

Disparities in Community Viral Load among HIV Infected Persons in NYC

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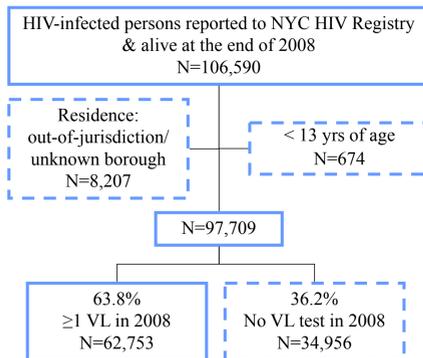
BACKGROUND

- Viral load is a measure of the amount of virus in the plasma/blood that can indicate transmissibility.
- Community viral load (CVL) is the measure of total or average viral load level in a given population. CVL is a novel public health approach and calculations vary.
- The National HIV/AIDS Strategy highlights the absence of community-level approaches to alter conditions in which HIV is transmitted and to address factors that influence disparities among persons with HIV.

- Key interventions to reduce CVL in NYC:
Care Coordination and treatment adherence
Early and widespread HIV treatment
- Knowing where HIV is concentrated creates an opportunity to:
Intensify prevention
Lower community collective risk
Reduce disparities
Reduce morbidity and mortality

METHODS

- To be included in the analysis HIV-infected persons reported to the NYC HIV Registry (eHARS) had to be ≥13 years old by the end of 2007, alive at the end of 2008, NYC residents, and have ≥1 VL measure in 2008, as reported by 09/30/2010.
- Analyses were performed using SAS 9.1.
- Kruskal Wallis and Chi Square tests were used to investigate differences in CVL.
- Jonckheere - Terpstra trend test was used to investigate viral load trends from 2007-2009.
- Differences in CVL by neighborhood were mapped using ArcGIS 9.3.1.
- Detectable VL was defined as individual mean > 400 copies / ml for the year. Suppressed VL was defined as individual mean ≤ 400 copies / ml for the majority of the year (Apr – Dec).



OBJECTIVES

- Describe patterns of CVL in NYC, using laboratory data routinely reported through HIV surveillance.
- Determine correlates of CVL by patient and community-level characteristics.
- Determine trend of CVL from 2007 – 2009 by proportion of persons with suppressed viral loads.

CONCLUSION

- Among persons with detectable mean VL, CVL varied significantly by sex, age group, transmission risk, residence and CD4 levels.
- Males, young and middle aged adults, and men who have sex with men had higher mean VL compared to other demographic groups.
- There were significant differences in proportion suppressed by characteristics studied.
- Blacks, Hispanics, Native Americans, young adults and individuals residing in the Bronx had lower proportion of suppressed VL.
- The proportion suppressed increased over 3 years (2007 -2009).

DISCUSSION

- There are disparities in CVL that mirror known disparities of NYC's HIV epidemic.
- There are also clear geographic community disparities in CVL, and the proportion undetectable parallels differences in HIV/AIDS prevalence and death rates by neighborhood.
- CVL may be a valuable biomarker to add to routine analysis of HIV surveillance data.
- CVL may be useful to evaluate community-level interventions, especially those addressing disparities, or changing treatment paradigms like Test and Treat.
- However, the proportion of persons with undetectable VL in a population may be a more sensitive measure to assess the impact of community interventions and treatment effectiveness.

Strengths:

- The analyses was based on a comprehensive population-based surveillance system.
- Results were updated with the most recently available NYC data.
- Results were not limited to individuals' address at diagnoses.

LIMITATIONS

- This analysis excludes individuals unaware of their HIV status or not receiving HIV related medical care.
- The statistical analyses did not include treatment history as treatment data is not yet reportable by law.
- The statistical analyses did not adjust for the frequency of individual viral load testing.
- Viral load is not an absolute proxy for care engagement.
- Labs throughout NYC use testing kits with different platforms and therefore VL values may not be comparable across the city.

