Treatment Failure Inevitable or avoidable?

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Right to Care

Introduction

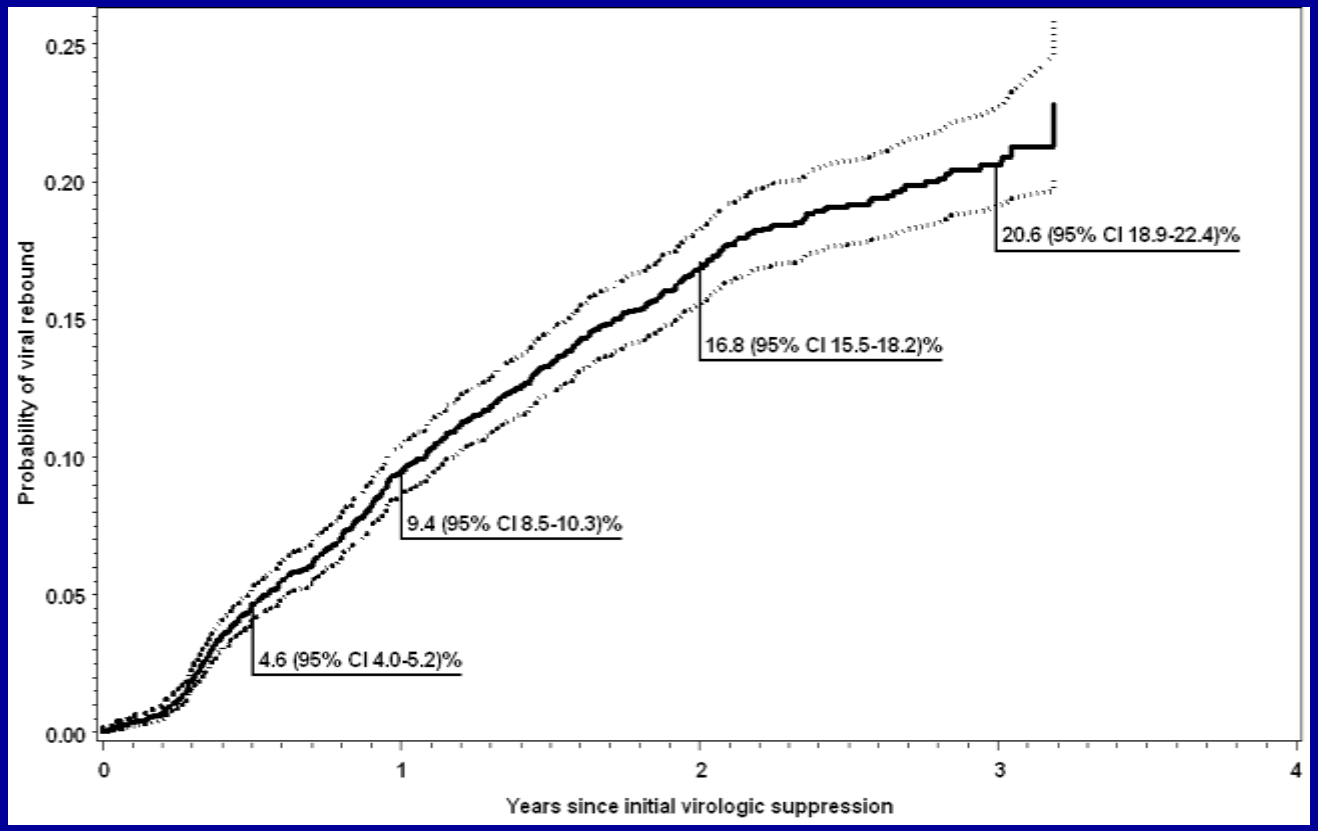
- ART programme April 2004, 1.2M patient on ART
- Assess program outcomes and efficacy
- What does the programme cost?
- What adjustments can be made to the improve the outcomes?
- How can this be balanced against increasing the access to treatment?

Long-term treatment outcomes in the Themba Lethu Clinic Cohort – 4 years

- 7583 patients total of 161,000 patient months follow-up
- Mortality rate 2.9 deaths/year (95% CI=2.6-3.2) highest in first three months of ART 8.4 (CI=7.2-9.9)
- Long-term retention in care 74.4% (CI=73.2-75.6%)
- CD4+>200 after 6 months of treatment
- 59.9% had at least one drug substitution at 4 years
- At 6 months 90.4% of patients on traetment and in-care had an undetectable viral load
- Viral rebound at 1, 2 and 3 years occurred 9.4%, 16.8%, and 20.6%
- TLCC – 10% women and 13% of men on second-line therapy

Sanne I, van Rie A J Int AIDS Soc. 2009 Dec 17;12:38

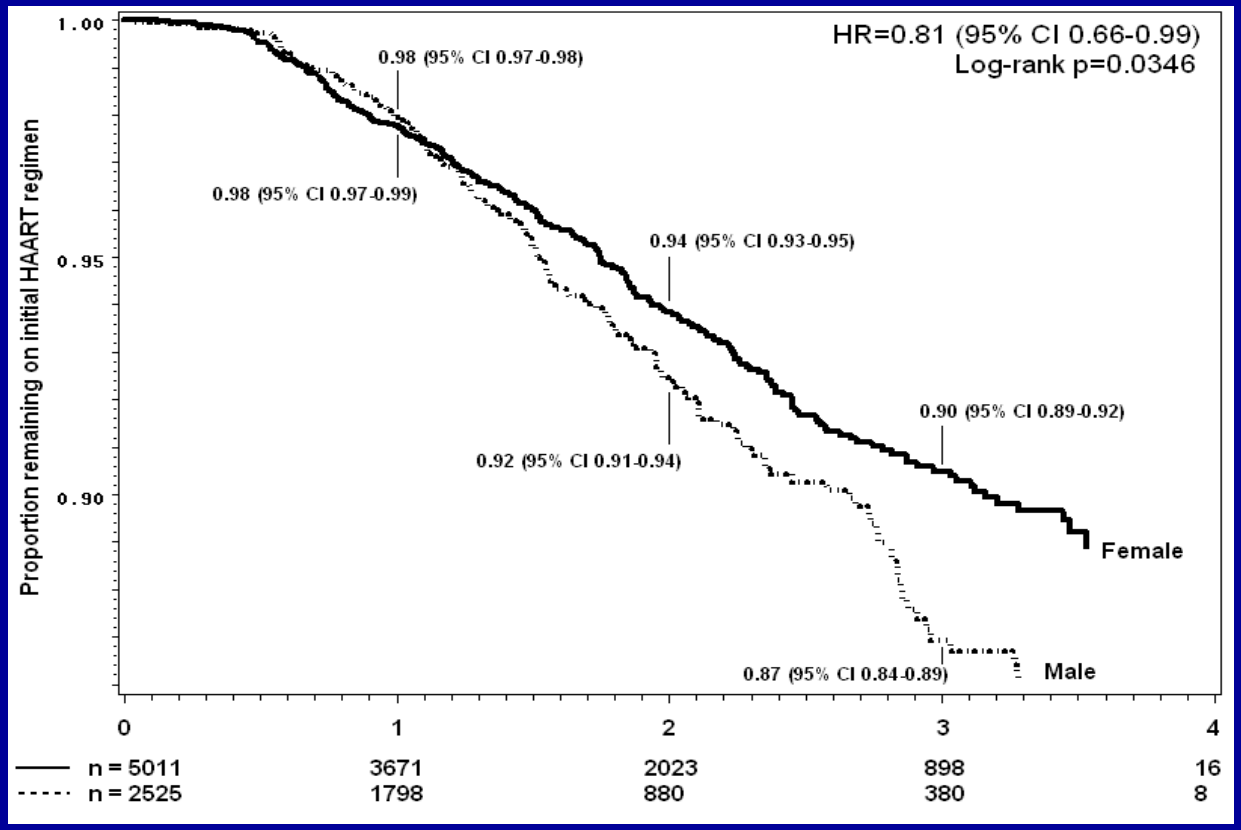
TLCC - Probability of viral rebound



- Suppression <400c/ml within 6 months
- Rebound – two consequetive viral loads > 400c/ml; or one viral >5,000c/ml

Sanne I, van Rie A, J Int AIDS Soc. 2009 Dec 17;12:38

TLCC- Proportion remaining on initial ART

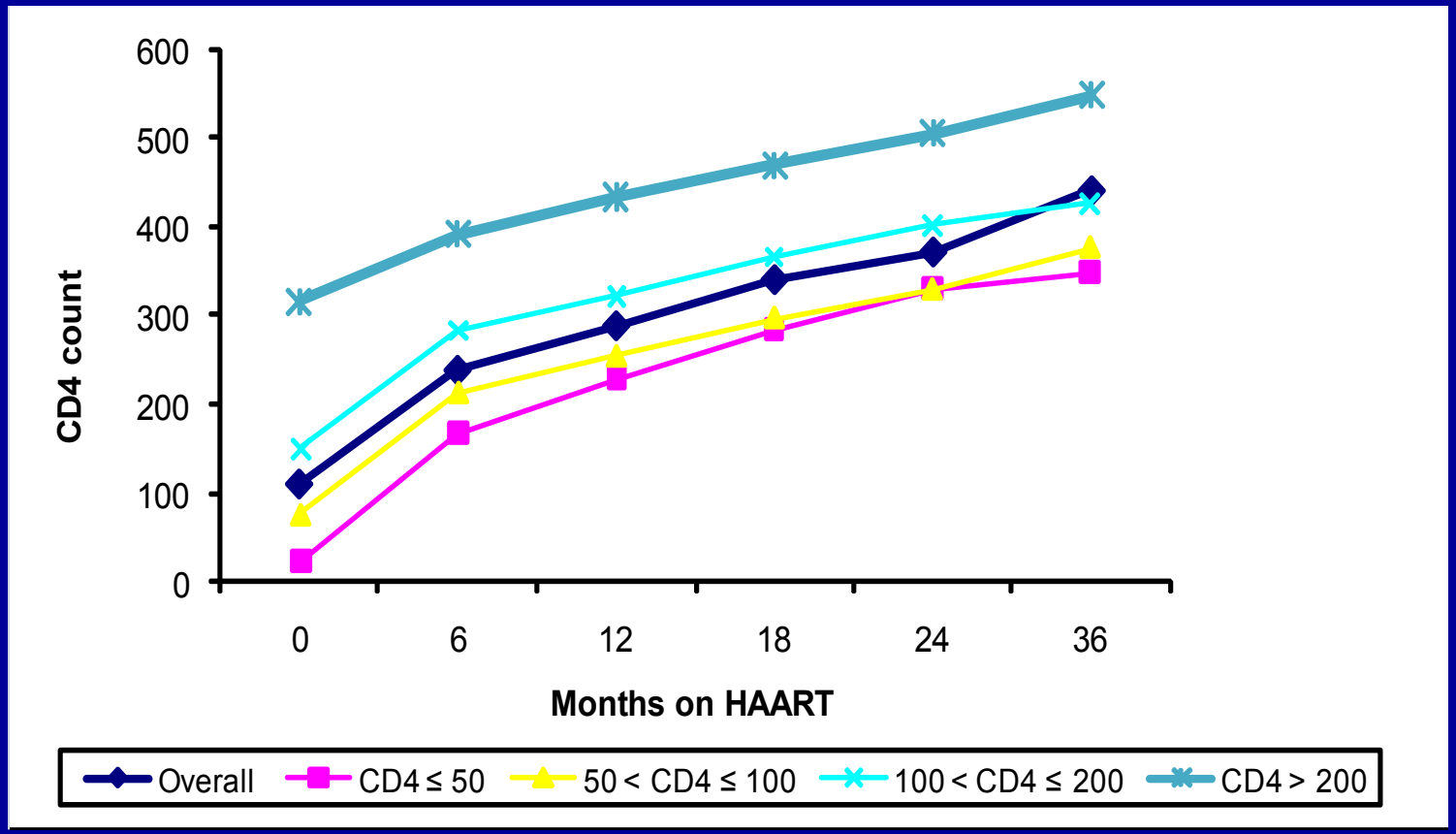


- 87% switches to second-line regimen were related to virologic failure

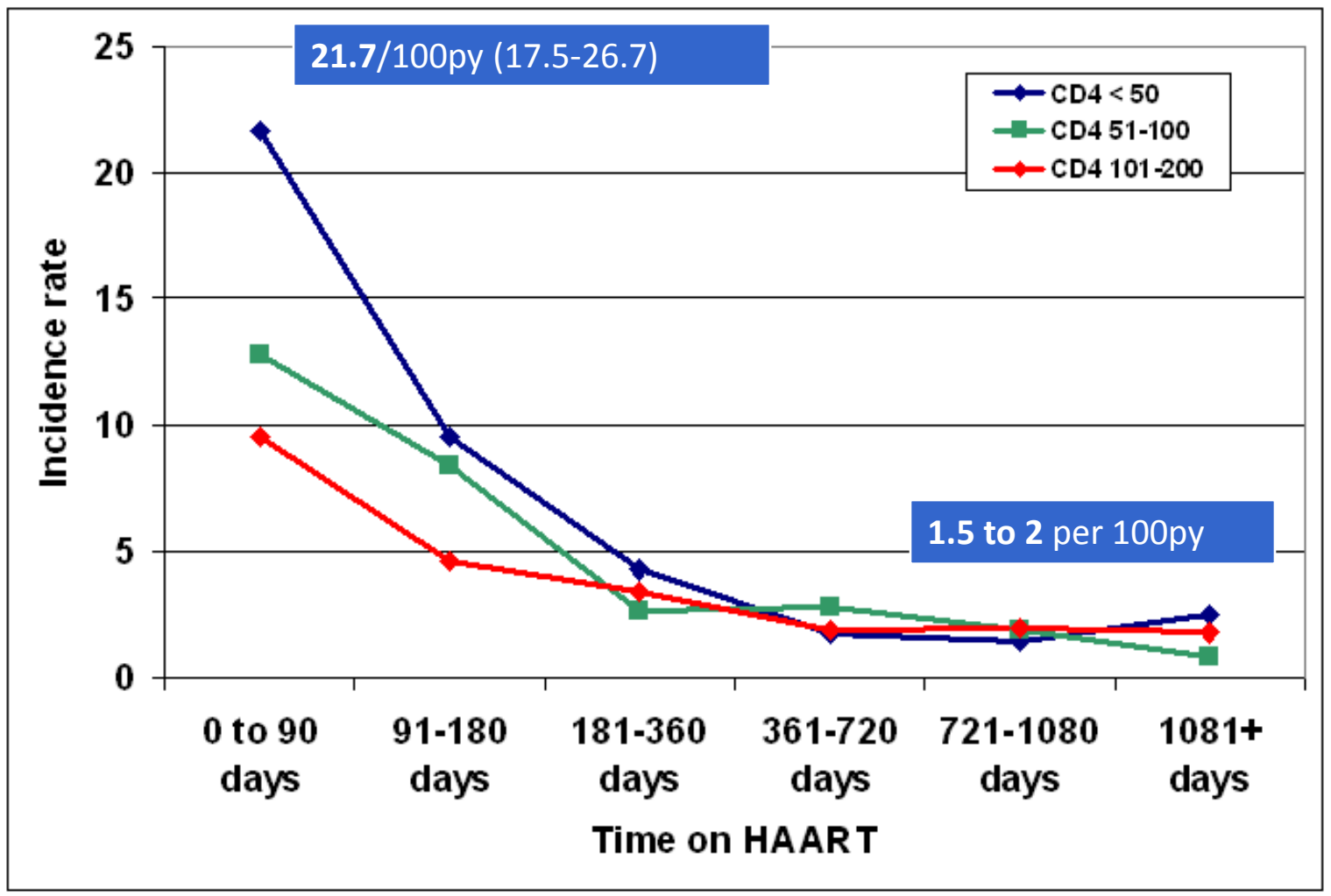
Sanne I, van Rie A, J Int AIDS Soc. 2009 Dec 17;12:38

