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Durable Viral Suppression among HIV Care Coordination Participants and Non- participants

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Conflict of Interest Disclosure

McKaylee Robertson

Has no real or apparent
conflicts of interest to report.



HIV Care Coordination in NYC

- In 2009, with Ryan White Part A funding, NYC began implementing a comprehensive HIV care coordination program (CCP) at 28 HIV care provider agencies
 - Targets patients at high risk for suboptimal outcomes
- The CCP intervention combines various evidence-based programmatic elements*:
 - Case conferencing, patient navigation, adherence support including directly observed therapy (DOT), structured health promotion, and case conferencing
- Service delivery program – no randomization
- CCP increases short-term (12 month) viral load suppression, beyond usual care, for
 - Persons newly diagnosed or
 - Persons with no evidence of viral suppression 12 months prior to enrollment

*For more details, see CDC's Compendium of Evidence-Based Interventions:

http://www.cdc.gov/hiv/pdf/prevention/research/compendium/cdc-hiv-HIVCCP_EI_Retention.pdf



Objective

We aimed to compare durable viral suppression (DVS) of CCP enrollees with DVS in a matched group of HIV patients for 24 months, following an initial 12-month period for establishment in care and treatment.





Data Sources

- We retrospectively created an observational cohort of persons enrolled and not enrolled in the CCP by merging
 - Provider-reported programmatic data (CCP clients)
 - NYC HIV Surveillance Registry data (NYC residents with diagnosed HIV)
- Persons not enrolled in the CCP were identified after the merge and considered to be in the usual-care group
- For CCP and non-CCP persons, all outcome data (viral load) was taken from the Registry



Matched Usual-Care Comparison

- Randomly assigned a pseudo-enrollment date to usual-care
- Matched CCP enrollees to those in the usual-care group on
 - Propensity for CCP enrollment,
 - Pseudo-enrollment/enrollment dates and
 - Baseline treatment status

Baseline Treatment	Definition
Newly diagnosed	Diagnosed ≤ 12 months prior to pseudo-enrollment/enrollment
Consistently suppressed	≥ 2 VLs ≥ 90 days apart and all VLs ≤ 200 copies/ μ L
No evidence of suppression	All VLs reported > 200 copies/ μ L or no VL reported
Inconsistently suppressed	≥ 1 VL ≤ 200 copies/ μ L but not all VLs ≤ 200 copies/ μ L

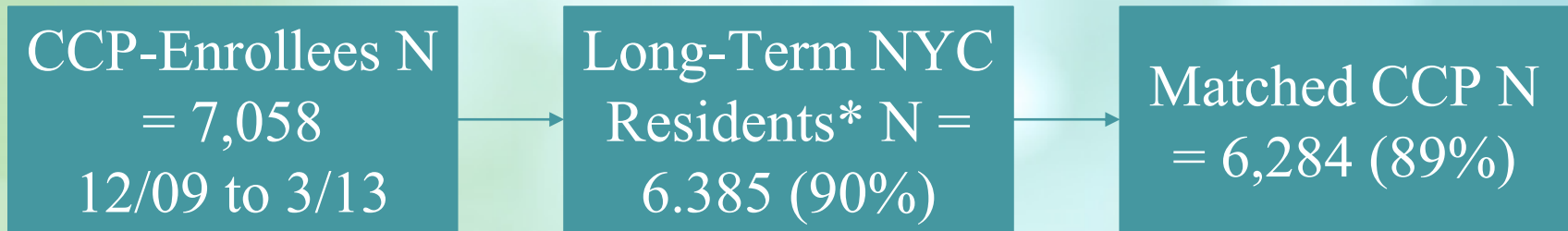


Statistical Analysis and Outcome Definitions

- Durable viral suppression (DVS):
 - Regular monitoring: ≥ 1 VL result in each 12-month period of follow-up
 - *All VLs ≤ 200 copies/ μ L*
 - From 13-36 months of follow-up
 - *Also examined DVS using a ≤ 1500 copies/ μ L threshold*
- Ever achieved viral load suppression:
 - ≥ 1 VL was ≤ 200 copies/ μ L
 - From 0-36 months of follow-up
- To examine DVS, used log binomial regression



