

# 95% Adherence Is Not Necessary to Suppress the Majority of Individuals to Less Than 400 copies/ml on NNRTI Regimens

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## Background

- 95% antiretroviral (ARV) adherence has been identified as the minimum level of adherence to suppress the majority of individuals to an HIV viral load (VL) less than 400 copies/ml (1).
- Early relationships between adherence and viral suppression were based on single protease inhibitor (PI)-based therapies.
- Recent therapies, including nonnucleoside reverse transcriptase inhibitor (NNRTI) regimens, have led to improved viral suppression compared to single protease-inhibitor therapies in clinical trials (2).

## Objective

We examined adherence and viral suppression in single-PI and NNRTI-based regimens using two validated, objective measures of adherence: unannounced pill counts and electronic medication monitoring.

## Methods

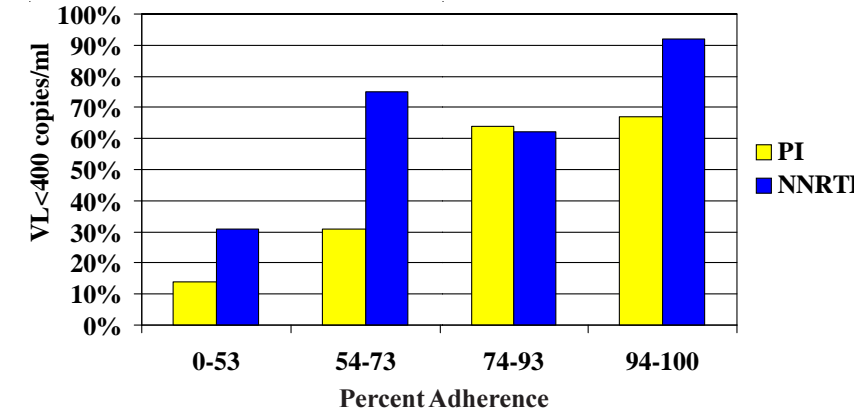
- Subjects were recruited into the REACH cohort study from San Francisco homeless shelters, soup kitchens, and low-rent hotels.
- Eligibility: single-PI or NNRTI ARV regimen for at least 3 months prior to study baseline.
- Adherence was measured by unannounced pill counts in all individuals.
- Adherence was measured by electronic medication monitoring in those without mediset pill box organizers.

- The primary outcome was suppression of HIV viral RNA to <400 copies/ml.
- Adherence categories were defined by unannounced pill count quartiles.
- Multiple logistic regression was used to compare the independent affects of PI and NNRTI-based regimens on viral suppression

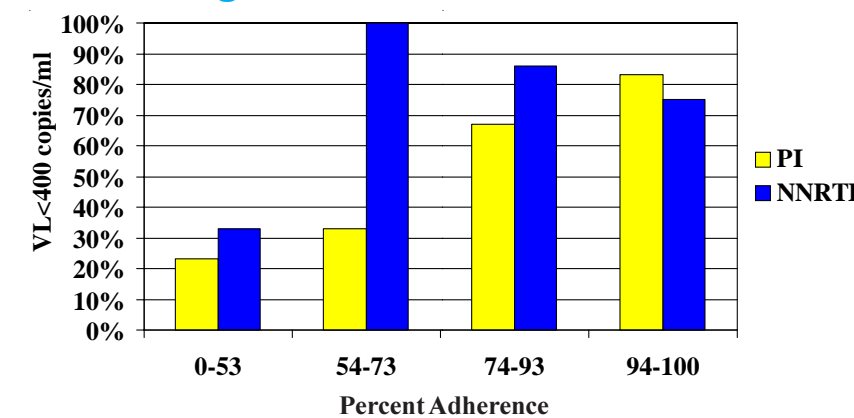
## Results

- 109 patients (56 on PIs and 53 on NNRTIs) were followed for a median of 9.1 months.
- Unannounced pill count data was available on all patients and electronic medication monitoring data was available on 65 patients not using medisets.
- Viral suppression to <400 copies was common in individuals on NNRTI-regimens in the highest 3 quartiles of adherence (54-100% adherence) whereas reliable viral suppression was only seen in those with 94-100% adherence to single-PI therapy (Figures 1/2).
- The odds of virologic suppression were 7.75 times higher for participants on NNRTI regimens compared to participants on single-PI regimens when controlling for adherence, nadir CD4, treatment duration, and mono/dual nucleoside exposure (Table 3).
- There was no statistically significant difference in adherence by unannounced pill counts in patients receiving NNRTI (71%) versus single-PI-containing regimens (70%).

**Figure 1. Proportion of individuals with HIV VL <400 copies/ml by unannounced pill count adherence**



**Figure 2. Proportion of individuals with HIV VL <400 copies/ml by electronic medication monitoring adherence**



**Table 1. Patient & Treatment Characteristics**

	All (n=109)		NNRTI (n=53)		PI (n=56)		Chi-sq p-value
	Freq	Percent	Freq	Percent	Freq	Percent	
IDU	65	59.6	34	64.2	31	56.4	0.44
White	43	39.4	25	47.2	18	32.1	0.12
Female	17	15.6	7	13.2	10	17.9	0.60
Street/shelter	25	22.9	15	28.3	10	17.9	0.26
Prior NRTI	47	43.1	18	34.0	29	51.8	0.082
VL Suppression	34	31.2	23	43.4	11	19.6	0.012

	All (n=110)			NNRTI (n=53)			PI (n=56)			p-value
	Mean	Std dev	Median	Mean	Std dev	Median	Mean	Std dev	Median	
Age	44.1	8.9	43.9	42.5	9.0	40.0	45.7	8.6	45.2	0.063
Nadir CD4	221.1	178.0	168.0	197.5	180.2	140	243.5	174.5	184.5	0.067
Baseline CD4	383.3	255.3	323	378.2	277.7	323.0	388.2	234.6	328.5	0.50
Months HAART	16.5	12.2	14	16.8	13.7	13.0	16.2	10.6	15.0	0.77
Mo. Current Reg.	8.3	8.6	4	7.4	6.5	3	9.2	10.2	4	0.71
Avg VL (log)	2.5	1.3	2.5	2.2	1.3	1.4	2.9	1.3	3.0	0.023
Avg Adherence	70.6	23.6	73.6	71.2	23.9	75.4	69.9	23.4	69.6	0.77
No. of Regimens	2.5	1.8	2.0	2.3	1.4	2.0	2.8	2.1	2.0	0.61

**Table 2. ARV Distribution**

Protease Inhibitor	
Nelfinavir	36 (64%)
Indinavir	15 (27%)
Saquinavir	4 (7%)
Ritonavir	1 (2%)
Non-nucleoside reverse transcriptase inhibitor	
Nevirapine	33 (62%)
Efavirenz	20 (38%)

**Table 3. Independent Predictors of Viral Suppression (<400 copies/ml)**

Effect	Units	OR	95% CI
NNRTI (vs. PI)		7.75	2.33-25.8
Adherence	10%	1.63	1.24-2.13
Nadir CD4	100 cells	1.48	1.08-2.03
Months on regimen	3 months	1.28	1.07-1.53

## Conclusion

- NNRTI regimens can lead to viral suppression at less than 95% adherence.
- While NNRTI potency may lead to viral suppression at moderate levels of adherence, near complete adherence improves the probability of durable viral suppression for all regimen types.

## References

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