TLCC - CD4+ response

Mean CD4 count gain after 6 months of treatment was 117 cells/mm^3 and the increase was greater for those with CD4 counts < 200 at baseline (122 cells/mm^3) than those with baseline CD4 count of 200 or more (71 cells/mm^3)

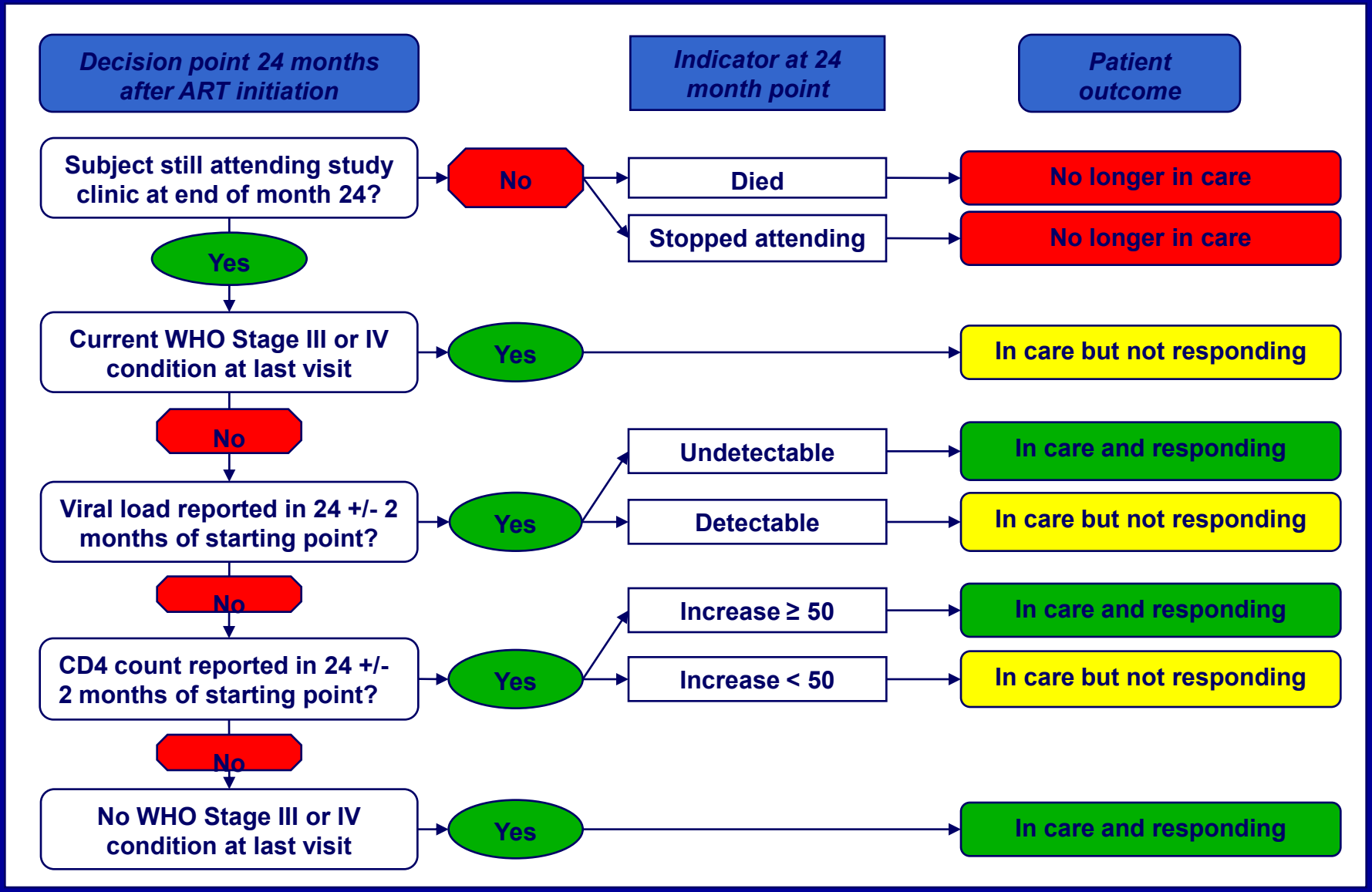


Incident TB by baseline CD 4 count (Poisson regression model)



A van Rie, I Sanne et al Int. TB and Lung Dis. Paris 2008

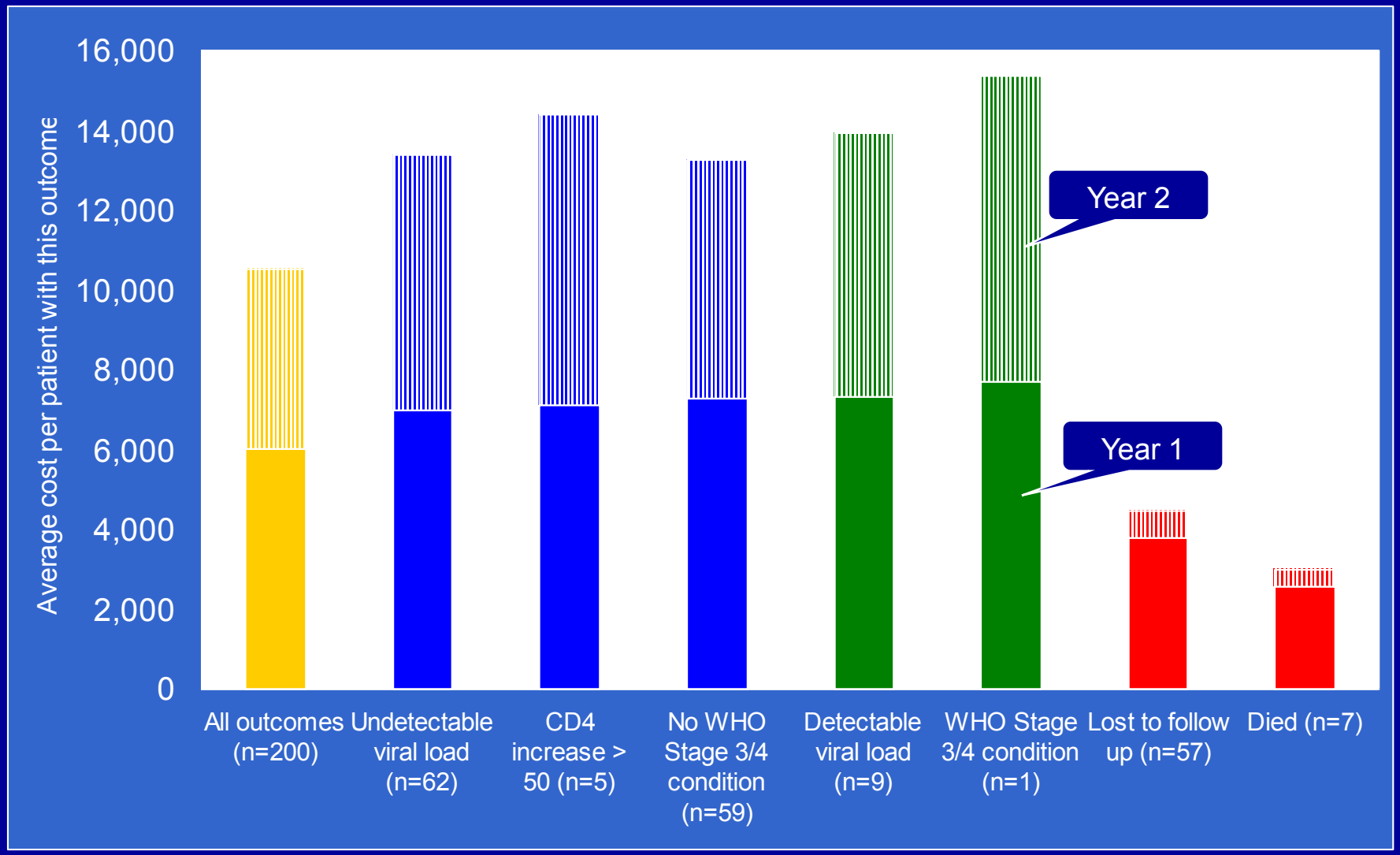
Cost-outcomes model - Syndey Rosen et al



Results: Outcomes - 24 Months

Outcomes	n	%	Median starting CD4
All outcomes (patients started)	200	100%	95
In care and responding (IC)	**126**	**63%**	**102**
Undetectable viral load	62	31%	98
Acceptable CD4 change	5	3%	172
No WHO Stage III/IV condition	59	30%	102
In care but not responding (NR)	**10**	**5%**	**101**
WHO Stage III/IV condition	1	1%	63
Detectable viral load	9	5%	107
Unacceptable CD4 change	0	0%	n.a.
No longer in care (NIC)	**64**	**32%**	**74**
Died	7	4%	42
Stopped attending site	57	29%	92

Results: Avg Cost Per Outcome



***All costs are in 2006 ZAR.**

Results: Cost-Outcome Ratios

Ratio	Formula	Year 1	Year 2
Average cost per patient started	All costs / all patients	R 6,028	R 4,480
Average cost per patient in care and responding (IC)	IC costs / IC patients	R 7,124	R 6,245
Average cost per patient in care but not responding (NR)	NR costs / NR patients	R 7,353	R 6,709
Average cost per patient not in care at study clinic (NIC)	NIC costs / NIC patients	R 3,664	R 656
Average cost to produce a patient in care and responding	All costs / IC patients	**R 9,569**	**R 7,111**

Comprehensive International Program of Research in AIDS – SA

Nurse versus doctor management of HIV-infected patients receiving antiretroviral therapy (CIPRA-SA): a randomised non-inferiority trial.

Sanne I, Orrell C, Fox MP, Conradie F, Ive P, Zeinecker J, Cornell M, Heiberg C, Ingram C, Panchia R, Rassool M, Gonin R, Stevens W, Truter H, Dehlinger M, van der Horst C, McIntyre J, Wood R; CIPRA-SA StudyTeam

Lancet. 2010 Sep 25;376(9746):1054.

Study Design 1

- Randomized, prospective, controlled, site limited, study of antiretroviral therapy in HIV positive subjects ≥ 16 years
- The study was designed to randomize HIV positive members of **households** to receive first line antiretroviral therapy under the **monitoring care** of either an **HIV-trained medical doctor** (Arm 1), or an **HIV-trained primary health care sister** (Arm 2)
- Subjects failing first line antiretroviral therapy will receive a second line therapy regimen depending on what is available at the clinic.

Lancet. 2010 Sep 25;376(9746):1054.

Figure 1. Study outline (2005-2009)

917 assessed for eligibility

aged >16 years, ART Naïve
WHO III or IV or CD4+ <350
No current OI or TB (8 weeks)
Not in first trimester pregnancy

105 excluded
89 did not meet inclusion
16 refused to participate

812 patient randomized

408 allocated to nurse group
10 Lost to follow-up
53 discontinued intervention

404 allocated to doctor group
14 Lost to follow-up
56 discontinued intervention

408 analyzed

404 analyzed

Funding support: NIH/DAIDS – Department of Health; Comprehensive International Program for AIDS Research; USAID/Right to Care;

Lancet. 2010 Sep 25;376(9746):1054.