Characteristics of Matched CCP and Usual-Care Persons



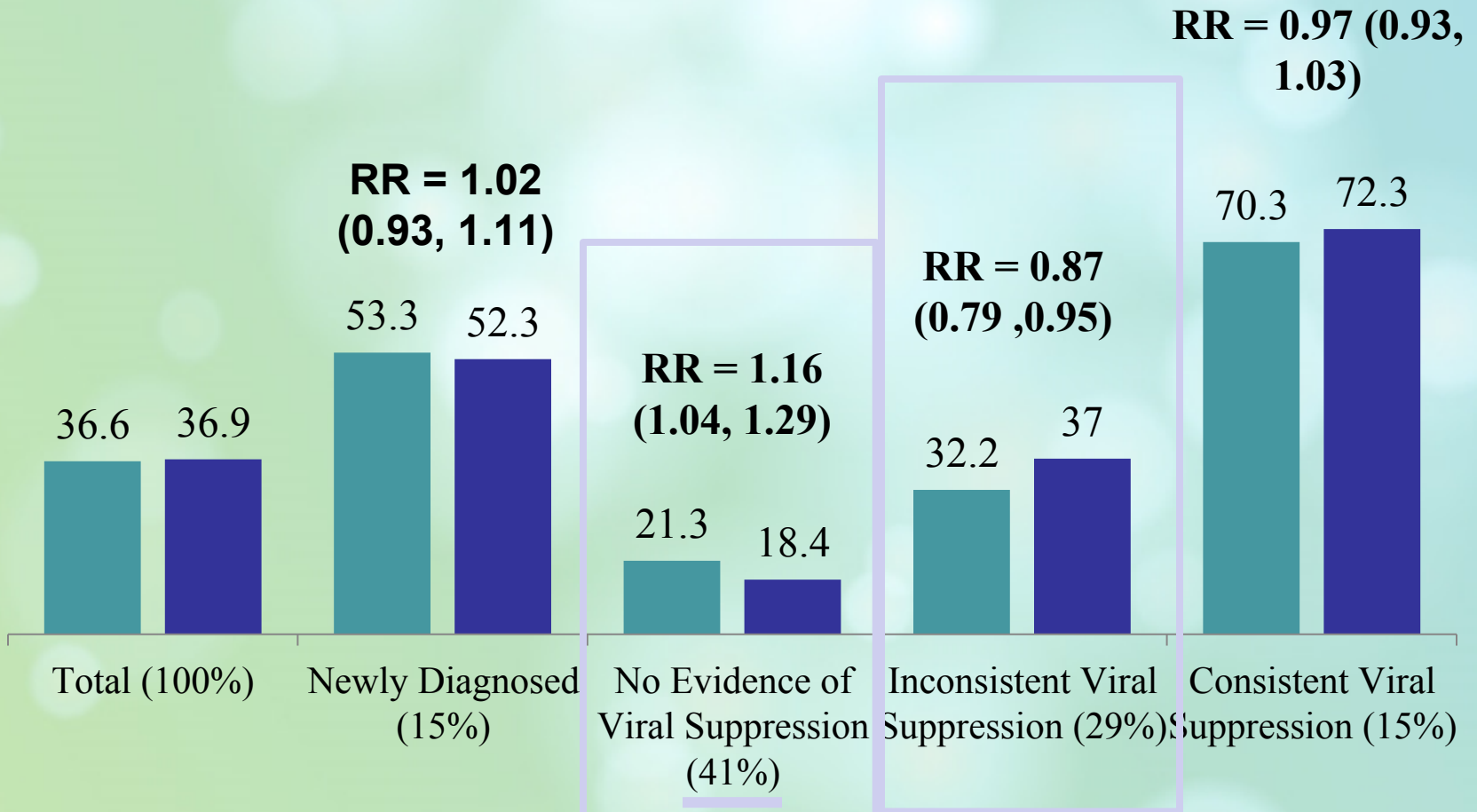
Characteristic	CCP N (%)	Usual Care N (%)
Total (N = 12,414)	6,207 (100)	6,207 (100)
Male	3,955 (64)	3,951 (64%)
Black	3,322 (54)	3,414 (55)
25-44	2,596 (42)	2,576 (42)
Men who have sex with men	1,788 (29)	1,810 (29)
Baseline CD4 <200	1,995 (32)	1,934 (31)

* 1 VL in first 12 months and ≥ 2 VL in months 13-36 of enrollment



Durable Viral Suppression (%) – CCP versus Usual Care, by Baseline Treatment Status

