3rd International Conference
on HIV Treatment Adherence

Relationship between adherence and viral load suppression

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BACKGROUND AND SIGNIFICANCE

- ✓ Highly active antiretroviral therapy (HAART) has changed the course of HIV disease.
- ✓ Patients have to take antiretroviral therapy for a long time with considerable adverse effects and sometimes with complex regimens.
- ✓ Evidence suggests that HIV-positive patients have problems taking the antiretroviral medication correctly.
- ✓ Extremely high levels of adherence are required to reduce viral replication.
- ✓ It is extremely important to know the adherence cutoff values that can lead to viral failure.

STUDY AIM

- **Objective**: Determine the association between adherence, type of the antiretroviral therapy and virologic suppression.

- **Design**: A prospective study of one year of follow up among 1142 chronically HIV infected patients.

STUDY CONTEXT

Hospital Clínic Barcelona

- ✓ University hospital
- ✓ 700 beds
- ✓ 3500 HIV patients
- ✓ 2800 HIV patients on ARV therapy

STUDY METHODS

PATIENTS – INCLUSION CRITERIA:

- ✓ HIV infected patients on antiretroviral therapy who went to the pharmacy during a 6-month period (from October 1, 2004 to April 1, 2005).
- ✓ *Naïve*
- ✓ Pre-treated patients with undetectable VL at enrollment and with no detectable determinations in the previous 6 months.
- ✓ Patients included in the final analysis were those who had been taking the same antiretroviral therapy for more than 6 months since the date of inclusion.
- ✓ Patients taking combinations which only included NRTI were excluded.

STUDY METHODS

- ✓ Baseline data (age, sex, risk factors, clinical data, ARV).
- ✓ Virologic failure: two consecutive HIV RNA levels greater than 200 copies/mL.
- ✓ Viral load and adherence were measured in each visit (usually every 4 months).
- ✓ Antiretroviral regimens: NNRTIs, boosted PIs, non-boosted PIs.

STUDY METHODS

ADHERENCE CALCULATION:

- ✓ Pill counts
- ✓ Dispensing pharmacy records

ADHERENCE CLASSIFICATION:

- ✓ <70%; 70-79%; 80-89%; ≥90%

DURATION:

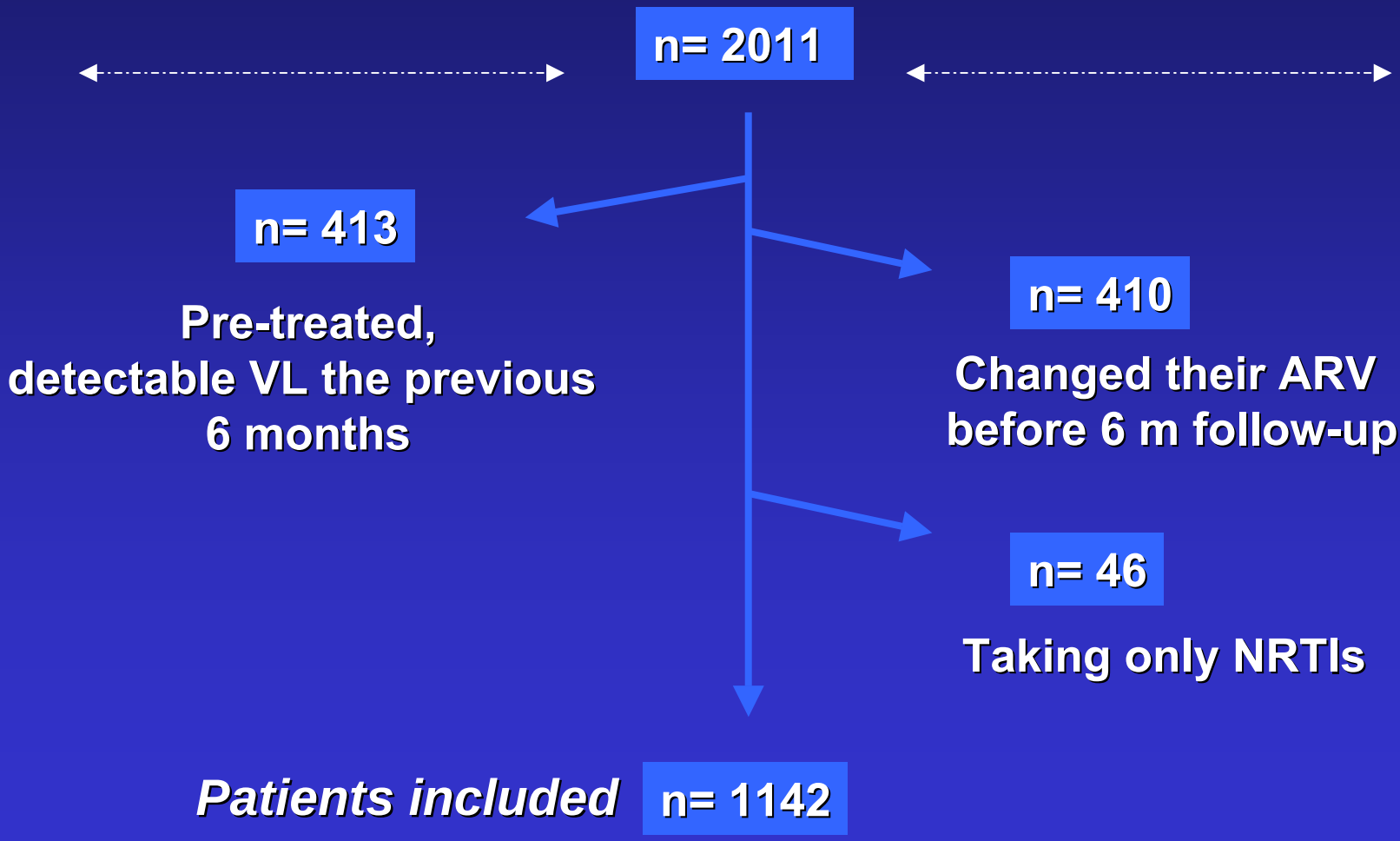
- ✓ The duration of follow-up was one year. For those patients who discontinued the therapy before one year, the follow-up period was time until discontinuation.