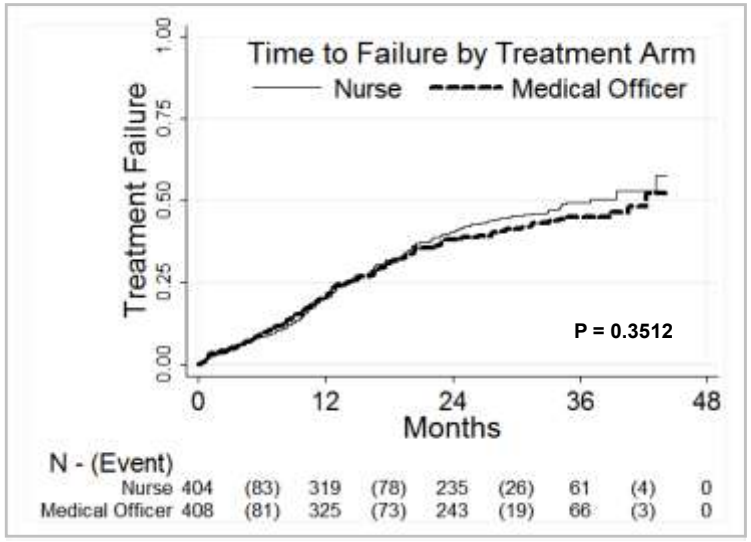
Randomisation

	Nurse Arm		MO Arm	
Female	297	(73.5%)	276	67.6%
Age median years (IQR)	32.3	(28.0-36.7)	32.2	(28.0-37.6)
BMI (kg/m^2), median (IQR)	23.5	(21.3-27.6)	23.5	(20.4-26.8)
CDC Classification				
Class A (%)	159	(39.4%)	141	(34.6%)
Class B (%)	110	(27.2%)	117	28.7%)
Class C (%)	134	(33.2%)	149	36.5%)
Missing (%)	1	(0.2%)	1	(0.2%)
CD4 Count (cell/mL)				
< 200 (%)	261	(64.6%)	264	(64.7%)
200 - 350 (%)	120	(29.7%)	124	(30.4%)
350 - 500 (%)	21	(5.2%)	17	(4.2%)
>500 (%)	2	(0.5%)	3	(0.7%)
Median (IQR)	157	(100-230)	161	(105-218)
Viral load (copies/mL)				
< 400 (%)	6	(1.5%)	3	(0.7%)
400 - 150000 (%)	211	(52.2%)	204	(50.0%)
150000 - 750000 (%)	148	(36.6%)	141	(34.6%)
>750000 (%)	39	(9.7%)	60	(14.7%)
Log mean viral load	5.47		5.63	

ART Regimens Table 2

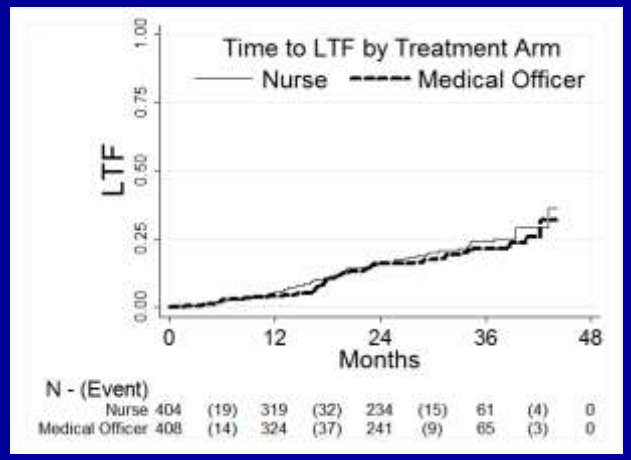
	Nurse Arm		MO Arm	
Assigned regimens	No	Percent	No	Percent
D4T+3TC+EFV (%)	293	(72.5 %)	300	(73.5 %)
D4T+3TC+NVP (%)	71	(17.6 %)	85	(20.8 %)
D4T+3TC+LPV/r (%)	36	(8.9 %)	20	(4.9 %)
D4T+3TC+NFV (%)	4	(1.0 %)	3	(0.7 %)

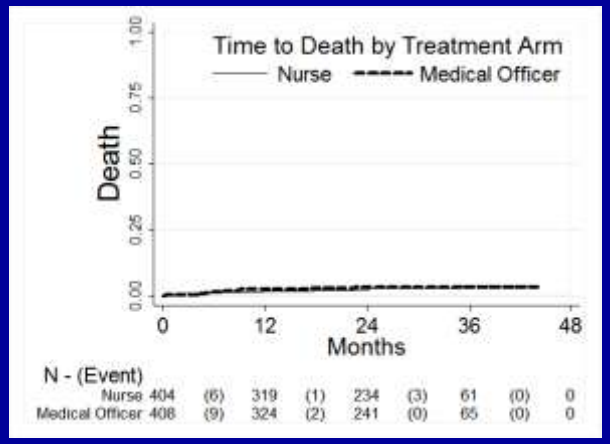
- Cumulative treatment failure by nurse or medical officer arm:

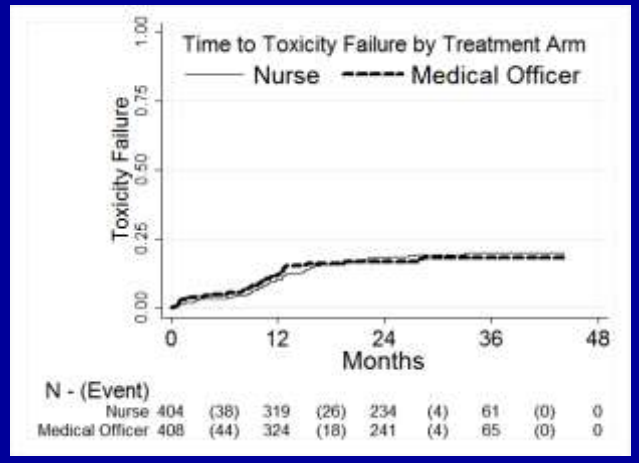


(1) all cause death;
(2) virologic failure:
  - with either a viral load decline of less than 1.5log at 12 weeks of treatment or
  - once undetectable a detectable viral load >1000 copies/ml on two occasions at least one month apart
(3) loss-to-follow-up
(4) treatment interruption for drug related toxicity last more than 42 days; and
(5) defaulting clinic schedule on three sequential visits.

Kaplan-Meier curves of time to specific reasons for treatment failure by study arm among 812 subjects randomized to doctor or nurse monitored antiretroviral therapy in the CIPRA-SA trial in South Africa*







Cumulative treatment failure (primary end-point) and accompanying reasons by study arm

	Primary Health Care Nurse (N=404)	Clinical Officer (N=408)	Hazard Ratio (95% CI)
CUMULATIVE FAILURE	192 (48%)	179 (44%)	1.09 (0.89-1.33)
All Virologic Failure	44 (11%)	39 (10%)	1.15 (0.75-1.76)
<1.5 Log drop VL^	7 (2%)	6 (2%)	1.18 (0.40-3.51)
2 VL > 1000*	37 (9%)	33 (8%)	1.14 (0.71-1.82)
Toxicity Failure	68 (17%)	66 (16%)	1.04 (0.74-1.45)
All Loss**	70 (17%)	63 (15%)	1.13 (0.81-1.59)
Withdrew Consent	18 (5%)	21 (5%)	0.87 (0.46-1.63)
Default Clinic Schedule	38 (9%)	32 (8%)	1.21 (0.76-1.93)
Lost to follow up	14 (4%)	10 (3%)	1.42 (0.63-3.20)
Death	10 (3%)	11 (3%)	0.92 (0.39-2.17)

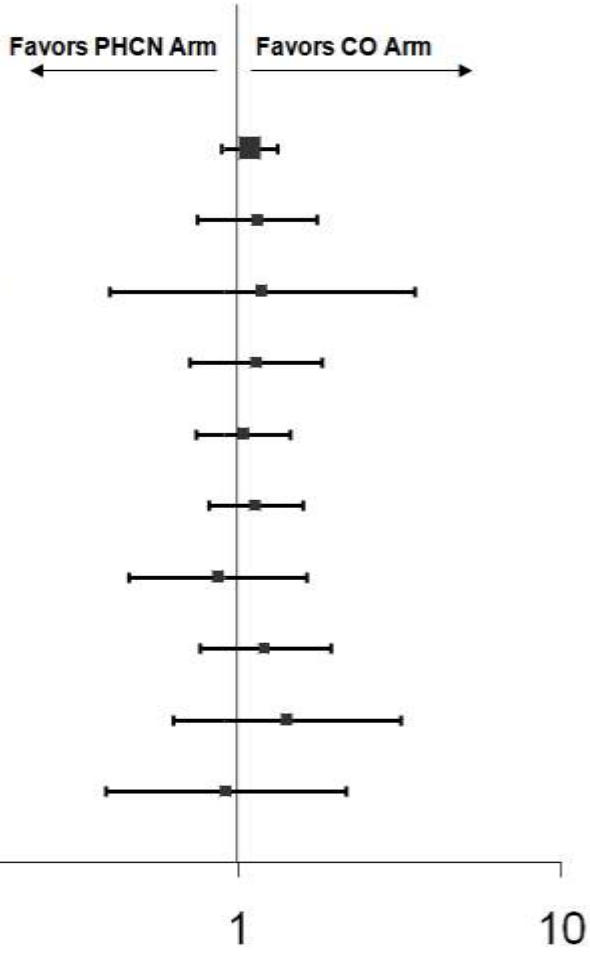


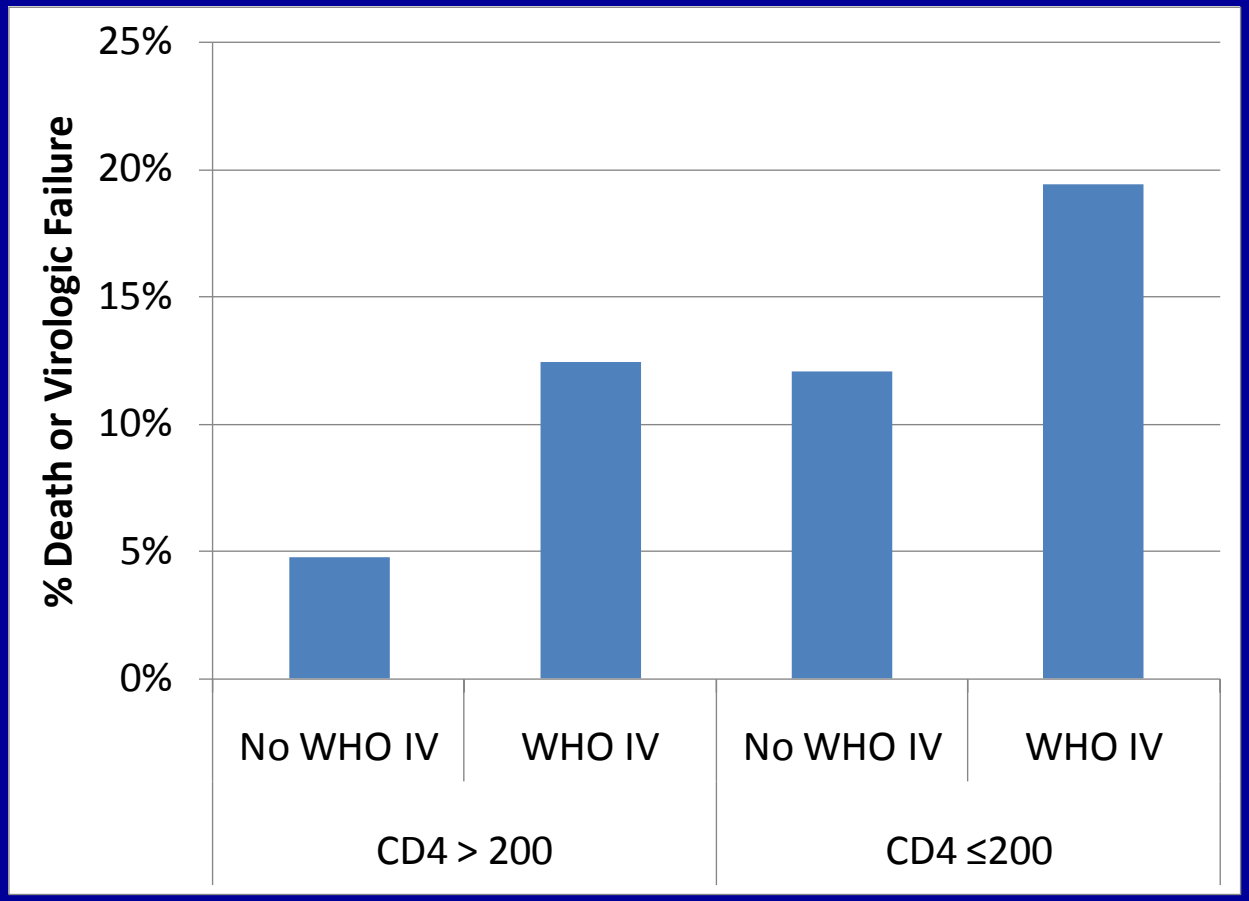
Table 2 – Reasons for ART treatment failure stratified by baseline CD4 count group among

	Baseline CD4 count group			
	≤ 200 (N=518)	> 200 (N=294)	Total (N=812)	Relative Risk (95% CI)*
Death	19/518 (3.7%)	2/294 (0.7%)	21 (2.6%)	5.39 (1.26 - 22.0)
Virologic Failure	63/518 (12.2%)	20/294 (6.8%)	83 (10.2%)	1.79 (1.10 - 2.90)
1.5 log drop#	8/518 (1.5%)	5/294 (1.7%)	13 (1.6%)	0.91 (0.30 - 2.75)
2 VL > 1000^	55/518 (10.6%)	15/294 (5.1%)	70 (8.6%)	2.08 (1.20 - 3.62)
Incident tuberculosis	41/515 (8.0%)	9/293 (3.1%)	50 (6.2%)	2.59 (1.28 - 5.26)
OTHER STUDY OUTCOMES				
Toxicity failure	81/518 (15.6%)	53/294 (18.0%)	134 (16.5%)	0.87 (0.63 - 1.19)
Loss to follow-up	52/518 (10.0%)	42/294 (14.3%)	94 (11.6%)	0.70 (0.48 - 1.03)
Default clinic schedule	40/518 (7.7%)	30/294 (10.2%)	70 (8.6%)	0.76 (0.48 - 1.19)
Lost to follow-up	12/518 (2.3%)	12/294 (4.1%)	24 (3%)	0.57 (0.26 - 1.25)

* CI = confidence interval, CIPRA-SA = Comprehensive International Program of Research on AIDS-South Africa
# Failure to achieve a 1.5 $\log_{10}$ drop in viral load from baseline at 12 weeks on treatment
^ VL = viral load, 2 consecutive viral loads > 1,000 copies/ml within one month of each other after 24 weeks on treatment

Fox M, AIDS. 2010 Aug 24;24(13):2041-50.