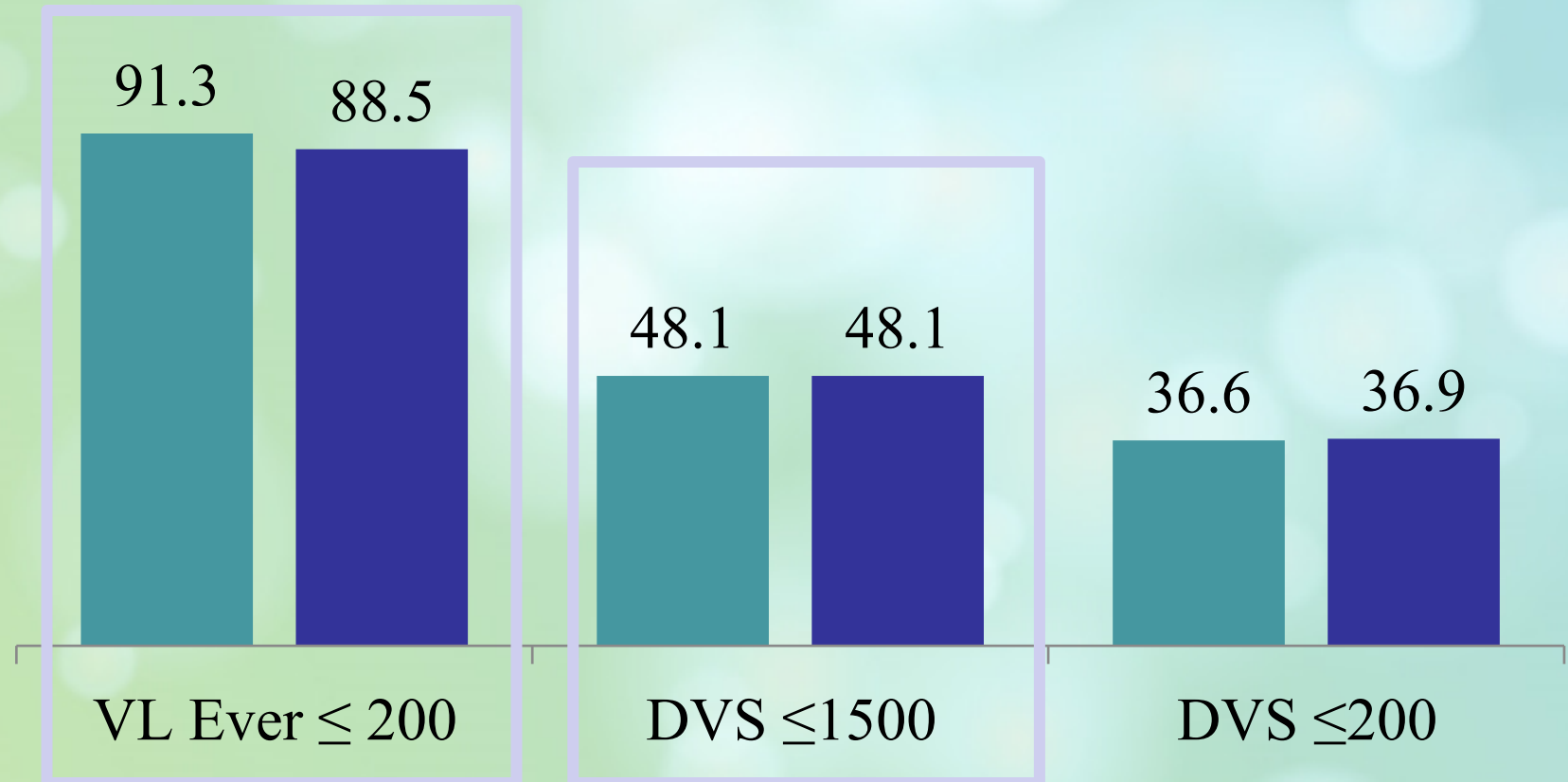
■ CCP ■ Usual Care





Viral Load Ever ≤ 200 or DVS at 1500 and 200 Copies/ μL Thresholds (%) – CCP versus Usual Care

■ CCP ■ Usual Care





Strengths

- Outcome data for CCP and usual-care group was longitudinal and came from the same source, and available regardless of care location or duration of enrollment
 - ≥ 3 years of follow-up
 - Ability to examine different viral load outcome definitions
- Population-based comparison group
- Our method of creating a comparison group (i.e., matching on pseudo-enrollment/enrollment date) ensured a CCP effect was not the result of secular improvements in VLS



Limitations

- Observational study
 - Possibility of uncontrolled confounding remains
 - However, we controlled for numerous demographic and clinical confounders, in addition to secular trends in VLS
- Change in treatment guidelines may affect outcomes of persons with high pre-treatment CD4 counts (>500 cells)



Discussion (1)

- Consistent with our short-term outcomes, CCP effect among persons with no evidence of viral suppression, the largest group of enrollees by baseline status
 - New York has many care and treatment services available to PLWH
 - People in usual-care group may be receiving similar services as CCP-enrollees
 - CCP effect may look better in jurisdictions with fewer resources
- No CCP effect for newly diagnosed
 - Newly diagnosed are entering a more favorable treatment landscape (e.g., reduced toxicity) with fewer negative experiences around ART and more services available than previous generations
 - As a result, newly diagnosed persons may have an easier time achieving DVS

Discussion (2)

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- CCP enrollees have more observation time and VL events reported during follow-up than the usual-care group
 - As a result, CCP group had more opportunities to fail on our measure of DVS than the usual-care group
 - Most problematic for outcomes measured among CCP-enrollees in the inconsistently suppressed group
 - Because the inconsistently suppressed group is, by definition, moving above and below the 200 copies/ul threshold
- Proportion achieving DVS is very low (36%)
 - Almost everyone had access to ART (90% ever suppressed).
 - Implies the barrier to achieving DVS is ART adherence over time, and not access to care



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- Care Coordination Program Service Providers and Clients
- DOHMH CCP TA providers
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Supplemental Slides

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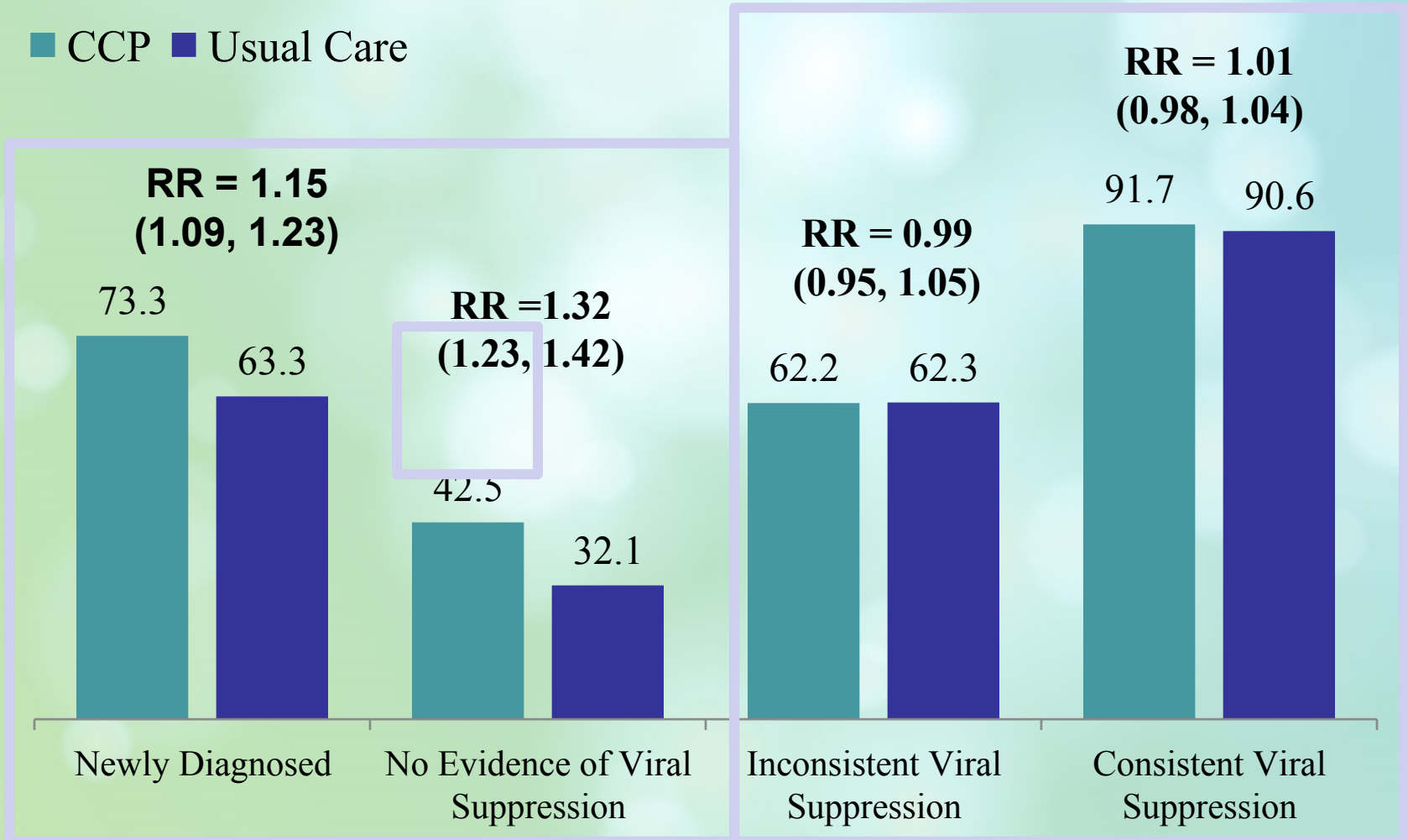