ACKNOWLEDGMENTS

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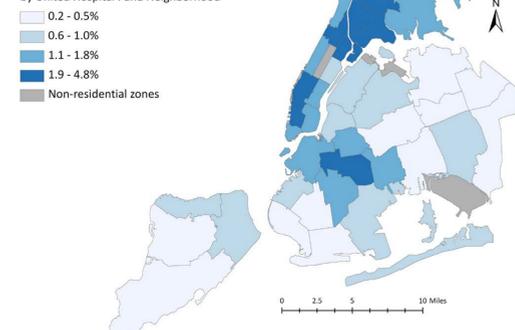


RESULTS

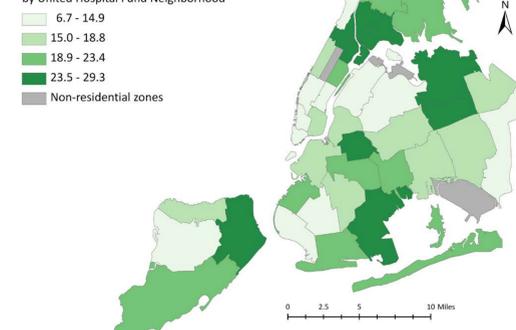
Table 1: Mean VL among persons with detectable mean viral load ^{1,4,5,7}

	Mean	N	%
Total	47,395	28,444	100.00
Sex*			
Male	50,387	18,959	66.65
Female	41,416	9,485	33.35
Race/Ethnicity			
Black	48,144	14,301	50.28
Hispanic	45,745	9,836	34.58
White	49,619	3,793	13.33
Asian/Pacific Islander	43,367	364	1.28
Native American	46,378	94	0.33
Other/unknown	23,531	56	0.20
Age Group (Years)*			
13 – 19	39,607	769	2.70
20 – 29	50,433	3,247	11.42
30 – 39	55,169	6,181	21.73
40 – 49	49,875	11,028	38.77
50 – 59	37,564	5,785	20.34
60+	31,780	1,434	5.04
Borough of residence*			
Manhattan	52,009	7,381	25.95
Brooklyn	47,797	7,951	27.95
Bronx	41,200	8,450	29.71
Queens	49,916	4,031	14.17
Staten Island	55,240	631	2.22
Transmission risk*			
Men who have sex with men	53,470	8,442	29.68
Injection drug use history	43,171	6,199	21.79
Heterosexual	43,475	6,377	22.42
Perinatal	32,375	663	2.33
Other	57,660	46	0.16
Unknown	48,794	6,717	23.61
Mean CD4 count*			
Missing	83,935	490	1.72
0-49	149,246	1,981	6.96
50-199	72,561	5,586	19.64
200-349	39,613	6,948	24.43
350-499	27,968	6,443	22.65
≥500	21,524	6,996	24.60

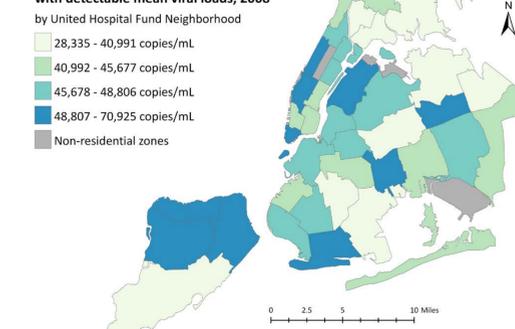
New York City - 2008 HIV Prevalence PWHA as percent of population ²
by United Hospital Fund Neighborhood



New York City - 2008 Death Rates Age-adjusted death rate per 1,000 PWHA ^{3,6}
by United Hospital Fund Neighborhood



New York City Mean viral load among HIV-infected persons with detectable mean viral loads, 2008 ^{2,4,5}
by United Hospital Fund Neighborhood



New York City Proportion of HIV-infected persons with detectable mean viral load, 2008 ^{2,4,5}
by United Hospital Fund Neighborhood

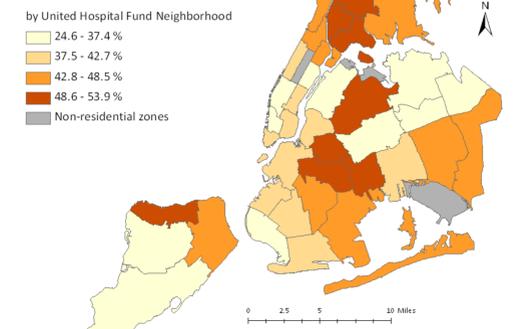


Figure 1: Proportion of persons with HIV/AIDS with suppressed VL each year, 2007 – 2009 ^{*,1,4,5,9}