STUDY METHODS

STATISTICAL ANALYSIS

- ✓ Pearson´s correlation test & Student t-test >normally distributed data
- ✓ Kruskal-Wallis & Mann-Whitney > not normally distributed data
- ✓ X^2 & Fisher´s exact test > categorical data
- ✓ Paired t-test & Wilcoxon Rank Sum test > compare baseline and follow-up values
- ✓ Mantel-Haenszel & Logistic regression models (backward)
- ✓ STATA

RESULTS


n= 2011
n= 413
Pre-treated, detectable VL the previous 6 months
n= 410
Changed their ARV before 6 m follow-up
n= 46
Taking only NRTIs
Patients included
n= 1142

RESULTS

DEMOGRAPHIC CHARACTERISTICS (*n* =1142)

Male	864 (75.6%)
Age, median years ± SD	44.0 ± 9.6
Risk factor	
Homosexual	454 (39.8%)
Heterosexual	334 (29.2%)
Injection drug use	275 (24.1%)
Other	79 (6.9%)
CD4 lymphocyte count (cells/mm^3)	564.9 ± 285.8

RESULTS

THERAPY CHARACTERISTICS

First therapy	244 (21.4%)
Duration of HAART, median months ± SD	85.6 ± 40.5
Duration of current HAART regimen, median months ± SD	32.4 ± 20.6
Type of HAART received	
Based on NNRTI	662 (58.0%)
Based on boosted PI	359 (31.4%)
Based on unboosted PI	121 (10.6%)

