

ART Coverage and Predictors of Detectable Viral Load in the Los Angeles County Ryan White System of Care

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Background: Benefits of ART

- An estimated 21%¹ of those with HIV/AIDS are unaware of their status, and incident HIV infection rates are not declining²
- HIV treatment as prevention is critical component of the HIV prevention toolbox
- Strong evidence that access and adherence to antiretroviral therapy (ART) can lead to:
 1. Improved morbidity and mortality
 2. Reduced forward HIV transmission

¹ CDC HIV/AIDS Facts October 2008, *New Estimates of U.S. HIV Prevalence, 2006*

² Prejean et al. Estimated HIV Incidence in the US, 2006-2009. PLoS



Changes in ART Guidelines

Guidelines for the Use of Antiretroviral Agents in HIV-1-Infected Adults and Adolescents

December 1, 2009

Developed by the DHHS Panel on Antiretroviral Guidelines for Adults and Adolescents – A Working Group of the Office of AIDS Research Advisory Council (OARAC)

How to Cite the Adult and Adolescent Guidelines:

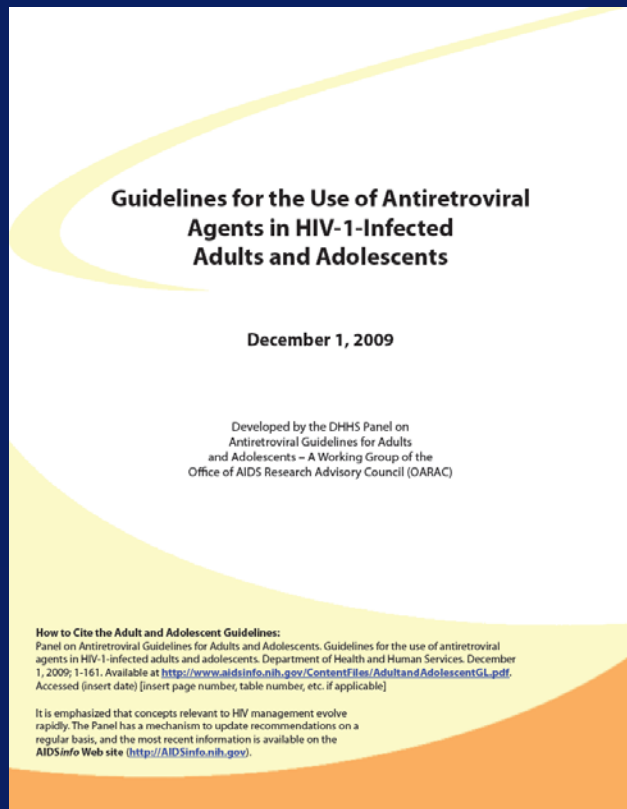
Panel on Antiretroviral Guidelines for Adults and Adolescents. Guidelines for the use of antiretroviral agents in HIV-1-infected adults and adolescents. Department of Health and Human Services. December 1, 2009; 1-161. Available at <http://www.aidsinfo.nih.gov/ContentFiles/AdultandAdolescentGL.pdf>. Accessed [insert date] [insert page number, table number, etc. if applicable]

It is emphasized that concepts relevant to HIV management evolve rapidly. The Panel has a mechanism to update recommendations on a regular basis, and the most recent information is available on the [AIDSinfo Web site \(http://AIDSinfo.nih.gov\)](http://AIDSinfo.nih.gov).