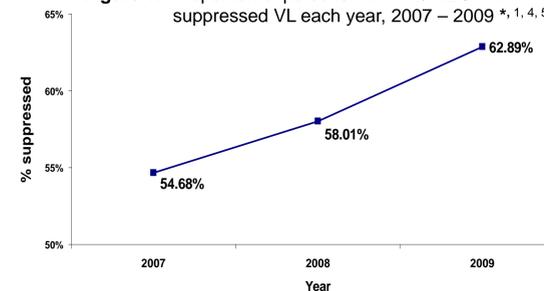


Table 2: Mean CVL by viral load categories ^{1,4,5,8}

	0-400: Suppressed		> 400: Not Suppressed		Total	
	N	Row %	N	Row %	N	Col %
Total	36,401	58.01	26,352	41.99	62,753	100.00
Sex*						
Male	25,212	58.95	17,553	41.05	42,765	68.15
Female	11,189	55.98	8,799	44.02	19,988	31.85
Race/Ethnicity*						
Black	15,171	53.15	13,372	46.85	28,543	45.48
Hispanic	12,452	57.88	9,063	42.12	21,515	34.29
White	7,913	69.67	3,445	30.33	11,358	18.10
Asian/Pacific Islander	652	66.33	331	33.67	983	1.57
Native American	79	46.75	90	53.25	169	0.27
Other/unknown	134	72.43	51	27.57	185	0.29
Age group (years)*						
13 - 19	440	37.64	729	62.36	1,169	1.86
20 - 29	1,660	35.15	3,062	64.85	4,722	7.52
30 - 39	5,988	50.96	5,763	49.04	11,751	18.73
40 - 49	14,034	57.83	10,232	42.17	24,266	38.67
50 - 59	10,458	66.55	5,256	33.45	15,714	25.04
60+	3,821	74.47	1,310	25.53	5,131	8.18
Borough of residence*						
Manhattan	11,280	62.37	6,807	37.63	18,087	28.82
Brooklyn	9,769	57.06	7,352	42.94	17,121	27.28
Bronx	8,974	53.26	7,875	46.74	16,849	26.85
Queens	5,545	59.80	3,728	40.20	9,273	14.78
Staten Island	833	58.54	590	41.46	1,423	2.27
Transmission risk*						
Men who have sex with men	12,586	61.81	7,775	38.19	20,361	32.45
Injection drug use history	6,570	53.08	5,808	46.92	12,378	19.72
Heterosexual	7,443	55.80	5,895	44.20	13,338	21.25
Perinatal	456	42.50	617	57.50	1,073	1.71
Other	110	72.85	41	27.15	151	0.24
Unknown	9,236	59.77	6,216	40.23	15,452	24.62
Mean CD4 count*						
Missing	742	60.72	480	39.28	1,222	1.95
0-49	116	5.68	1,925	94.32	2,041	3.25
50-199	2,255	30.49	5,140	69.51	7,395	11.78
200-349	5,736	47.40	6,364	52.60	12,100	19.28
≥500	19,179	74.55	6,546	25.45	25,725	40.99
350-499	8,373	58.68	5,897	41.32	14,270	22.74

Footnotes: PWHA: Persons with HIV/AIDS. Map categories defined by neighborhood quartile
* P < 0.0001

¹ Based on data reported by September 30, 2010

² Based on data reported by December 31, 2009

³ Based on data reported by September 30, 2009

⁴ NYC residents, 13 years or older by December 31, 2007, and alive at the end of 2008

⁵ At least one detectable viral load reported in 2008

⁶ Age-adjusted to the citywide population of persons with HIV/AIDS in 2008

⁷ P value for Kruskal Wallis test

⁸ P value for the Chi Square test

⁹ P value for the Jonckheere-Terpstra test