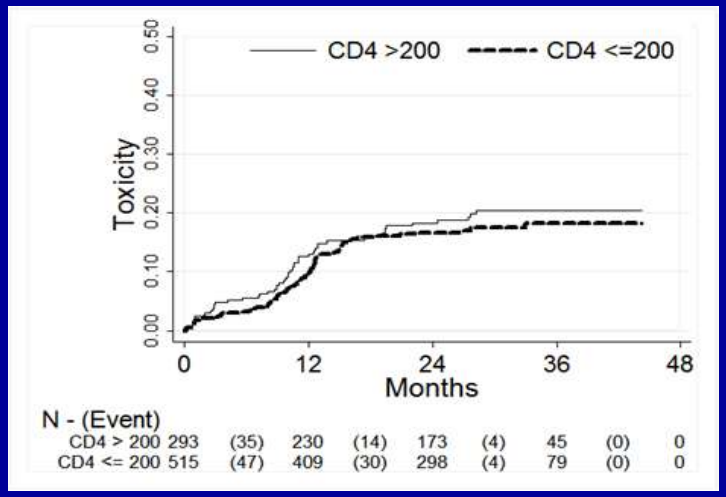
Figure 2 – Predicted Probabilities of Death or Virologic Failure by Baseline CD4 count group and baseline WHO Stage*

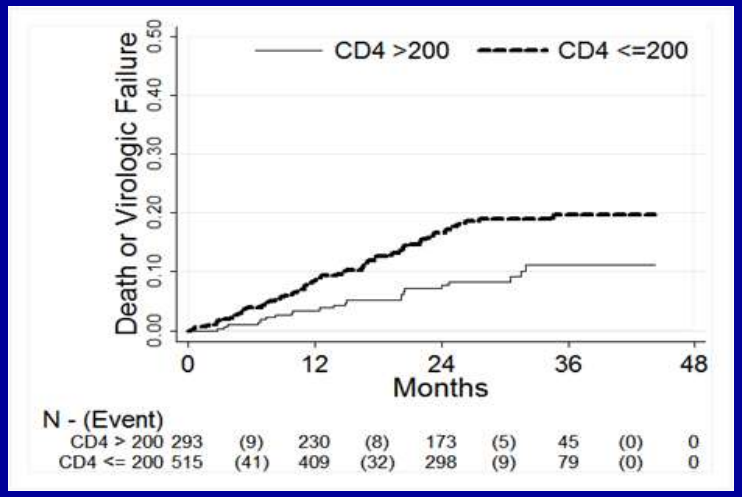


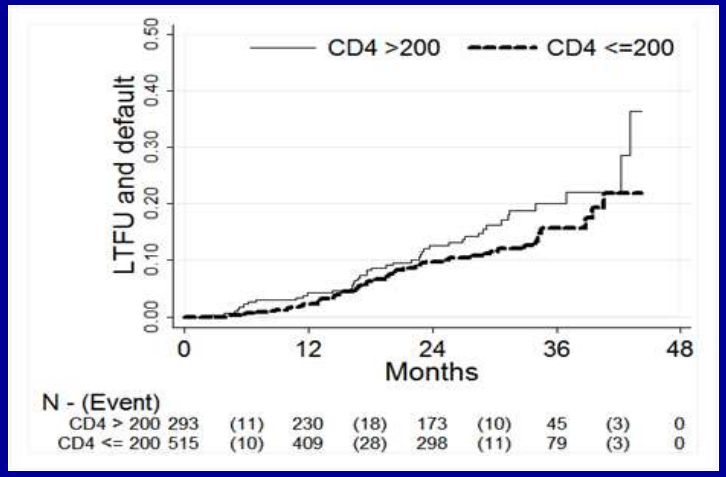
* Probabilities are from a logistic regression model also adjusted for age, sex, site, use of PI based regimen, treatment arm, BMI, viral load. Risks evaluated for a 32 year old female in Cape Town on a non-PI based regimen with a baseline viral load between 10,000-100,000 and a baseline BMI of 23.

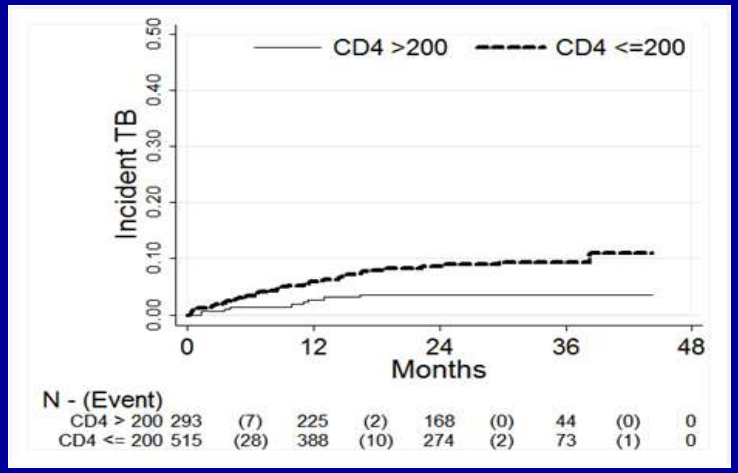
Fox M, AIDS. 2010 Aug 24;24(13):2041-50.

Treatment outcomes in CD4+ ≤ 200 vs ≤ 350







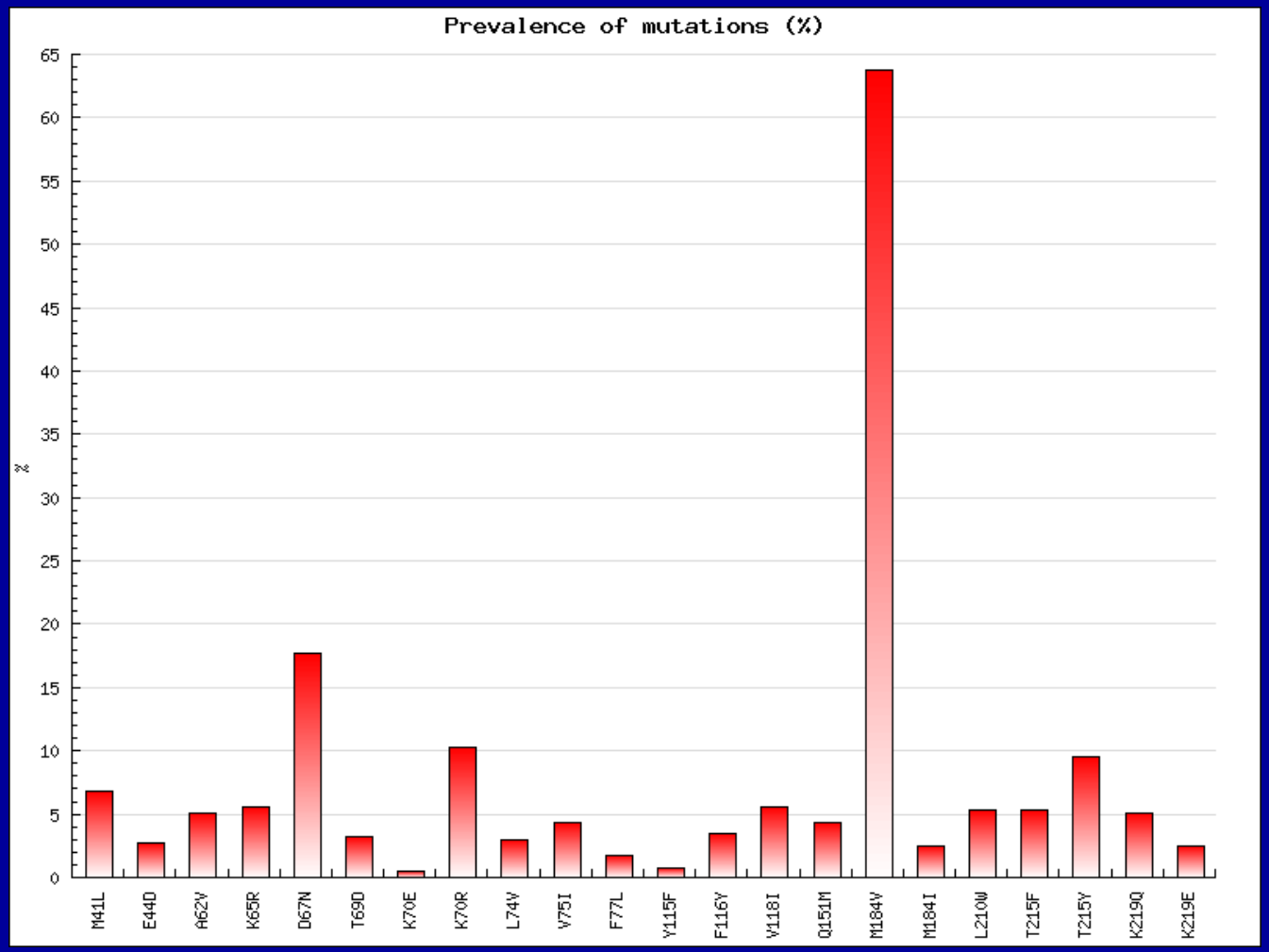


Fox M, AIDS. 2010 Aug 24;24(13):2041-50.

Drug resistance

Varied patterns of HIV-1 drug resistance on failing first-line antiretroviral therapy in South Africa - NRTI

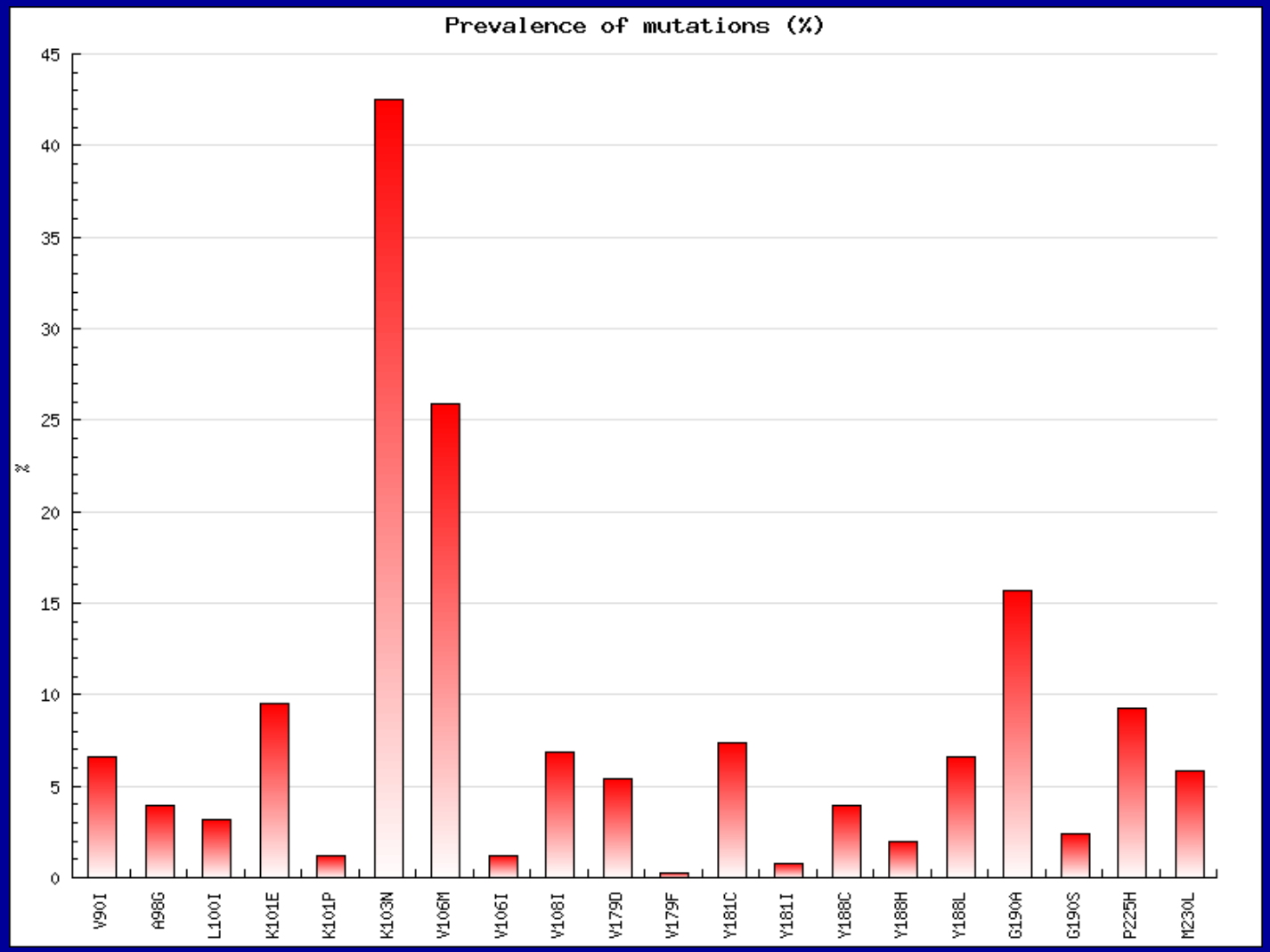
- M184V in 64% of patients failing
- Several TAMs in the population
- K65R at 5%



Wallis C, Mellors J, Venter F, Sanne I and Stevens W - J AIDS. 2010 Apr 1;53(4):480-4

Varied patterns of HIV-1 drug resistance on failing first-line antiretroviral therapy in South Africa - NNRTI

- K103N
- V106M
- Y181C
- G190A



Wallis C, Mellors J, Venter F, Sanne I and Stevens W - J AIDS. 2010 Apr 1;53(4):480-4

How can resistance testing be used?