RESULTS

THERAPY CHARACTERISTICS

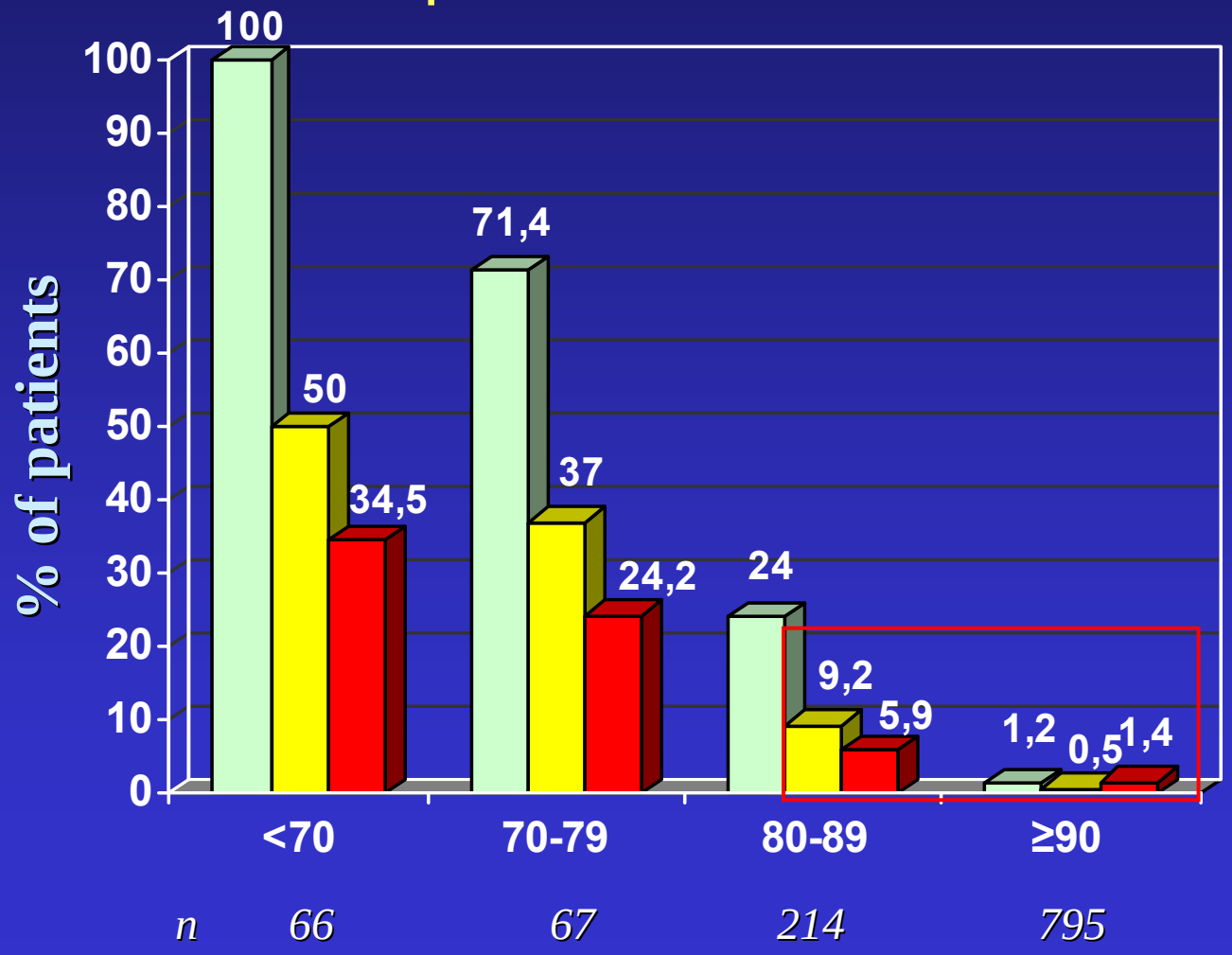
NNRTI	662	58.0%
NVP	342	51.7%
EFV	320	48.3%

Boosted PI	359	31.4%
LPV	204	56.8%
ATV	108	30.1%
SQV	15	4.2%
FPV	14	3.9%
IDV	10	2.8%
TPV	8	2.2%

Non-boosted PI	121	10.6%
ATV	56	46.3%
NFV	50	41.3%
SQV	8	6.6%
IDV	7	5.8%

RESULTS

Relationship between adherence and virologic failure



Mean adherence rates

- **Undetectable VL 95.7%**
- **Detectable VL 76.3%**

(p<0.005)

RESULTS

Risk for virologic failure in patients taking non-boosted PI

VARIABLE		Unadjusted Odds Ratio	(95% CI)	p-value	obs
Adherence	≥90	1		0.000	116
	70-79	207.500	(15.969;2696.247)		
	80-89	26.211	(2.978;230.685)		

There were no patients with adherence less than 70% and controlled viral load.