Supplemental Background



Short Term - Viral Suppression (%) at 12 Months after Enrollment – CCP versus Usual Care, by Baseline Treatment Status

■ CCP ■ Usual Care

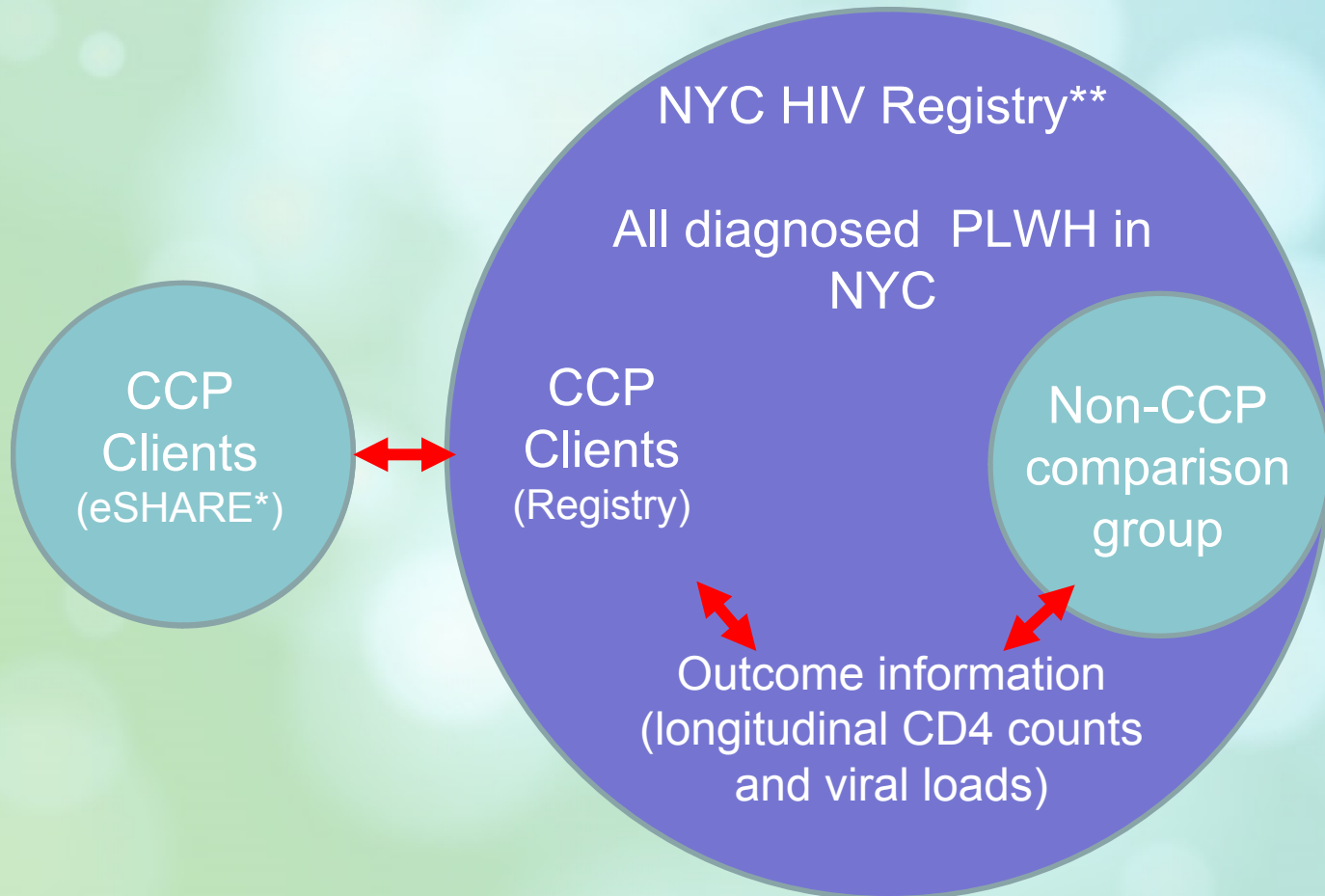




Supplemental Methods



Data Sources



*Electronic System for HIV/AIDS Reporting and Evaluation (eSHARE)

**The NYC HIV Registry contains information on HIV diagnoses and longitudinal viral load results for all diagnosed persons living with HIV.



