A Retrospective Analysis of Estimated Annual Prevalence of Transmitted Drug Resistance in an HIV Cohort in Northwest Louisiana

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Abstract

Background: Most studies done in the United States to determine the prevalence of anti-retroviral transmitted drug resistance (TDR) in HIV infected individuals have been conducted in highly urban metropolitan areas. Fewer studies have been done in populations similar to our catchment area of Louisiana Public Health Region 7, a population of half a million residing in suburban and rural Northwestern Louisiana.

Objectives: Our objective was to determine the prevalence of Nucleoside reverse transcriptase inhibitor (NRTI), Non- Nucleoside reverse transcriptase inhibitor (NNRTI) and Protease inhibitor (PI) TDR in newly diagnosed HIV infected individuals and to determine any change in annual prevalence of TDR over the study period.

Methods: Retrospective chart review of treatment naive HIV individuals, 18 years and older, enrolled in the viral disease clinic at Louisiana State University Health at Shreveport from January 2004 to December 2011 for whom HIV resistance testing was available prior to treatment initiation.

Results: 1449 charts were reviewed and 275 met the inclusion criteria. Age ranged from 18 to 62 with male to female ratio of 2:1 and African American to Caucasian ratio of 5:1. 37 of the 275 individuals had TDR with an overall prevalence of 13.4% during the study period. 32 individuals had a single class, 4 individuals had dual class and 1 individual had triple class drug resistance. Male gender, Afro-American race, Male sex with male acquisition risk and hepatitis B or C co-infection was not statistically associated with TDR. Odds ratio for TDR for individuals enrolled in care 2009-2011 in comparison to 2006-2008 was 1.02(CI 0.5277-1.9000) p=0.9. NNRTI TDR prevalence was 7.6% and 4% for NRTI and PI. K103N was the most common mutation, identified in 18 individuals.

Conclusion: Overall prevalence of TDR was 13.4% in our HIV population which is slightly lower than the 15.6% national prevalence rate according to 2006-2009 CDC National HIV surveillance data. Annual prevalence rate of TDR fluctuated and varied widely over the study period. Our TDR prevalence rate was much higher compared to studies conducted in similar sized population. Our data reaffirm the need for baseline genotype testing for TDR even in predominantly semi urban and rural HIV population.

Introduction

- Anti-retroviral drug resistance is an important cause of treatment failure in persons infected with HIV-1 and has been associated with increased mortality.
- Most studies done in the United States to determine the prevalence of anti-retroviral transmitted drug resistance (TDR) in therapy naive HIV infected individuals have been conducted in highly urban metropolitan areas.
- Fewer studies have been done in populations similar to our catchment area of Louisiana Public Health Region 7, a population of half a million residing in suburban and rural Northwestern Louisiana.
- Knowledge of the local resistance data helps guide recommendations for baseline resistance testing and selection of initial anti-retroviral regimens.

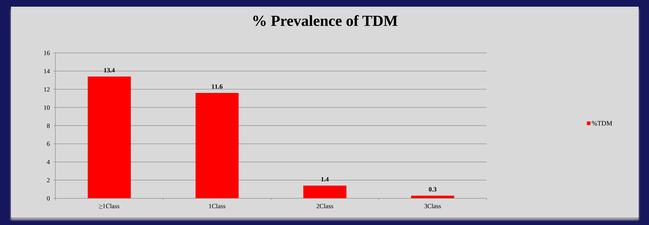
Objectives & Methods

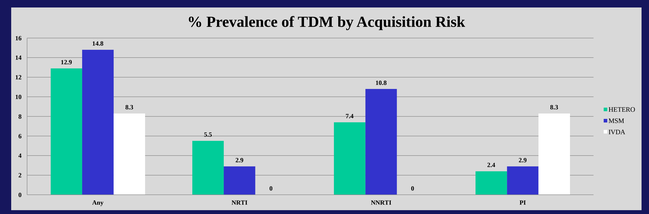
- To determine the prevalence of Nucleoside reverse transcriptase inhibitor (NRTI), Non- Nucleoside reverse transcriptase inhibitor (NNRTI) and Protease inhibitor (PI) transmitted drug resistance in therapy naive newly diagnosed HIV infected individuals.
- Determine any change in prevalence of transmitted drug resistance over the study period.
- Retrospective chart review of treatment naive HIV individuals, 18 years and older, enrolled in the viral disease clinic at Louisiana State University Health at Shreveport from January 2004 to December 2011 for whom HIV resistance testing was available prior to treatment initiation.
- Genotype resistance interpretation was as determined by performing laboratory and partial resistance interpretation was considered resistant for analysis.