- Sentinel site surveillance, resistance testing network
- Primary resistance, first line failure
- Cost-effective to reduce transition from first, second and salvage regimens
- Quality assurance of clinical sites
- Define a resistance thresh-hold to change treatment guidelines

Total cost and potential cost savings of the national antiretroviral treatment (ART) programme in South Africa 2010 to 2017

Gesine Meyer-Rath[1,2,3], Yogan Pillay[4], Mark Blecher[5], Alana Brennan[1,2,3], Lawrence Long[2,3], Leigh Johnson[6], Harry Moultrie[3,7], Ian Sanne[2,3], Matthew Fox[1,2,3,8], Sydney Rosen[1,2,3]

[1] Center for Global Health and Development, Boston University, US
[2] Health Economics and Epidemiology Research Office (HE²RO), Wits Health Consortium, South Africa
[3] Faculty of Health Sciences, University of the Witwatersrand, South Africa
[4] National Department of Health, South Africa
[5] National Treasury, South Africa
[6] Centre for Infectious Disease Epidemiology and Research, University of Cape Town, South Africa
[7] Enhancing Children's HIV Outcomes (ECHO), Wits Health Consortium, South Africa
[8] Department of Epidemiology, Boston University School of Public Health, US

Scenarios

Old South African Guidelines

Eligibility	**Adults**: CD4 **<200** cells/mm^3 or WHO stage 4 **Children**: CD4 15% to 20% or WHO stage 3 or 4
Regimens	**Adults**: **d4T** + 3TC + EFV/NVP; **AZT + ddI** + LPV/r **Children <3 yrs: d4T** + 3TC + LPV/r ; AZT + ddI + NVP

New South African Guidelines

Eligibility	**Adults**: CD4 **<350** cells/mm^3 **for TB/HIV co-infected or pregnant pts**, <200 cells/mm^3 or WHO stage 4 for all others **Children**: **Early Paediatric Treatment**
Regimens	**Adults**: **TDF** + 3TC + EFV/NVP for all new initiates; **TDF + 3TC** + LPV/r if failing d4T- or AZT-containing regimens/ **AZT + 3TC** + LPV/r if failing TDF-containing regimens **Children** <3 yrs: **ABC** + 3TC + LPV/r; AZT + ddI + NVP

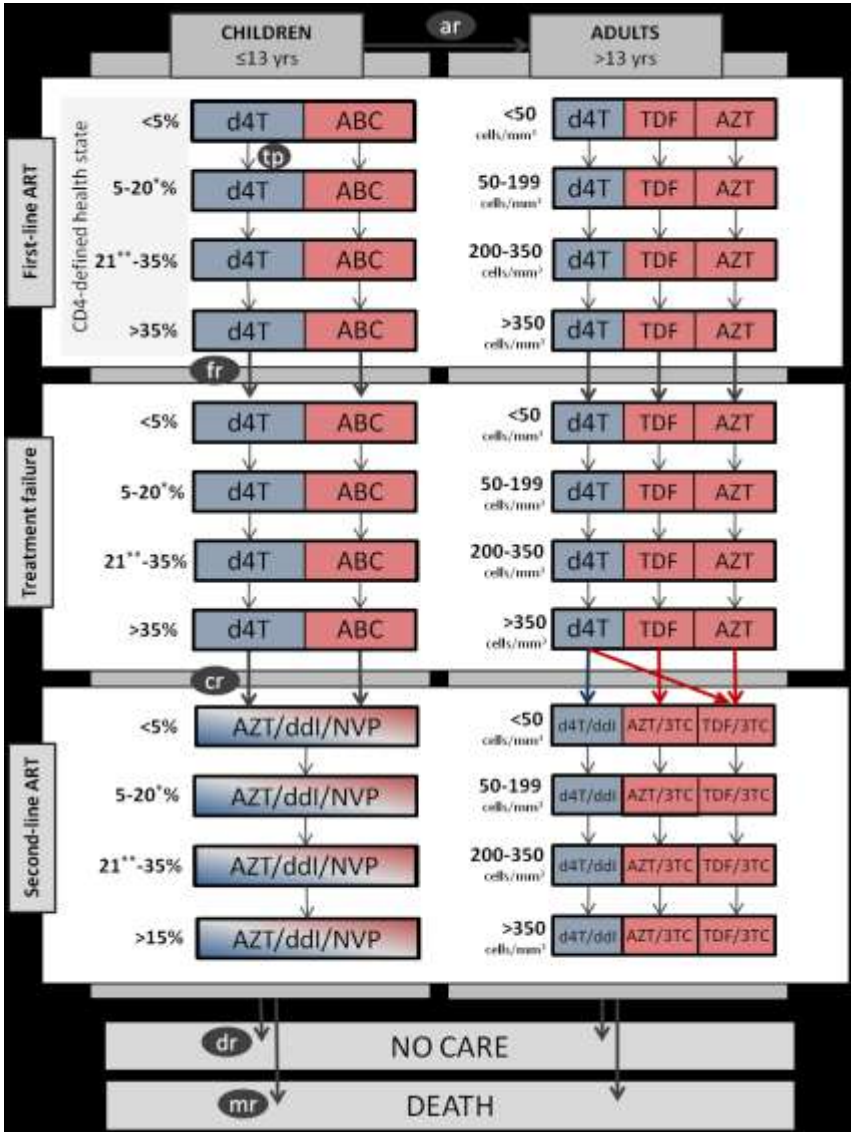
Full WHO Guidelines

Eligibility	**Adults**: CD4 **<350** cells/mm^3 or WHO stage 4 **for all** **Children**: **Early Paediatric Treatment**
Regimens	As in “New South African Guidelines”

Additional conditions

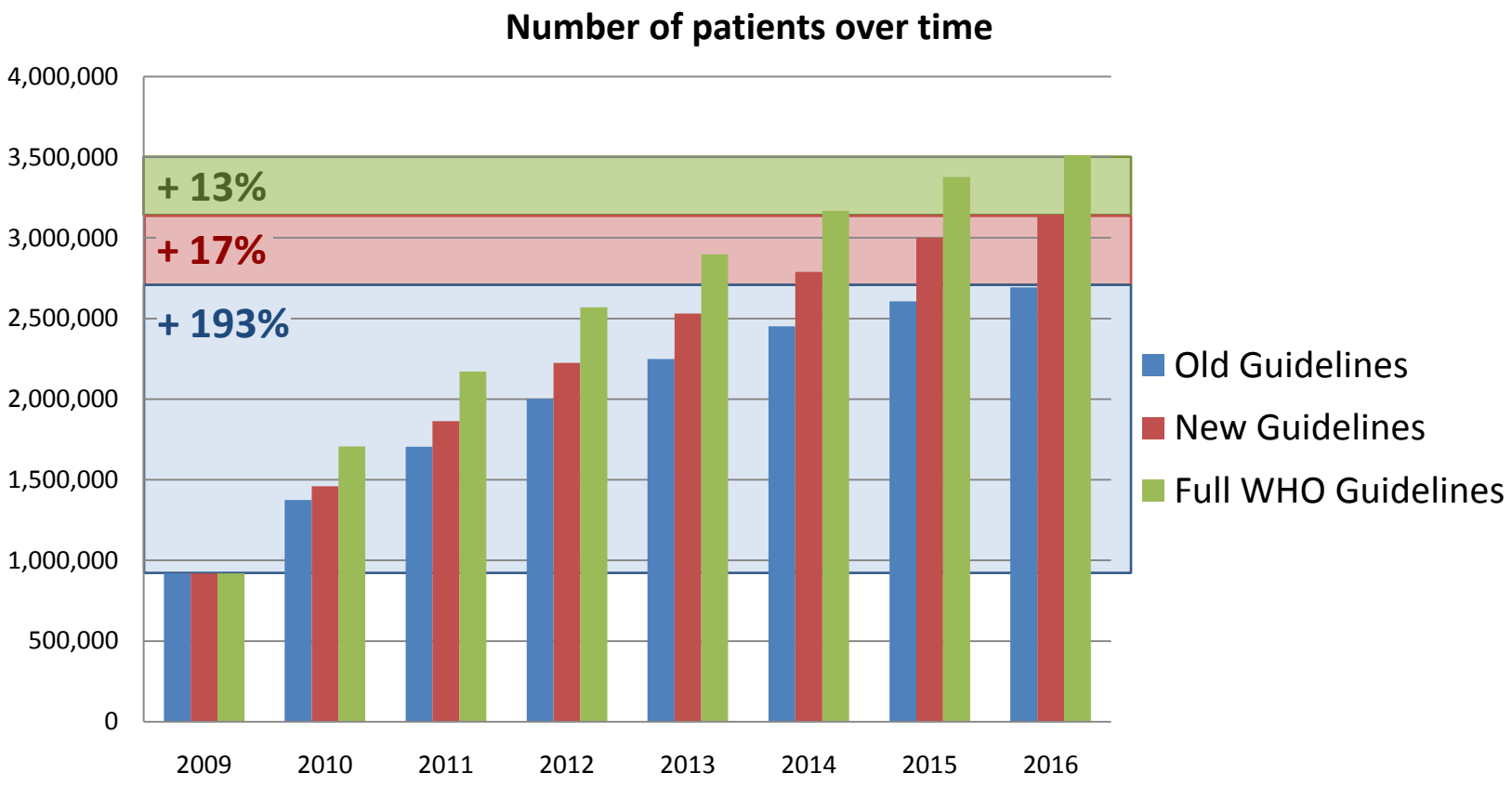
- **New drug purchasing system (RL/FDC):**
  - ARV drugs at prices set in reference list (modelled on CHAI/ GPRM/ SCMS prices)
  - Fixed-dose combination where possible
- **Task shifting (TS):**
  - ARV initiation and management by nurses under physician supervision
  - ARV dispensing by pharmacy assistants under pharmacist supervision

Health-state transition model
National ART Cost Model (**NACM**)



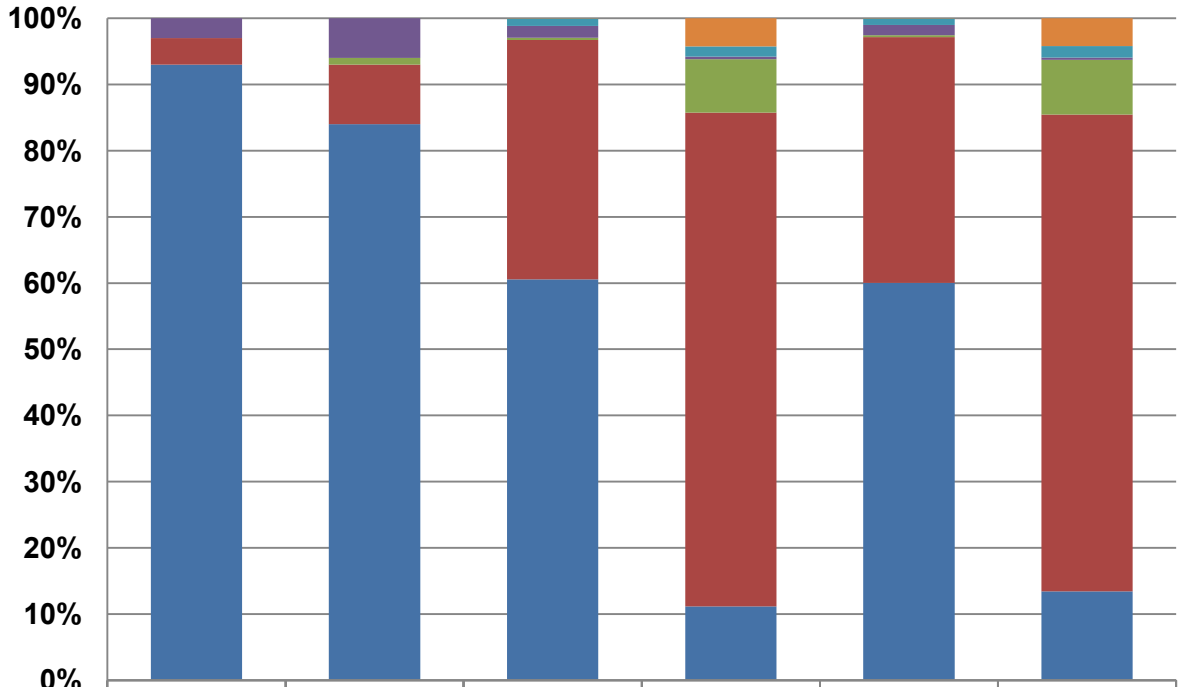
- 6-monthly transitions between types of care and CD4-defined health states
- Number of patients initiating ART from ASSA2003 model
- Initiation rate (coverage of newly eligible pts)
  - 80% in pts with <200 CD4 cells/mm^3
  - 27% in pts with 200-350 CD4 cells/mm^3
- Transition probabilites and rates of mortality, loss to follow-up, and first-line treatment failure based on 2 large Johannesburg cohorts:
  - Themba Lethu Clinic Cohort (n= 9,502)
  - Harriet Shezi Children's Clinic (n= 3,748)
- Transition probabilities and rates depend on CD4 cell count/ percentage and, for adult first-line treatment, also on time on treatment
- Model is evaluated for 2010/11 to 2016/17, with a run-in between 2003/4 and 2009/10