Constructing a Usual-Care Comparison (1)

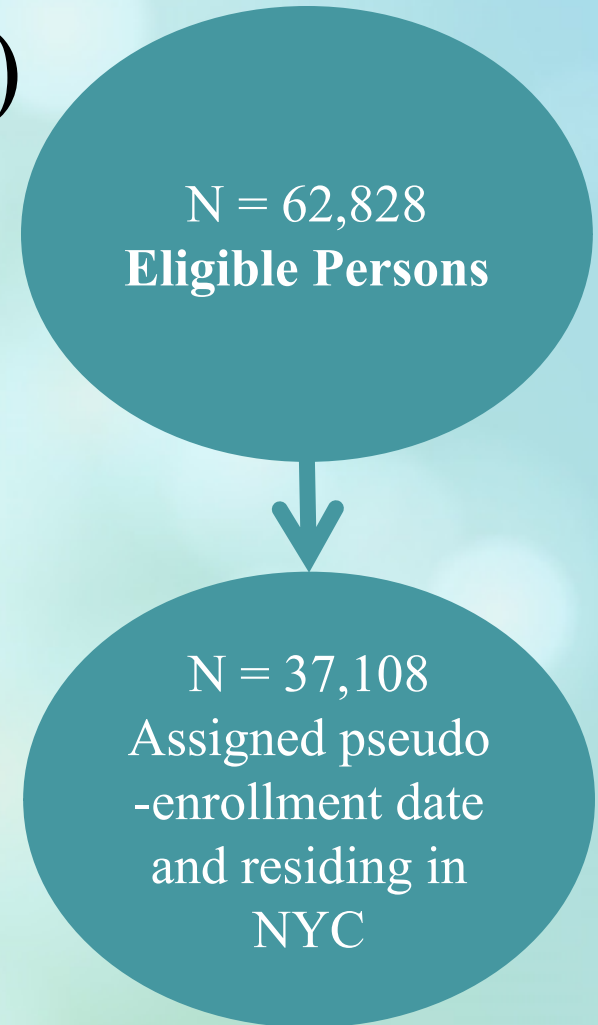
1. Identified persons who met clinical criteria for CCP enrollment, but were not enrolled
 1. Newly diagnosed
 2. Out of medical care
 3. Treatment naïve
 4. Exhibiting poor ART adherence
 5. Experiencing a viral rebound
 6. Experiencing a high viral load

N = 62,828
Eligible
Persons



Constructing a Usual-Care Comparison (2)

2. Randomly assigned a pseudo-enrollment date to eligible persons and restricted to persons residing in NYC
 - Assigned with probabilities such that the temporal distribution of dates matched the distribution of enrollment dates among CCP enrollees
 - Pseudo-enrollment date = time zero
 - Required persons to have ≥ 1 VL in months 0-12 after pseudo-enrollment/enrollment and ≥ 2 VLs in months 13-36 (evidence of NYC residence and HIV care)





Constructing a Usual-Care Comparison (3)

3. Matched CCP enrollees to those in the usual-care group on

- a) Propensity for CCP enrollment
- b) Pseudo-enrollment/enrollment dates
- c) Baseline treatment status

Baseline Treatment Status	Definition
Newly diagnosed	Diagnosed ≤ 12 months prior to pseudo-enrollment/enrollment
Consistently suppressed	≥ 2 VLs ≥ 90 days apart and all VLs ≤ 200 copies/ μ L
No evidence of suppression	All VLs reported > 200 copies/ μ L or no VL reported
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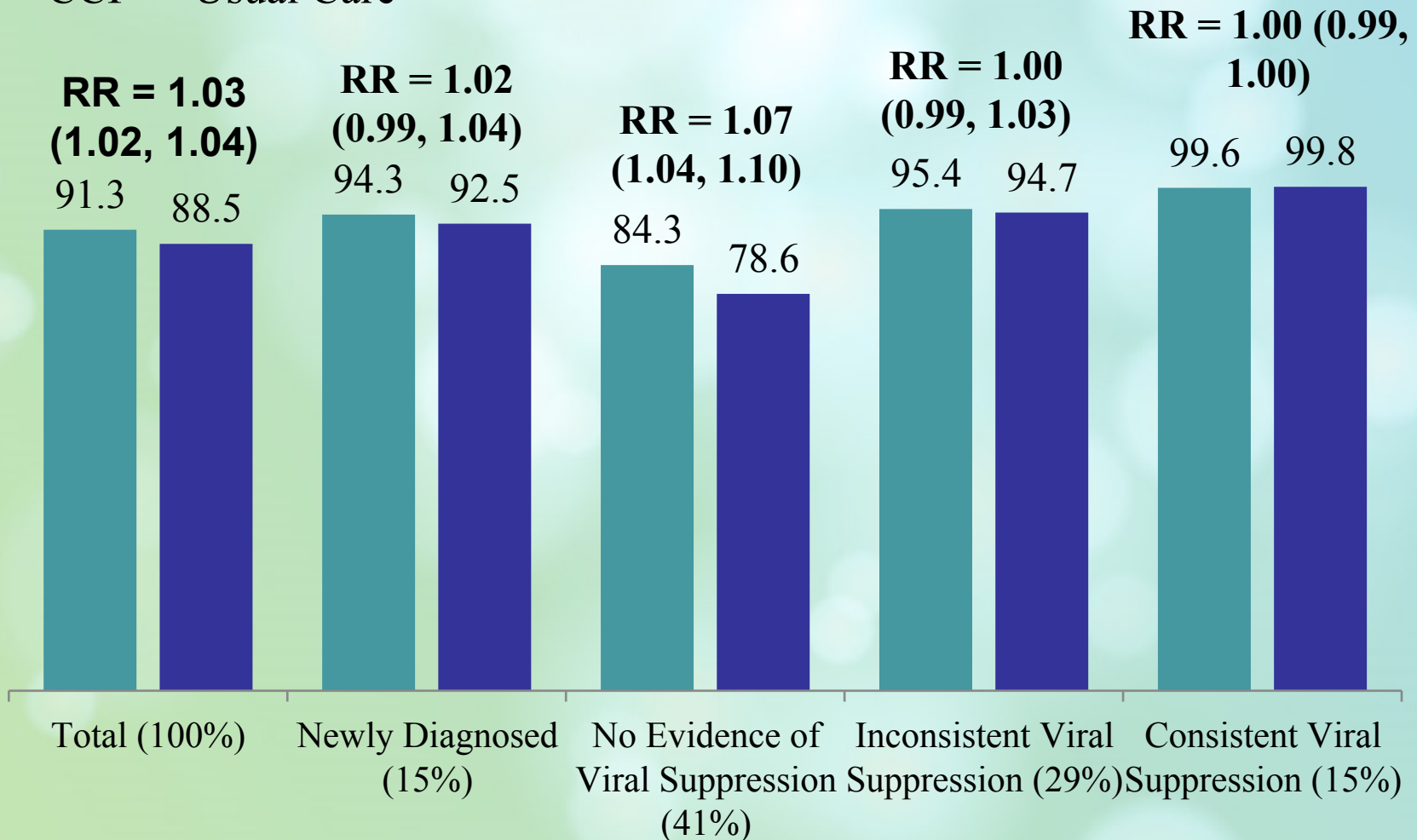
Supplemental Results