RESULTS

Risk for virologic failure in patients taking boosted PI

VARIABLE		Unadjusted Odds Ratio	(95%CI)	p-value	obs
Adherence	≥90	1		0.000	359
	<70	212.000	(26.400;1702.402)		
	70-79	124.706	(15.056;1032.897)		
	80-89	21.468	(2.643;174.413)		

RESULTS

Risk for virologic failure in patients taking NNRTI

VARIABLE		Unadjusted Odds Ratio	(95%CI)	p-value	obs
Adherence	≥90	1		0.000	662
	<70	36.917	(12.675;107.529)		
	70-79	22.446	(7.539;66.831)		
	80-89	4.384	(1.442;13.331)		

RESULTS

Risk of virologic failure in patients with an adherence rate of <90%

VARIABLE		Unadjusted Odds Ratio	(95%CI)	p-value	obs
Type of regimen	B-PI	1		0.001	347
	U-PI	2.510	(1.179;5.341)		
	NN	0.565	(0.317;1.007)		

B-PI: boosted PI; U-PI: unboosted PI; NN: non nucleoside

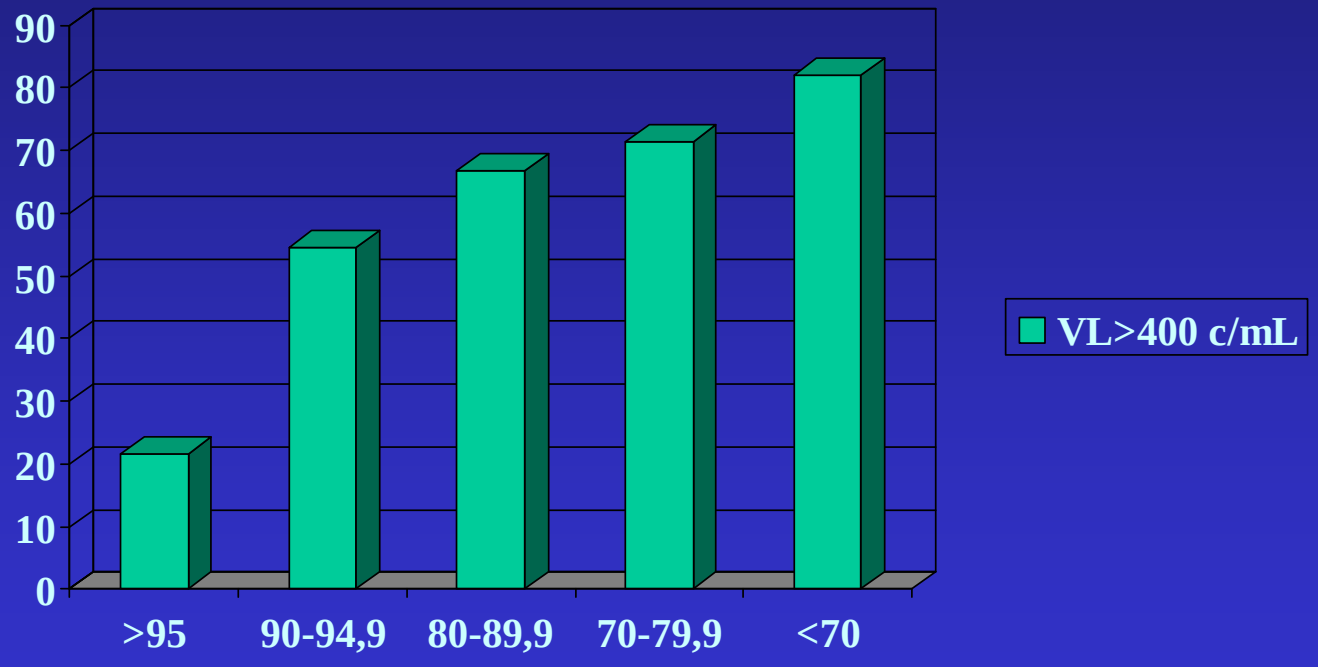
RESULTS

VARIABLES ASSOCIATED WITH ADHERENCE:

- ✓ Drug class: Patients who were taking NNRTI-based therapies presented better adherence levels than patients taking PI (96.2% vs 92.6%; $p<0.000$).
- ✓ Number of pills to be taken per day: as the number of pills increased, patients were less likely to take the medication as prescribed.
- ✓ Number of daily doses: No statistically significant differences in adherence were found between once daily and twice daily, but both of them had better adherence rates than three or more times a day.