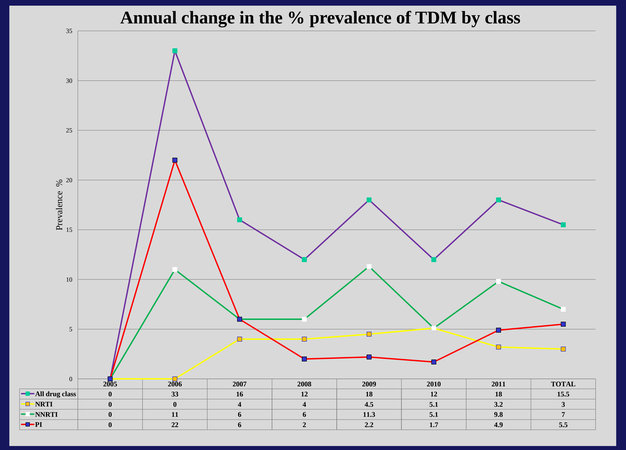
Objectives & Methods

Demographics

- 1449 charts were reviewed and 275 met the inclusion criteria.
- Age ranged from 18 to 62 with male to female ratio of 2:1 and African American to Caucasian ratio of 5:1.
- Mean HIV RNA viral load and CD4 count at the time of genotyping was 167,482 copies/ml and 316/mm^3.





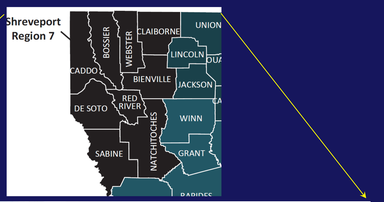


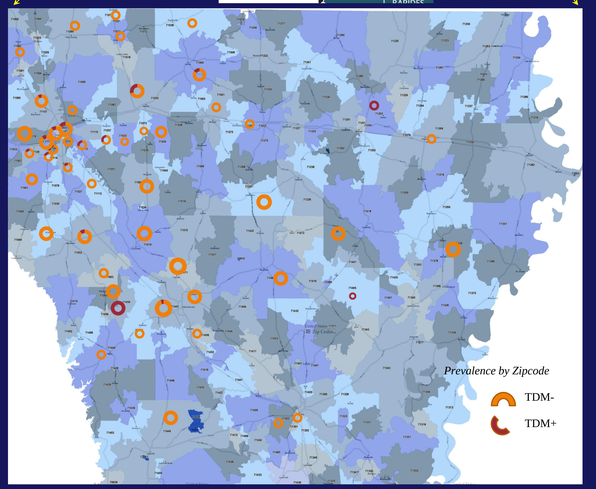
	2005	2006	2007	2008	2009	2010	2011	TOTAL
All drug class	0	33	16	12	18	12	18	15.5
NRTI	0	0	4	4	4.5	5.1	3.2	3
NNRTI	0	11	6	6	11.3	5.1	9.8	7
PI	0	22	6	2	2.2	1.7	4.9	5.5

	TDR+	TDR-	Odds Ratio	95% CI	P value
MSM	15	90	1.1212	0.5531 to 2.2729	0.7510
BLACK	31	197	1.0753	0.4214 to 2.7436	0.8793
MALE	23	149	0.9813	0.4803 to 2.0048	0.9587
HCV+	2	17	0.7429	0.1644 to 3.3558	0.6992
HBV+	0	6	0.4769	0.0263 to 8.6426	0.6164
2009-2011	26	137	1.0271	0.5277 to 1.9990	0.9374

ARV drug class	Major mutation (%)	Top major IAS-USA mutations by class*
NRTI	4	D67N(7),K219Q/E(7),M41L(3),L210W(1), Q151M(1)
NNRTI	7.6	K103N(18),G190A(3),Y181C(2)
PI	4	L90M(3),V82A(2),M46I(2),I84V(1),V32I(1), I47V(1),T74P(1)

* Mutations in order of decreasing frequency ( )No. of subjects in parenthesis





Conclusion

- Overall prevalence of TDR to one or more drug class was 13.4% in our newly diagnosed HIV population which is slightly lower than the 15.6% national prevalence rate in newly diagnosed individuals according to 2006-2009 Centers for Disease Control and Prevention HIV surveillance data.
- Annual prevalence rate of TDR fluctuated and varied widely over the study period and there was no consistent trend identified.
- Our TDR prevalence rate was much higher compared to studies conducted in similar sized population.
- For instance, it was 8% in an urban clinic in Wilmington, Delaware and 5% in Western Massachusetts.
- Prevalence of 13.4% suggests need to screen 7 individuals to detect 1 individual with TDR and therefore cost effective for our population.
- Our data reaffirm the need for baseline genotype testing for TDR even in predominantly semi urban and rural HIV population.