Results:
Total number of patients



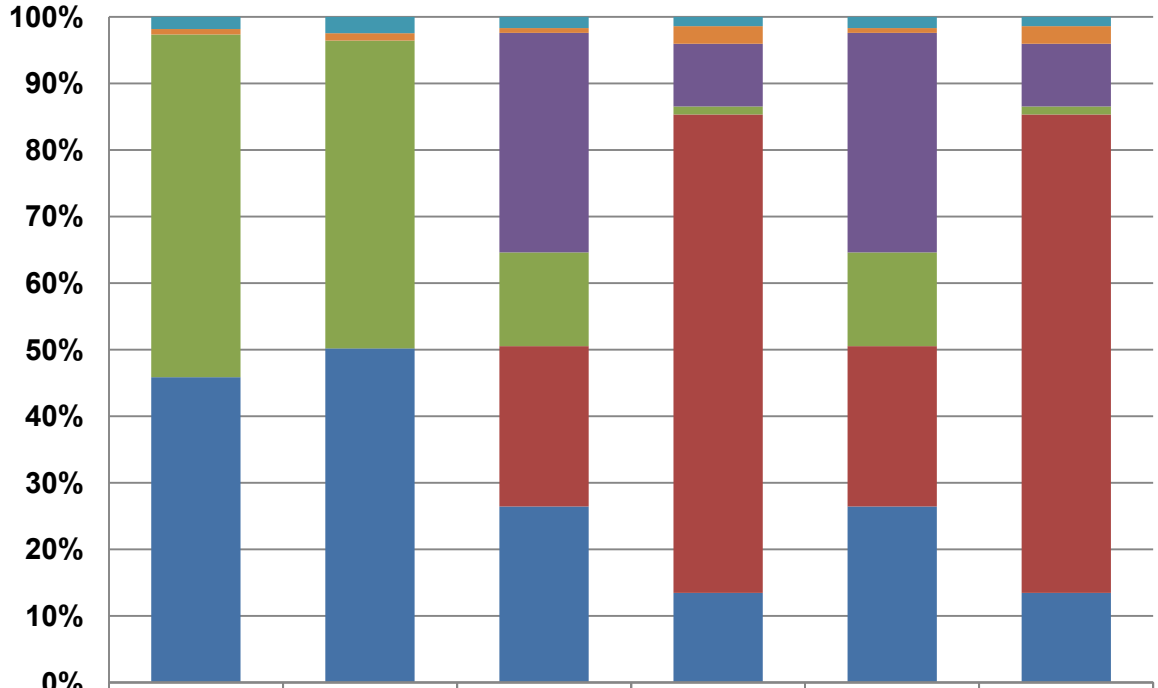
→Growth in number of patients on ART over time as a result of prevalence is higher than growth in patients as a result of increase in eligibility

Regimen distribution (Adults)



	2010/11	2016/17	2010/11	2016/17	2010/11	2016/17
	Old Guidelines		New Guidelines		Full WHO Guidelines	
AZT+3TC+LPV/r	0%	0%	0.1%	4%	0.1%	4%
TDF+3TC+LPV/r	0%	0%	1%	2%	1%	2%
AZT+ddI+LPV/r	3%	6%	2%	0.4%	2%	0.4%
AZT+3TC+EFV/ NVP	0%	1%	0.3%	8%	0.3%	8%
TDF+3TC+EFV/ NVP	4%	9%	36%	75%	37%	72%
d4T+3TC+EFV/ NVP	93%	84%	61%	11%	60%	13%

Results: Regimen distribution (Children)



	2010/11	2016/17	2010/11	2016/17	2010/11	2016/17
	Old guidelines		New guidelines		Full WHO guidelines	
AZT + ddI + LPV/r	1.8%	2.4%	1.7%	1.4%	1.7%	1.4%
AZT + ddI + EFV	0.8%	1.1%	0.7%	2.6%	0.7%	2.6%
ABC + 3TC + EFV	0.0%	0.0%	33.0%	9.4%	33.0%	9.4%
d4T + 3TC + EFV	51.4%	46.2%	14.1%	1.2%	14.1%	1.2%
ABC + 3TC + LPV/r	0.0%	0.0%	24.0%	71.7%	24.0%	71.7%
d4T + 3TC + LPV/r	45.8%	50.1%	26.4%	13.4%	26.4%	13.4%

Results:
Total cost [million 2009 ZAR]

Scenario	Full cost (Staffing and drug cost as current)			Reduced cost (With task-shifting and reference list for drug prices)			
	2010/11	2016/17	Total	2010/11	2016/17	Total	Change on Full cost
Old Guidelines	7,729	19,053	**94,647**	4,900	12,090	59,961	-33%
New Guidelines	8,317	22,869	110,152	5,190	14,865	**70,489**	-35%
Change on Old GL (Full cost)	8%	20%	17%	-29%	-22%	-25%	-
Full WHO Guidelines	9,731	25,209	124,925	6,044	16,323	**79,565**	-33%
Change on Old GL (Full cost)	27%	33%	32%	-11%	-14%	-16%	-

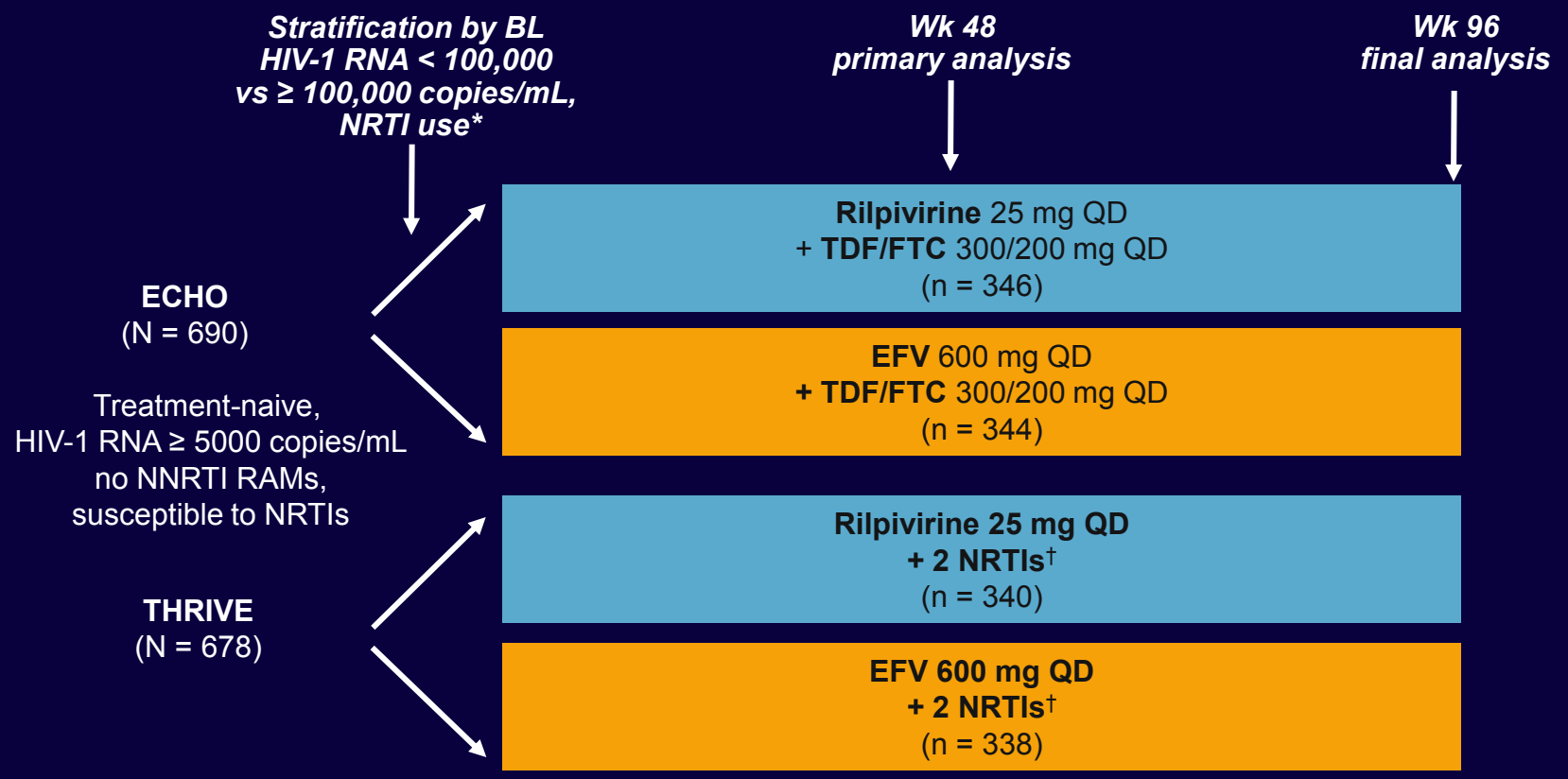
→ **The total cost of the programme increases by 17% and 32%, resp., for the New Guidelines and WHO Guidelines scenarios, as a result of both higher numbers of patients and higher drug cost for TDF-containing regimens.**

What about new drugs?

CLINICAL CARE OPTIONS HIV

ECHO, THRIVE: Rilpivirine vs EFV in Treatment-Naive Patients

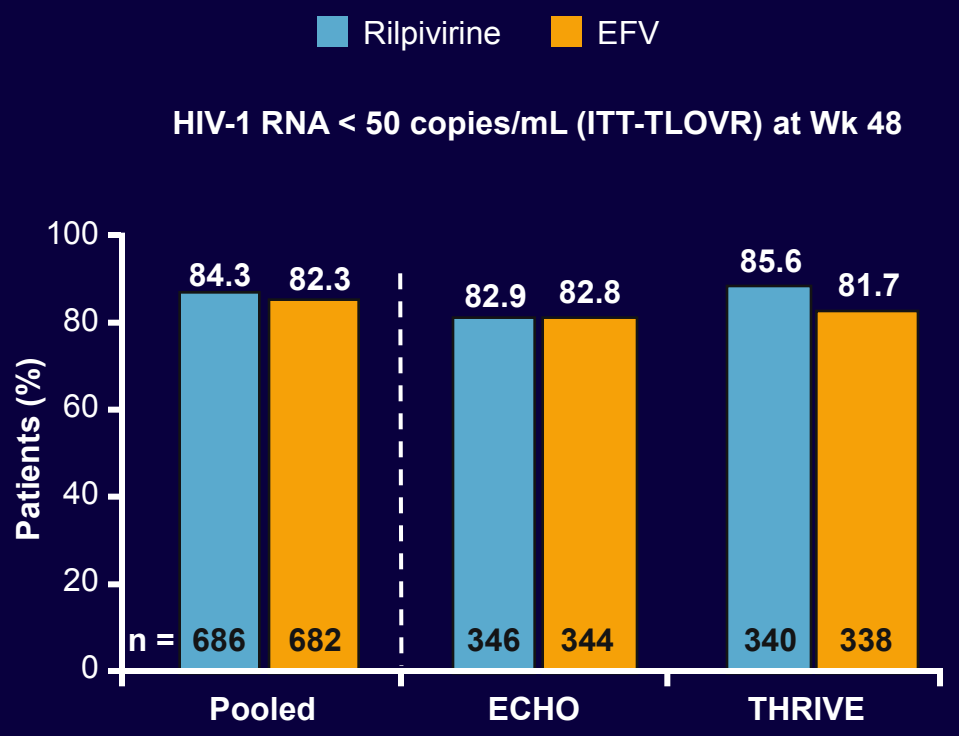
- Randomized, double-blind phase III trials

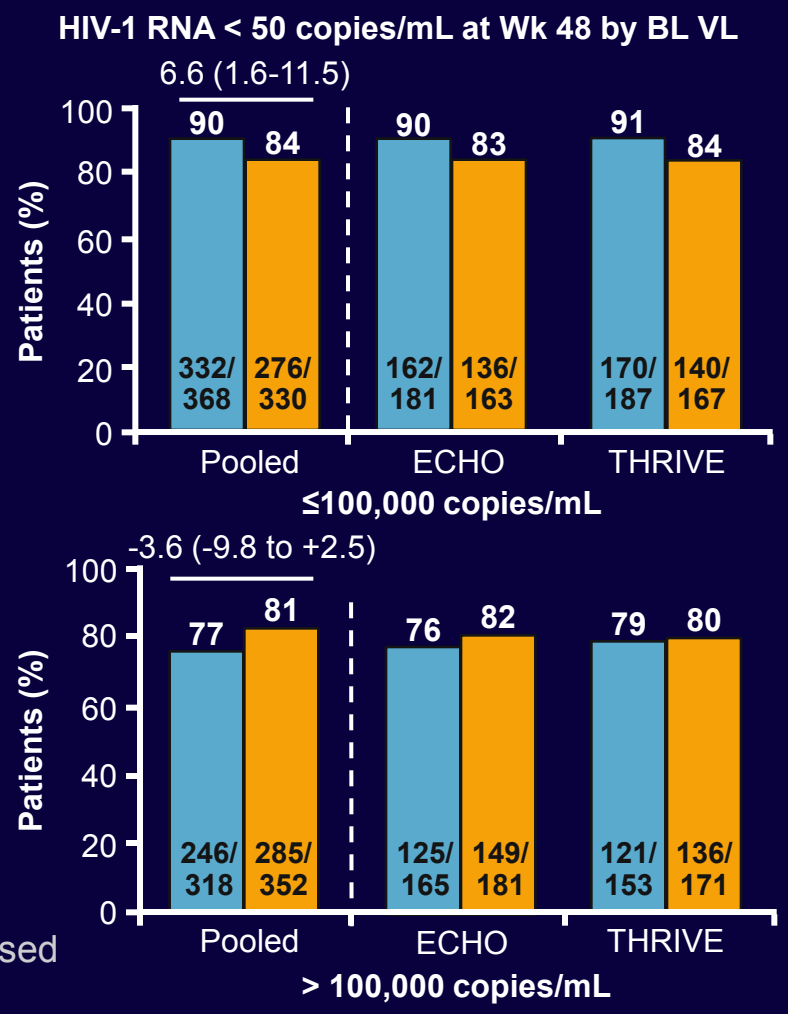


*THRIVE only. †Selected by investigator from ABC/3TC, TDF/FTC, ZDV/3TC.

Cohen C, et al. AIDS 2010. Abstract THLBB206.

ECHO, THRIVE: Rilpivirine vs EFV in Treatment-Naive Patients



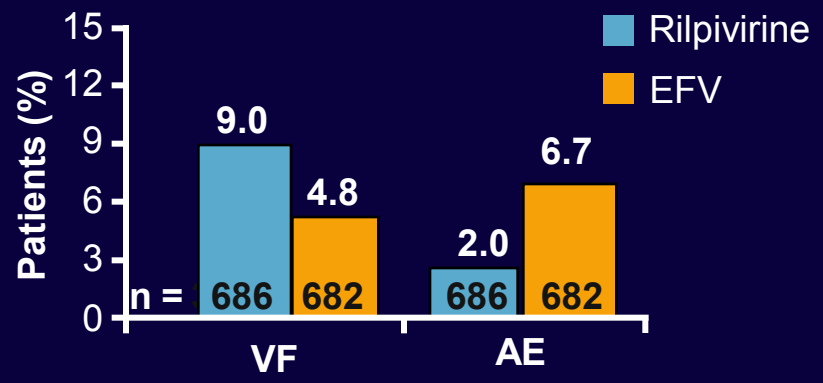


*P < .0001 for noninferiority at -12% margin.