DISCUSSION

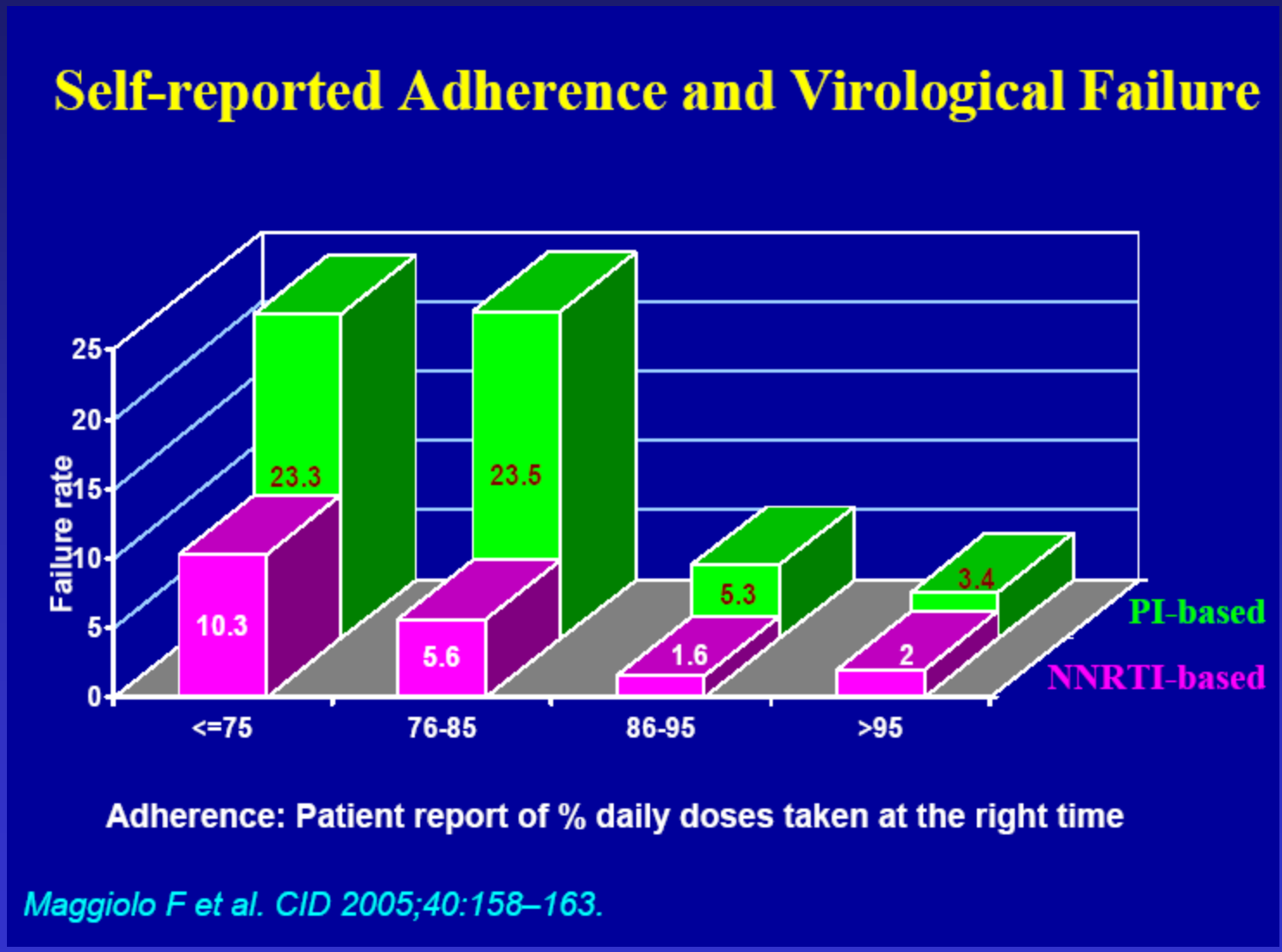
% patients with viral load >400 copies/mL