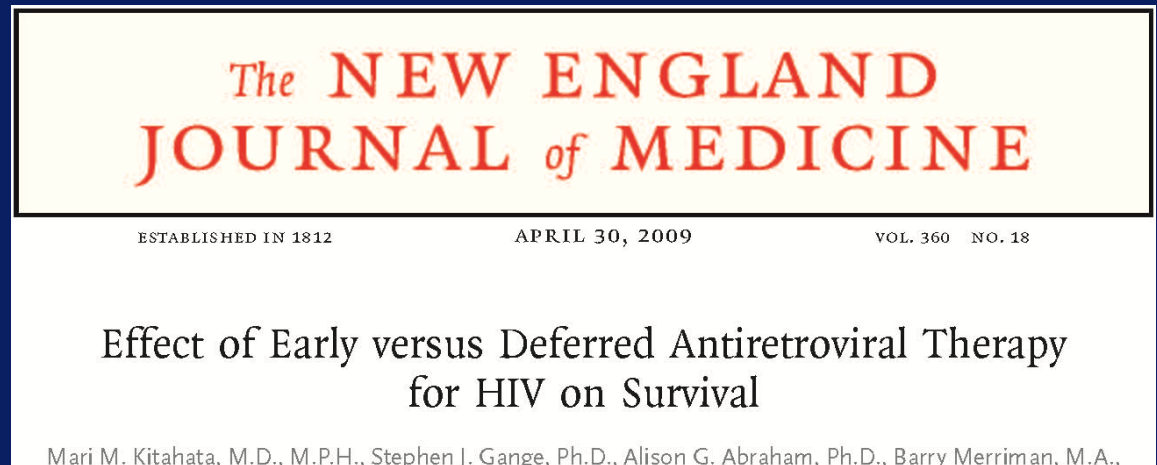
- Treat patients w/ CD4 counts b/w 350-500 cells/mm³ (A/B-II)
- Consider treatment for patients w/ CD4 counts >500 (B/C-III)



Changes in ART Guidelines



- Treat patients w/ CD4 counts b/w 350-500 cells/mm³ (A/B-II)
- Consider treatment for patients w/ CD4 counts >500 (B/C-III)



- CD4 351-500: Deferred ART group had 69% increase risk of death
- CD4 > 500: Deferred ART group had 94% increase risk of death
- Conclusion – Early ART initiation before CD4 count decrease led to significant improvements in survival.



The NEW ENGLAND JOURNAL of MEDICINE

Prevention of HIV-1 Infection with early Antiretroviral Therapy

Myron S. Cohen, MD, et. al.

- HPTN 052: RCT of 1763 serodiscordant couples
- HIV+ had CD4 350-550, randomized to early/ immediate ART or delayed ART (CD4<250 or AIDS related illness)
- Overall 39 transmission, 28 linked to HIV+ partner: 27 delayed arm, 1 early tx arm: HR 0.04, 95% CI, .01-0.27
 - **96% relative reduction HIV transmission w early ART**
- Overall early ART associated with fewer clinical events, HR 0.59, 95% CI, .40-.88
 - **41% relative reduction HIV related clinical events with early ART**

Analysis Goals & Objectives



How can we optimize ART coverage and viral suppression in LA County to reduce HIV transmission?

Step 1: Understand ART use and viral load levels in a population of HIV+ persons in LA County

Goal:

Identify individual-level and geographic factors associated with ART use and detectable viral load in the LA County Ryan White system of care

Objectives:

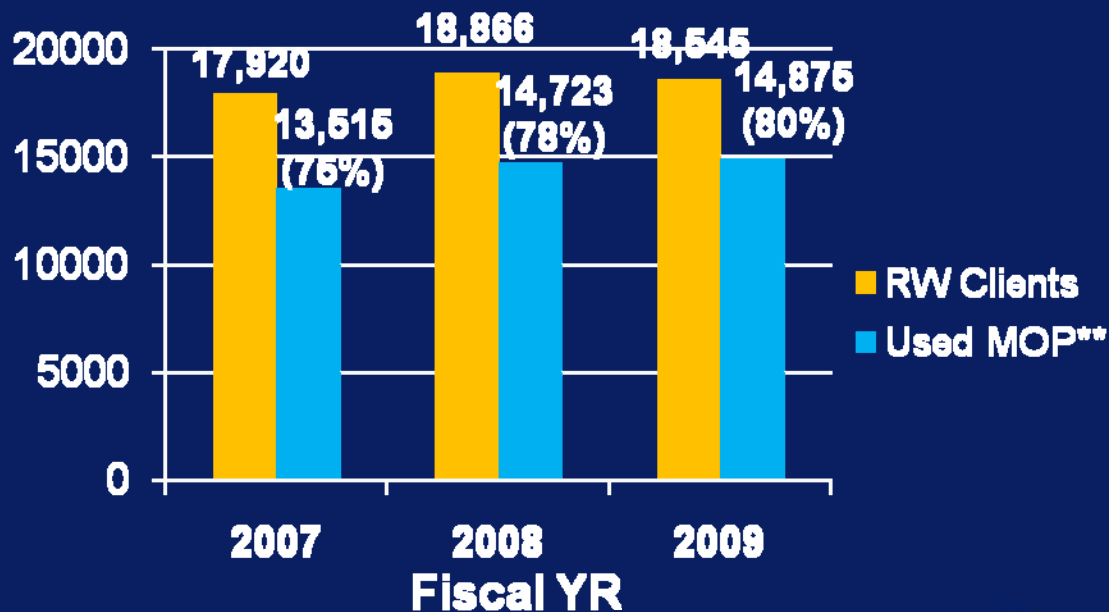
Assess geographic, demographic differences in ART coverage

Model behavioral, clinical, demographic predictors of VL



Ryan White Population in LAC

- Approx 18,000 HIV+ individuals receive HIV care and support services in the Los Angeles County (LAC) Ryan White (RW) system
 - RW population represents ~37% of all known HIV/AIDS cases in LAC.