Cohen C, et al. AIDS 2010. Abstract THLBB206. Graphics used with permission.

ECHO, THRIVE: Treatment Failure, Resistance, and Adverse Events

Treatment Failure in ECHO and THRIVE



Resistance at Virologic Failure

Wk 48 Outcome	Rilpivirine (n = 686)	Efavirenz (n = 682)
VF with resistance data, n	62	28
No NNRTI or NRTI RAMs,%	29	43
≥ 1 Emergent NNRTI RAM,%	63	54
▪ Most frequent NNRTI RAM	E138K	K103N
≥ 1 Emergent NRTI RAMs, %	68	32
▪ Most frequent NRTI RAM	M184I	M184V

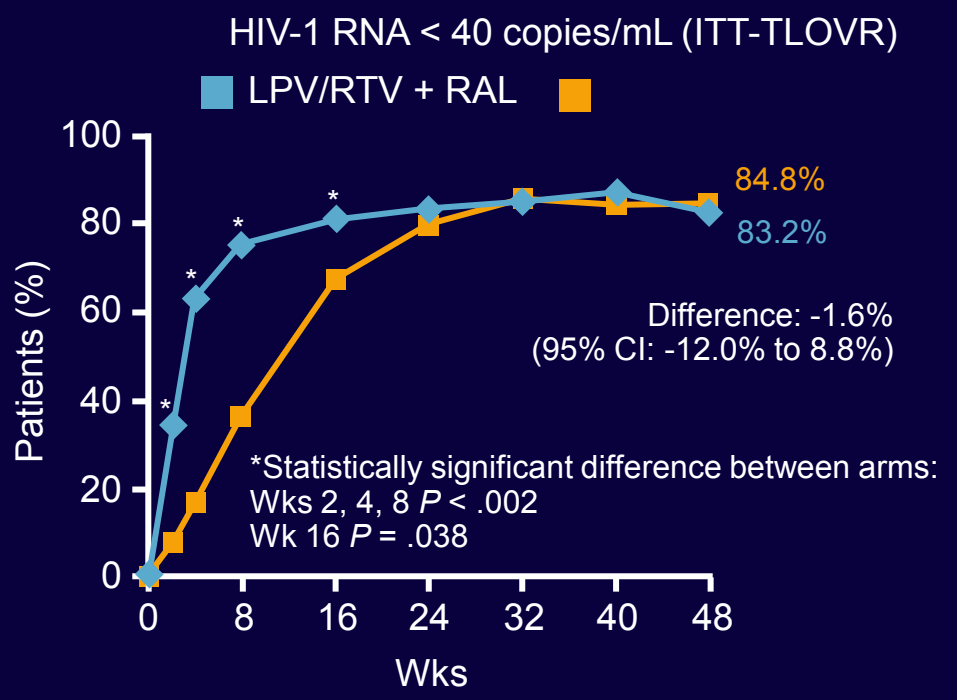
Adverse Events and Discontinuation

Wk 48 Outcome, %	Rilpivirine (n = 686)	Efavirenz (n = 682)	*P* Value
DC for AE	3	8	.0005
Most Common AEs of Interest, %			
Any neurologic AE	17	38	< .0001
Any psychiatric AE	15	23	.0002
Any rash	3	14	< .0001

Cohen C, et al. AIDS 2010. Abstract THLBB206. Table used with permission.

PROGRESS: LPV/RTV + RAL vs LPV/RTV + NRTIs in Treatment-Naive Patients

- Randomized, open-label, multicenter phase III trial in treatment-naive patients with HIV-1 RNA > 1000 copies/mL
  - LPV/RTV 400 mg BID + RAL 400 mg BID (n = 101) vs
  - LPV/RTV 400 mg BID + TDF/FTC 300/200 mg QD (n = 105)
- Relatively low mean baseline HIV-1 RNA
  - 4.25 $\log_{10}$ copies/mL

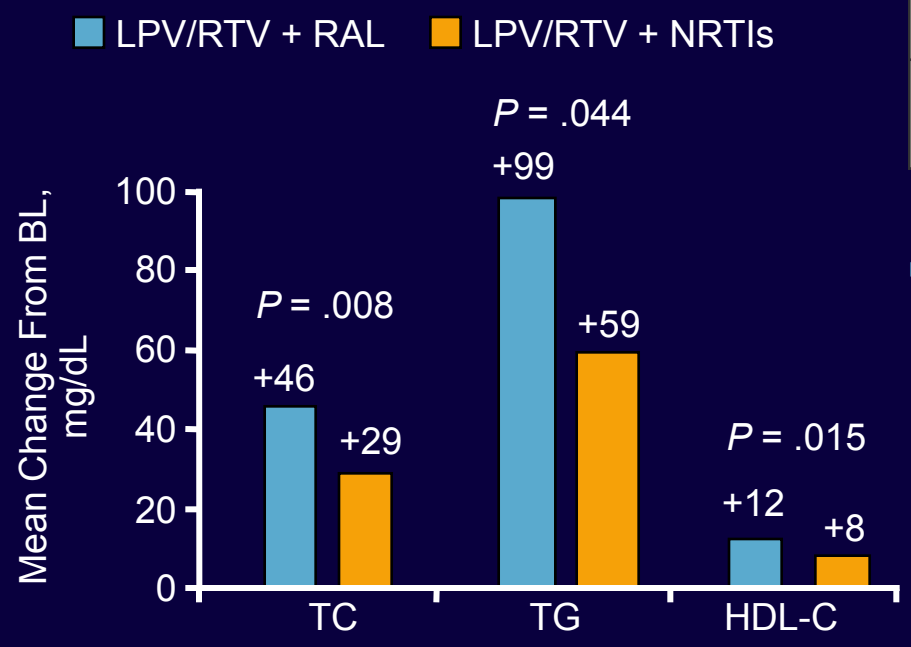


- Similar CD4+ cell count gain at Wk 48
  - LPV/RTV + RAL: 215 cells/mm³
  - LPV/RTV + NRTIs: 245 cells/mm³

Reynes J, et al. AIDS 2010. Abstract MOAB0101.
Graphic used with permission.

PROGRESS: Lipids and Adverse Events at Wk 48

- Mean increases in TC, TG, and HDL-C from BL to Wk 48 significantly greater in RAL arm vs NRTI arm



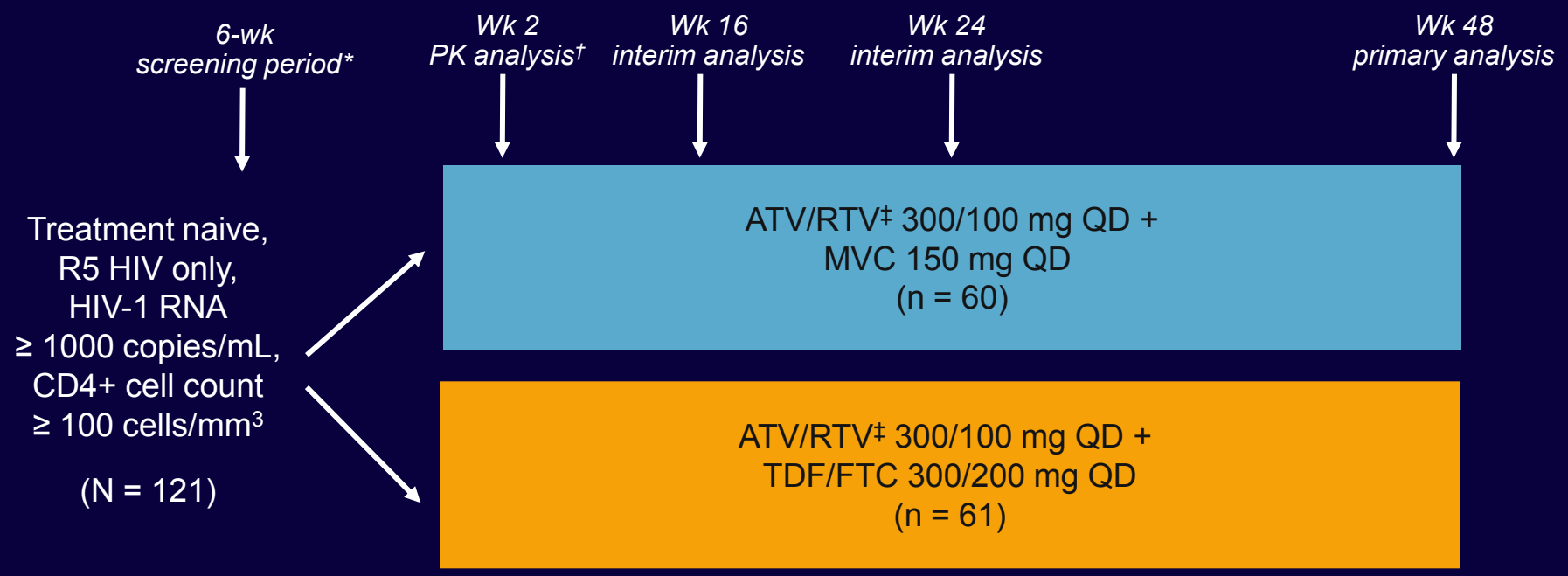
Resistance Development at VF	LPV/RTV + RAL	LPV/RTV + NRTIs
Met criteria for resistance testing	4	3
▪ INSTI mutation (N155H)	1	0
▪ NRTI mutations (M184V)	0	1

- Grade 3/4 laboratory events did not differ between arms, except higher risk of CPK > 4 x ULN in RAL arm
  - 12.9% vs 3.8% (P = .023)

Reynes J, et al. AIDS 2010. Abstract MOAB0101.

A4001078: ATV/RTV + MVC vs ATV/RTV + TDF/FTC in Treatment-Naive Patients

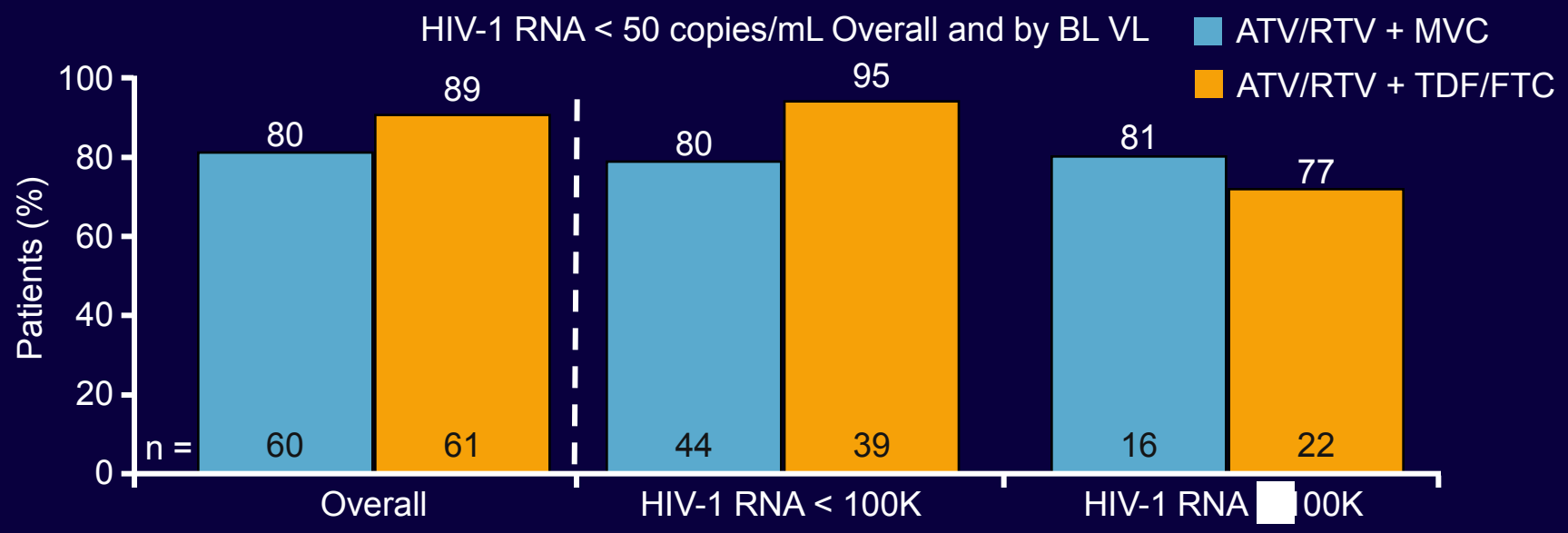
- Randomized, multicenter, open-label phase IIb pilot study



*Prior to randomization.
†PK analysis of MVC exposure in 15 MVC recipients.
‡Patients without virologic failure but with jaundice and/or scleral icterus allowed to switch ATV/RTV to DRV/RTV or LPV/RTV if desired.
Not powered for statistical comparisons.

Mills A, et al. AIDS 2010. Abstract THLBB203.