% adherence

Paterson. Ann Intern Med. 2000

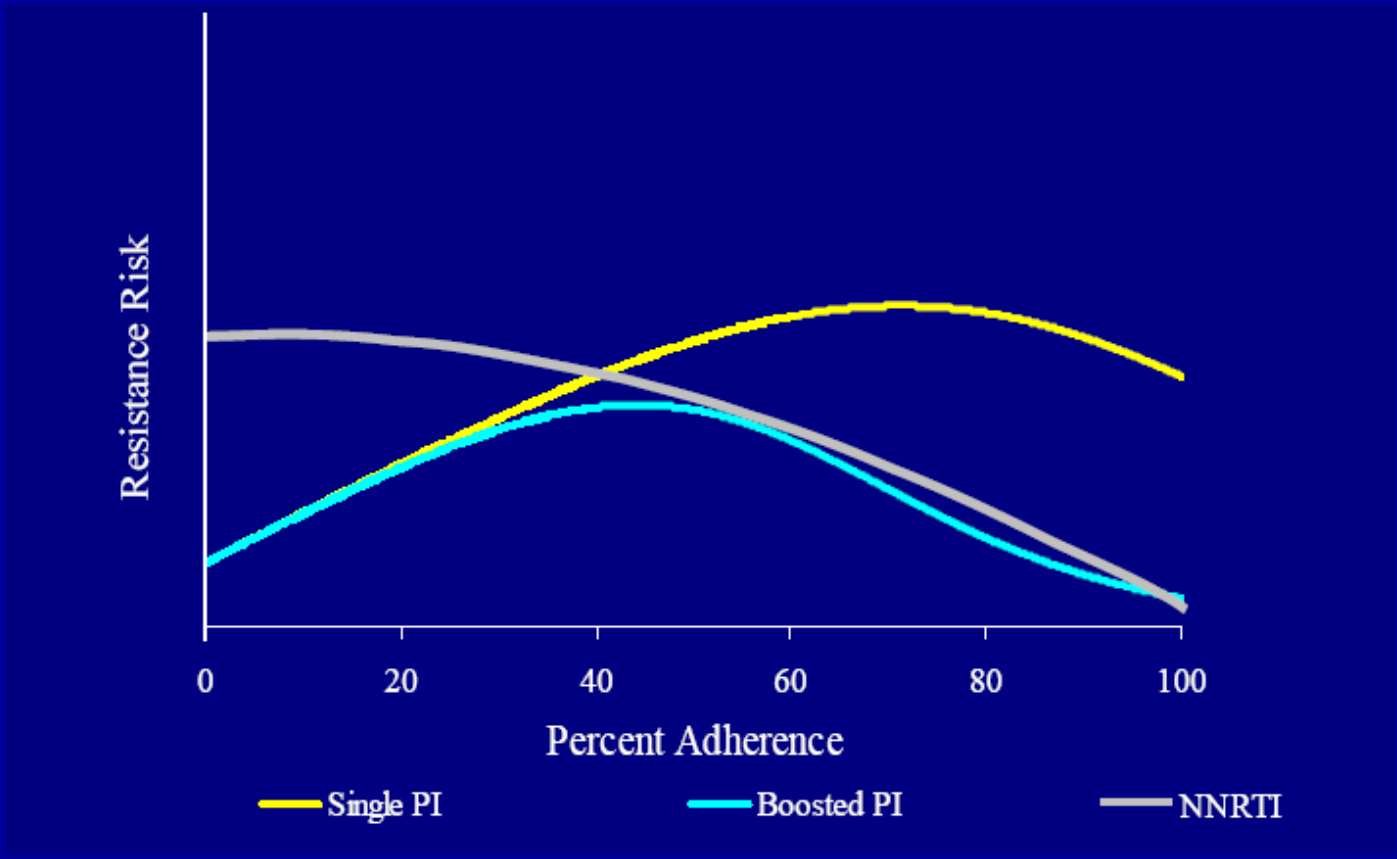
DISCUSSION



Maggiolo F et al. CID 2005;40:158–163.

DISCUSSION

Resistance Risk by Adherence and Regimen Class



Bangsberg et al J. Antimicrob Chem; 2002 53(5):696-9.

CONCLUSION

- ✓ New antiretroviral combinations lead to viral load suppression with lower adherence rates than the older ones.
- ✓ For patients taking NNRTI- or boosted PI-based regimens with adherence rates of 80%, the failure rate is less than 10%.
- ✓ This data does not affect the goal to achieve the highest level of adherence possible.

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Patients

THANK YOU FOR YOUR ATTENTION

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