Viral Load Ever ≤ 200 (%) – CCP versus Usual Care, by Baseline Treatment Status

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■ CCP ■ Usual Care

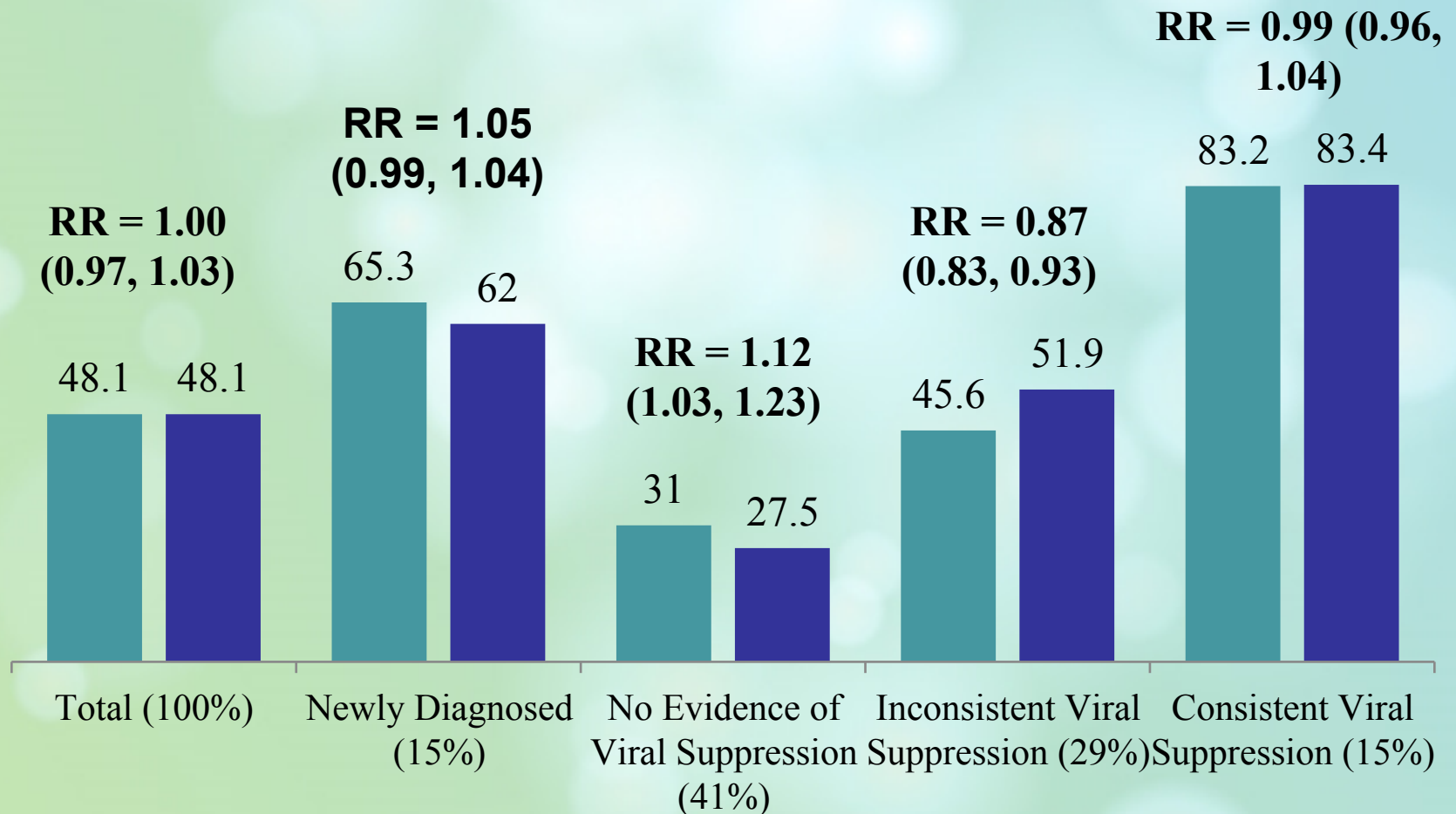


Long Term – Durable Viral Suppression at 1500 copies/ μ L threshold (%) – CCP versus Usual Care, by Baseline Treatment Status

