1999	1	Referent		1	Referent		1	Referent	
2000-2003	4.57	0.42 - 49.28	0.21	4.54	0.45 - 45.56	0.11	4.84	0.50 – 46.52	0.17
>2003	75.48	3.66 - 1556.36	0.005	35.24	2.22 - 558.17	0.01	62.32	3.56 – 1091.15	0.005
Number of missed clinical visits									
0	1	Referent		1	Referent		1	Referent	
1-2	1.67	0.13 - 22.14	0.70	0.94	0.08 - 10.93	0.96	1.70	0.13 – 22.23	0.69
> 2	0.72	0.11 - 4.81	0.73	0.89	0.13 - 5.94	0.90	0.80	0.13 – 4.92	0.81
Cumulative HIV RNA, log₁₀ copy-years/ml at cART initiation^f	0.26	0.07 - 0.98	0.04	-	-	-	-	-	-
Peak HIV RNA before cART initiation, log₁₀ copies/ml^g	-	-	-	0.74	0.18 - 3.04	0.672	-	-	-
Plasma HIV RNA at cART initiation, log₁₀ copies/ml^h	-	-	-	-	-	-	0.34	0.12 – 0.99	0.05
Nadir CD4 %ⁱ	1.12	1.01 – 1.25	0.03	1.11	1.00 - 1.23	0.04	1.15	1.03 – 1.27	0.01

A hazard ratio > 1 indicates higher rate of viral suppression per unit of time., Significance is defined as a two-side p value < 0.05.

CONCLUSIONS

Our data demonstrate the importance of linking and retaining perinatally HIV infected patients in care for successful viral suppression as well as the impact of engagement into care for successful viral suppression among vulnerable populations. The incidence rate of viral suppression is suggested as a metric for comparing interventions within and across HIV practices.