A4001078: ATV/RTV + MVC vs ATV/RTV + TDF/FTC—Wk 24 Interim Analysis



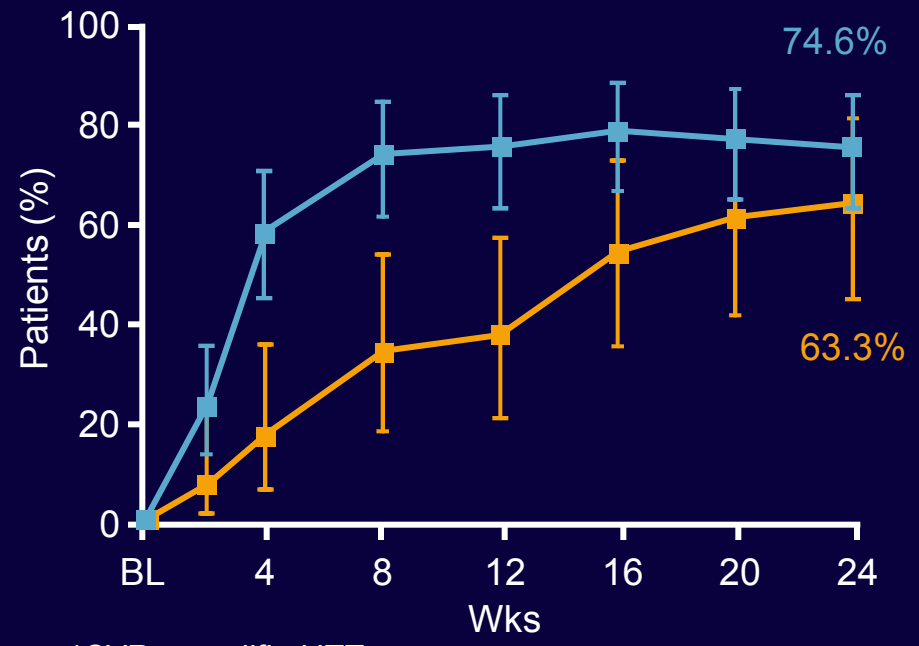
- CD4 + cell count increases similar
  - ATV/RTV + MVC: 195 cells/mm³
  - ATV/RTV + TDF/FTC: 173 cells/mm³
- Grade 3/4 hyperbilirubinemia
  - ATV/RTV + MVC: 59.3%
  - ATV/RTV + TDF/FTC: 49.2%
- 5 patients in MVC arm, 1 patient in TDF/FTC arm switched to DRV/RTV per protocol for jaundice or scleral icterus

Mills A, et al. AIDS 2010. Abstract THLBB203.

SPARTAN: Pilot Study of ATV + RAL vs ATV/RTV + TDF/FTC in Naive Pts

- Randomized, noncomparative, open-label, multicenter pilot study in treatment-naive patients with HIV-1 RNA ≥ 5000 copies/mL
  - ATV 300 mg BID + RAL 400 mg BID (n = 63) vs
  - ATV/RTV 3001/00 mg QD + TDF/FTC 300/200 mg QD (n = 31)
- Mean BL HIV-1 RNA: 4.9 $\log_{10}$ copies/mL

Primary Endpoint: HIV-1 RNA < 50 copies/mL Through Wk 24 (CVR*, NC = F)

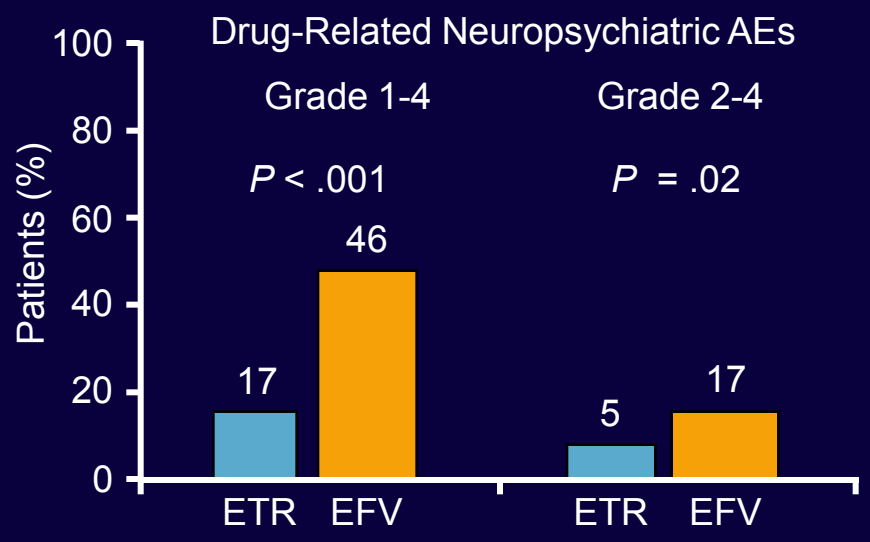


*CVR = modified ITT.

Kozal MJ, et al. AIDS 2010. Abstract THLBB204. Graphic used with permission.

SENSE: EFV vs ETR in Treatment-Naive Patients

- Randomized, double-blind trial of treatment-naive patients with HIV-1 RNA > 5000 copies/mL
  - EFV 600 mg QD (n = 78) vs
  - ETR 400 mg QD (n = 79)
  - Each with investigator-selected NRTIs (TDF/FTC, ABC/3TC, or ZDV/3TC)
- Primary endpoint: % of patients with grade 1-4 drug-related treatment-emergent neuropsychiatric AEs at Wk 12
- Mean change in HIV-1 RNA at Wk 12 similar between arms (-2.9 $\log_{10}$ copies/mL)
- More drug-related neuropsychiatric AEs in EFV arm vs ETR arm



- 10 patients discontinued in ETR and 8 in EFV arm by Wk 12

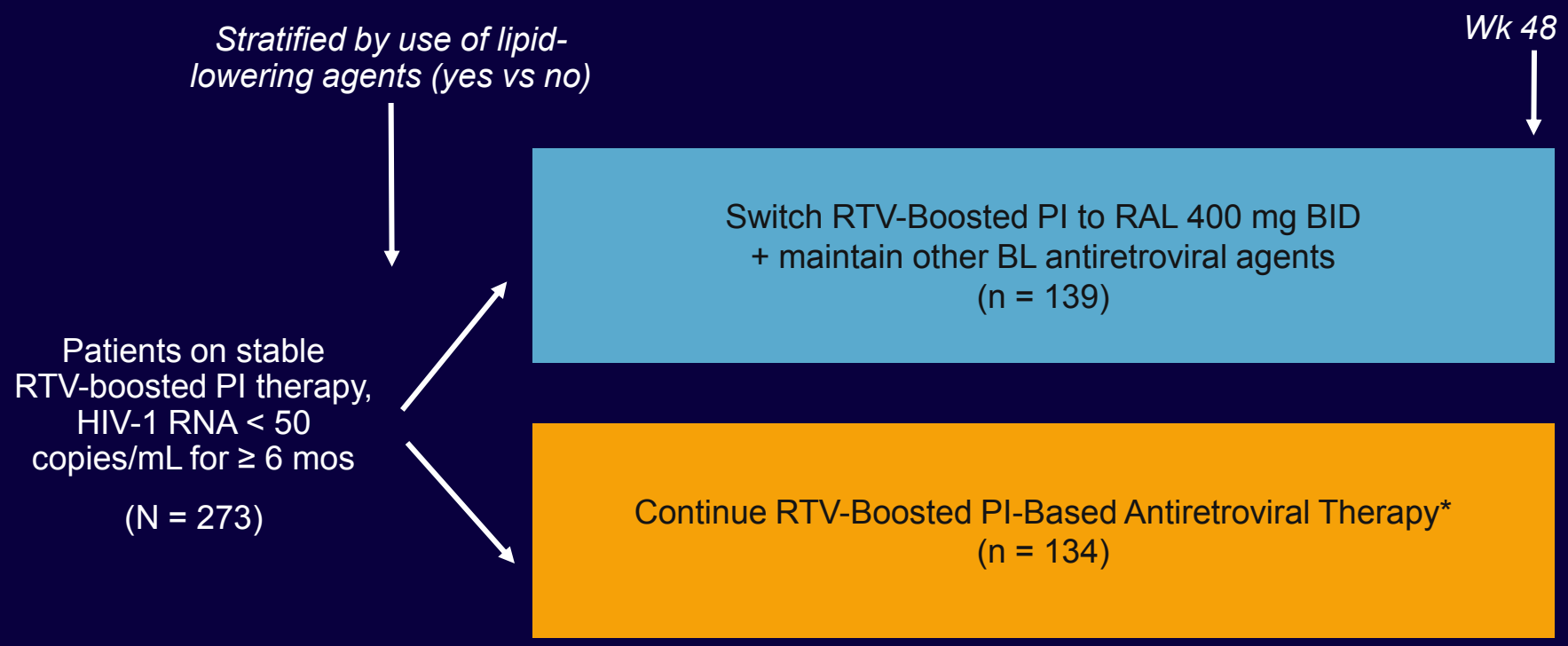
Gazzard B, et al. AIDS 2010. Abstract LBPE19.

Switch Studies

CLINICAL CARE OPTIONS HIV

SPIRAL: Switch From RTV-Boosted PIs to RAL in Virologically Suppressed Patients

- Randomized, open-label, multicenter study

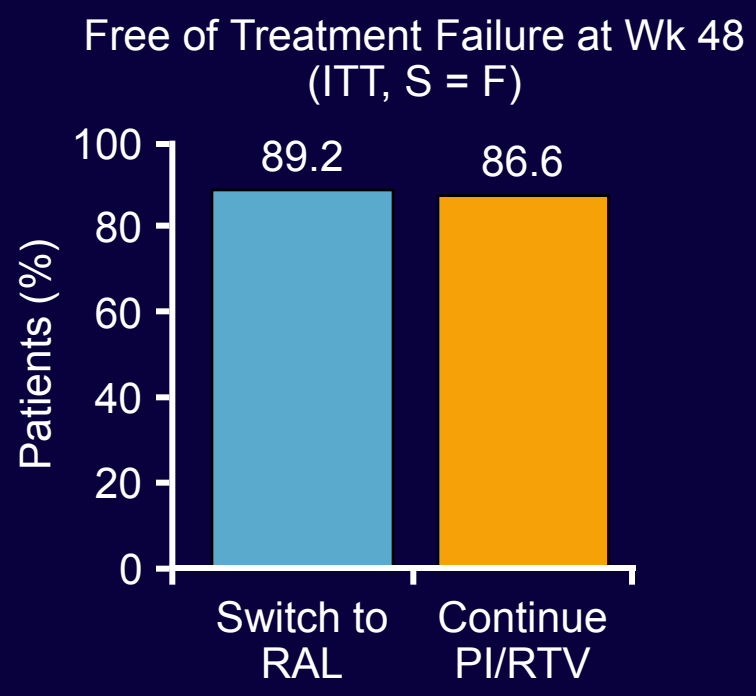


*LPV/RTV: 44%; ATV/RTV: 35%; other: 21%.

- Median duration of virologic suppression before switch: 6.6 yrs

Martinez E, et al. AIDS. 2010;24:1697-1707.

SPIRAL: Switch to RAL Noninferior to Maintaining PI/RTV Regimens



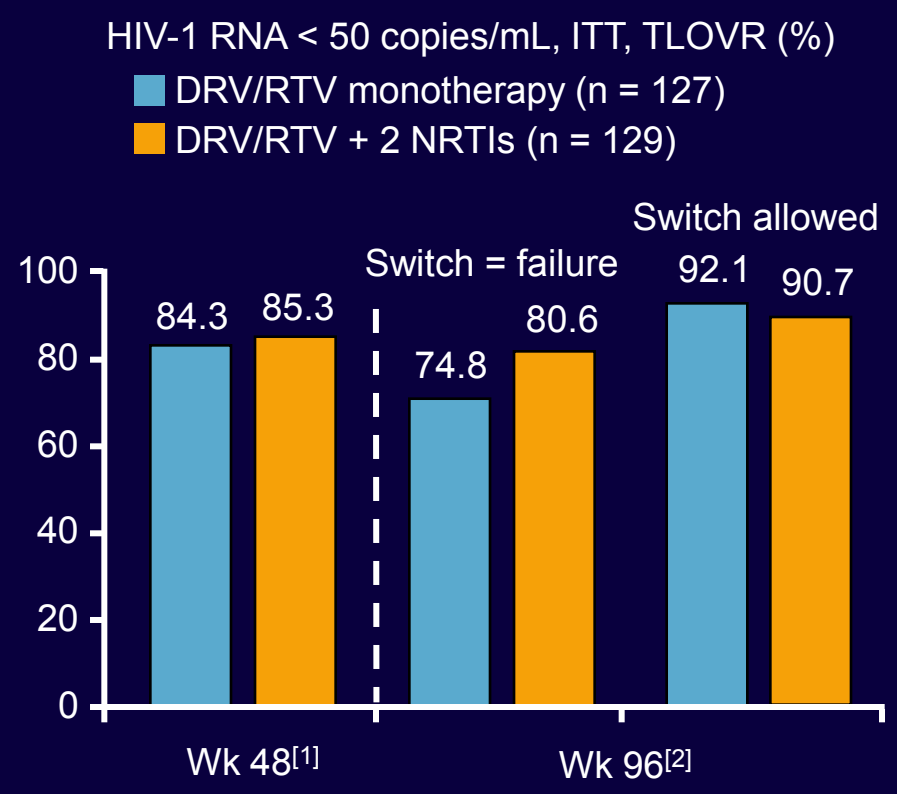
Patients With VF	RAL (n = 4)	PI/RTV (n = 6)
Prior VF	1	3
Prior suboptimal ART	2	3
Prior resistance mutations	1	5
Resistance test at VF	1	4
▪ Mutations	0	3 (PR, RT)

Mean Change From Baseline to Wk 48, %	Switch to RAL	Continue PI/RTV	*P* Value
Triglycerides	-22.1	+4.7	< .0001
TC	-11.2	+1.8	< .0001
LDL-C	-6.5	+3.0	< .001
HDL-C	-3.2	+5.8	< .0001
Total to HDL-C ratio	-4.9	-1.3	< .05

Martinez E, et al. AIDS. 2010;24:1697-1707.

MONET Trial: 96-Wk Efficacy Results of Switch to DRV/RTV Monotherapy

- Randomized, open-label trial of switch to DRV/RTV monotherapy vs continuing DRV/RTV HAART in virologically suppressed pts
- DRV/RTV monotherapy noninferior vs DRV/RTV HAART at Wk 48[1]
- Monotherapy NOT noninferior with switch = failure analysis at Wk 96[2]
  - Δ -5.8% (95% CI: -16.0% to +4.4%)
- If resuppression with intensification included as success, then monotherapy noninferior at Wk 96
  - Δ +1.4% (95% CI: -5.5% to +8.3%)



1. Arribas JR, et al. IAS 2009. Abstract TUAB106LB. 2. Rieger A, et al. AIDS 2010. Abstract THLBB209.

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