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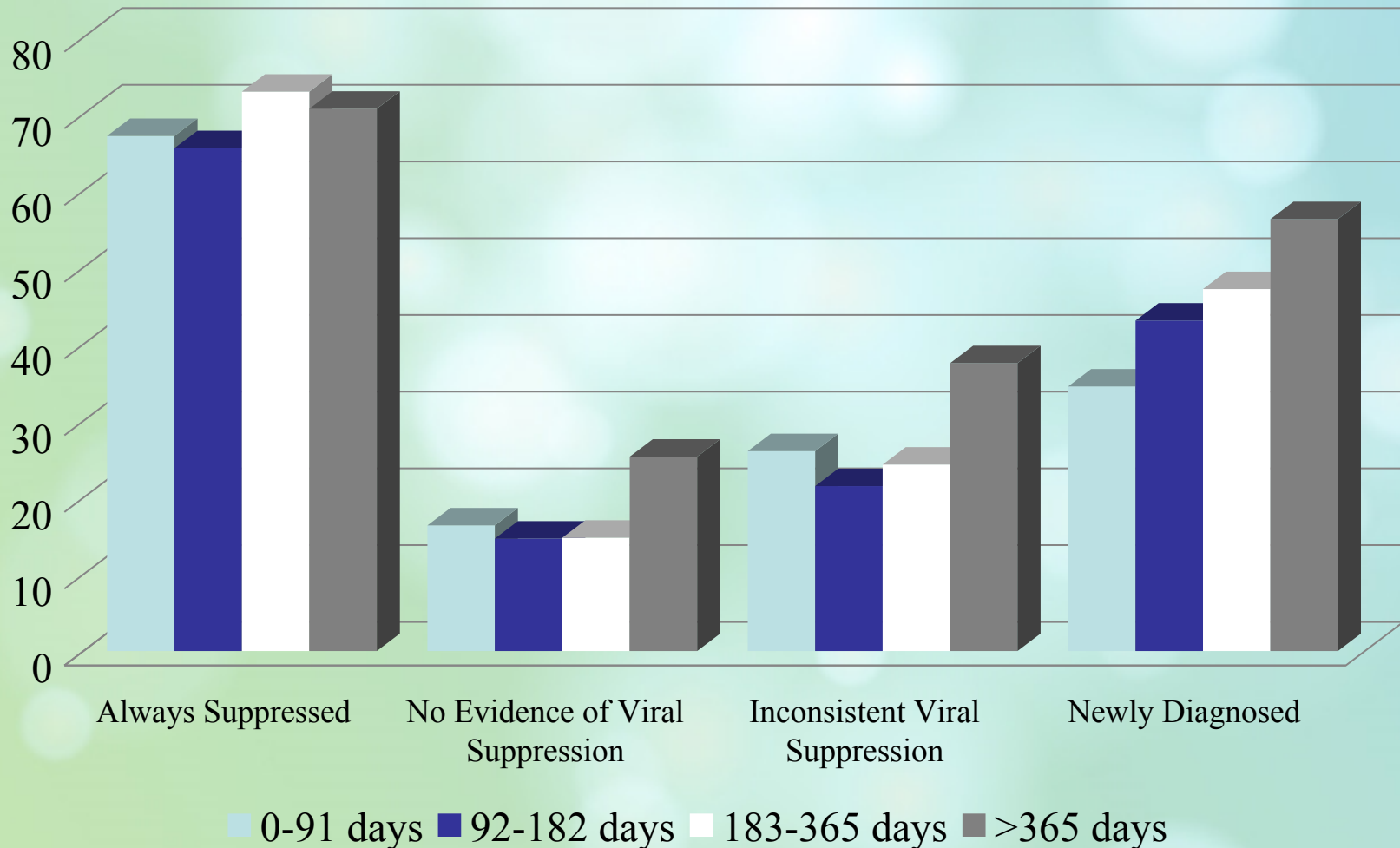


■ CCP ■ Usual Care



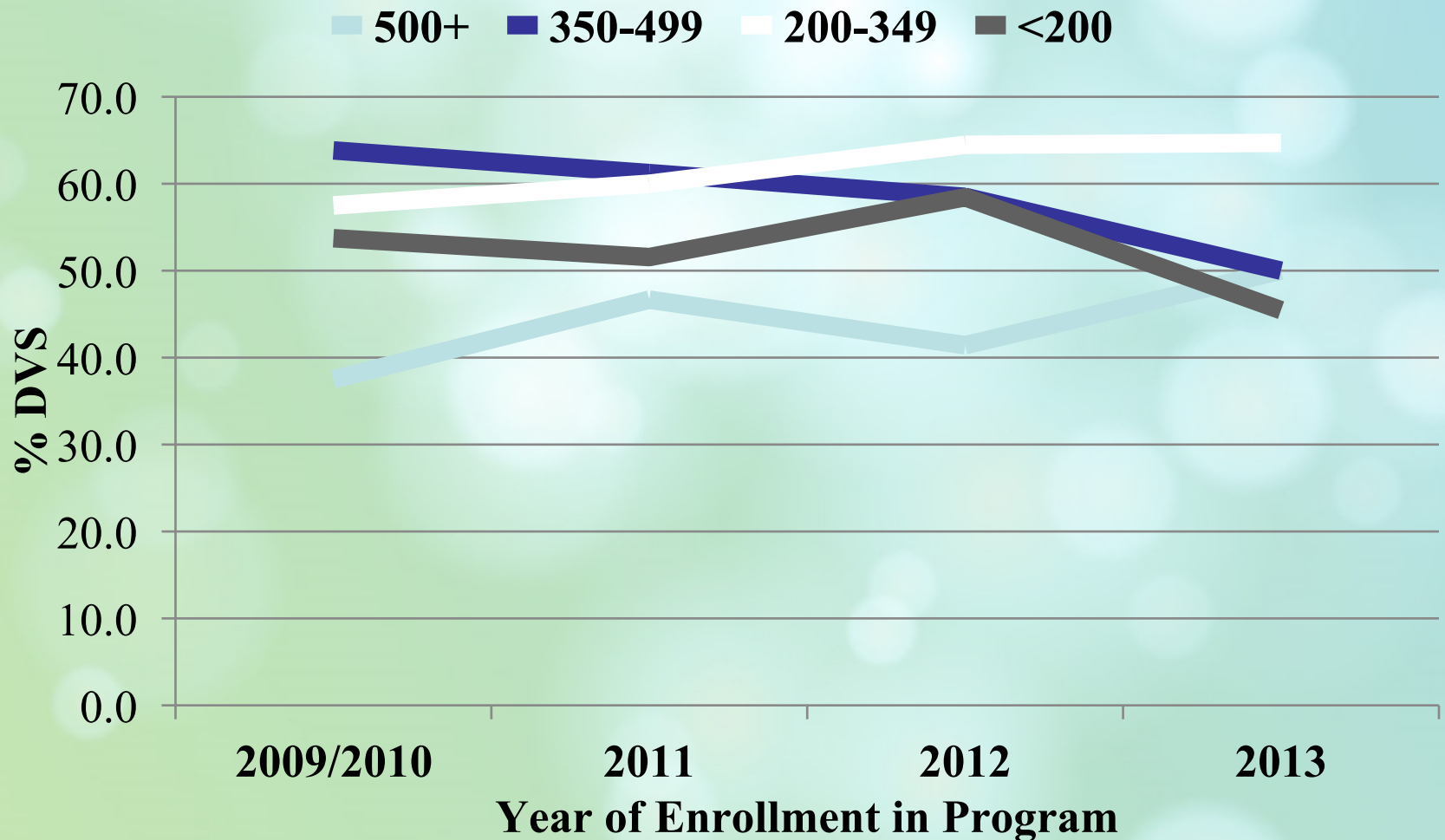
Proportion with Durable Viral Suppression at 200 copies/ μ L threshold (%), by Length of Enrollment - Among CCP Enrollees

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Proportion with Durable Viral Suppression at 200 copies/ μ L threshold (%), by Year of Enrollment and CD4 count at enrollment - Among Newly Diagnosed CCP Enrollees

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Differences in Person-Time and Number of Laboratory Results – CCP Versus Usual Care

	Mean (STD) Total PT CCP	Mean (STD) Total PT Non- CCP	P-value paired t- test	Mean (STD) Total Labs CCP	Mean (STD) Total Labs Non-CCP	P-value paired t- test
Baseline - Match Groups						
Newly Diagnosed	556.1 (127.8)	534.2 (146.3)	0.0008	6.3 (2.3)	5.7 (2.1)	<0.0001
Always Suppressed	574.7 (112.5)	543.6 (134.5)	<0.0001	6.7 (2.1)	5.7 (2.2)	<0.0001
Never Suppressed	547.8 (147.5)	521.3 (160.6)	<0.0001	7.1 (3.1)	6.3 (2.9)	<0.0001
Inconsistently Suppressed	561.6 (138.5)	537.8 (146.2)	0.0003	7.3 (3.0)	6.3 (2.7)	<0.0001

Person-time: number of days from first to last laboratory even reported in months 13-36 of follow-up

Total labs: number of CD4 or VL laboratory results reported to surveillance in months 13-36 of follow-up



Time above 1500 copies/ μ L (days) – CCP versus Usual Care, by Baseline Treatment Status

	Mean (STD) Days CCP	Mean (STD) Days Non-CCP	P-value paired t- test
Baseline - Match Groups			
Newly Diagnosed	92.1 (175.7)	96.4 (173.2)	0.59
Always Suppressed	33.2 (103.0)	28.5 (92.4)	0.3
Never Suppressed	233.5 (226.4)	242.6 (227.3)	0.15
Inconsistently Suppressed	151.8 (200.7)	129.8 (190.3)	0.0003

Time above 1500 copies/ul: Marks, Gary, et al. "Time above 1500 copies: a viral load measure for assessing transmission risk of HIV-positive patients in care." *AIDS (London, England)* 29.8 (2015): 947.



Year of Diagnosis (%) by Baseline Treatment Status among
Matched Population Diagnosed >1 Year before Pseudo-
Enrollment/Enrollment

	No Evidence of Viral Suppression	Inconsistent Viral Suppression	Consistent Viral Suppression
Year of HIV Diagnosis	N = 5,084	N = 3,644	N = 1,850
Prior 1995	19.2	24.8	24.6
1995-1999	19.7	21.8	22.1
2000-2004	32.3	31.3	32.4
2005-2009	25.2	19.6	19.8
2010-2013	3.6	2.5	1.0