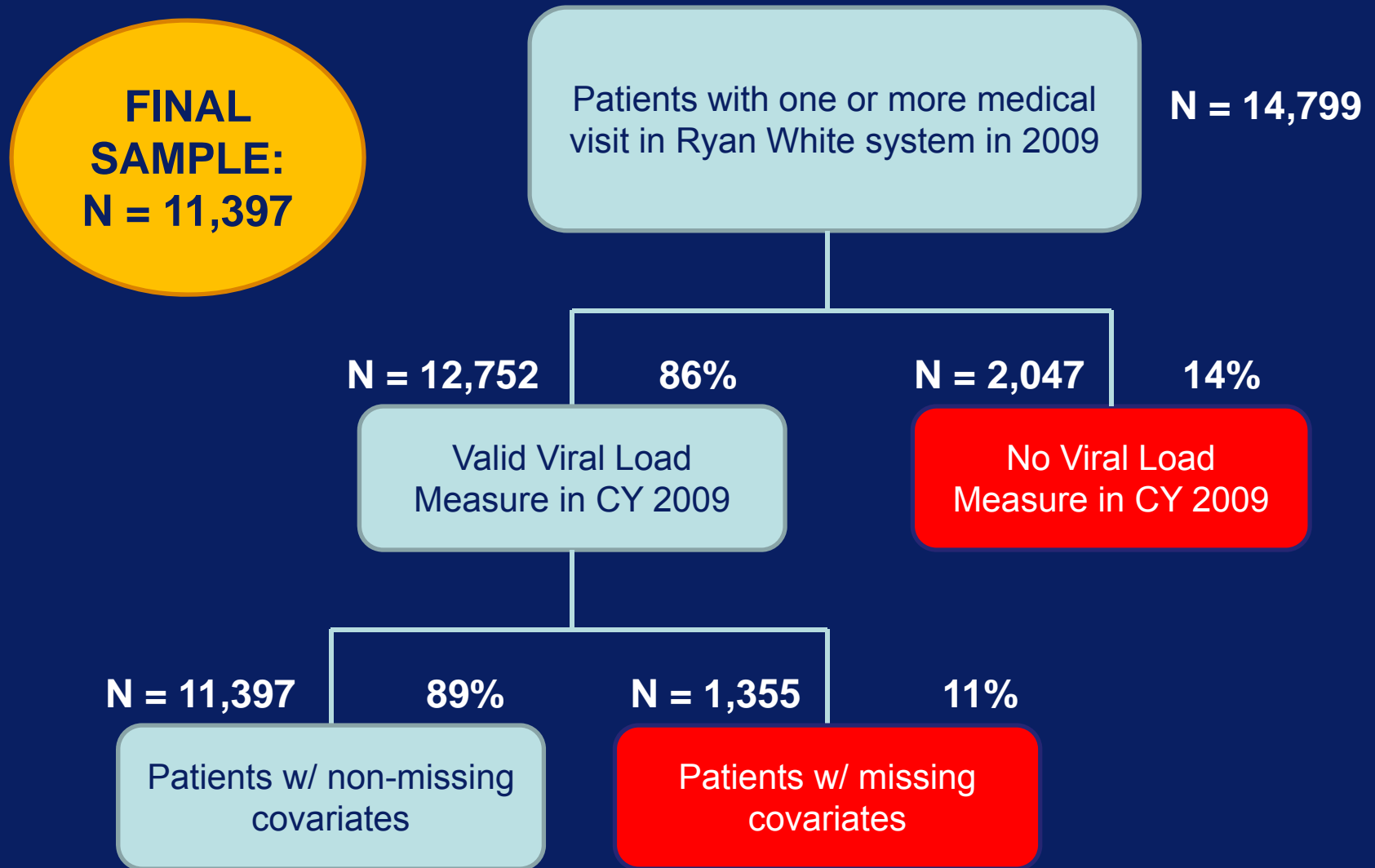


* Via Ryan White Part A, B and MAI funding.

** Utilized medical outpatient care services.



Sample for Analysis



Methods: Variable Definitions

- **On ART:**
 - patient reported to be on an antiretroviral regimen or on ADAP (AIDS Drug Assistance Programs)
- **HIV Viral Load:**
 - patient's most recent HIV RNA viral load (VL) reported in CY 2009
- **Undetectable VL:**
 - a viral load reported at less than 200 copies/uL
- **Mean VL:**
 - sum of most recent HIV VL for each patient / total # patients with VL



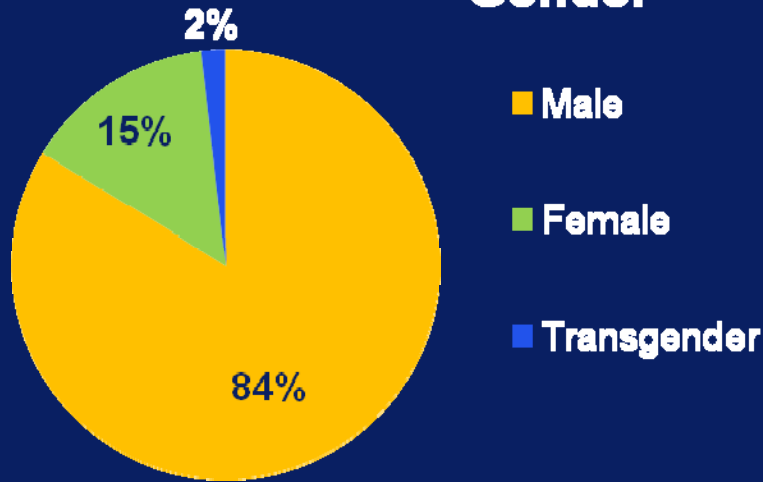
Methodology – Analysis

- Timeframe: Jan. 1 – Dec. 31, 2009
- Data Source: Casewatch Millennium
 - administrative and clinical data: demographics, insurance, income, health history, utilization, lab data.
- Analysis plan:
 - Frequencies and Chi Squares to determine ART coverage and variations in detectable VL on ART
 - Frequencies and bivariate of key demographic, behavioral and clinical variables by detectable VL
 - Multivariate logistic regression to determine key factors associated with detectable VL

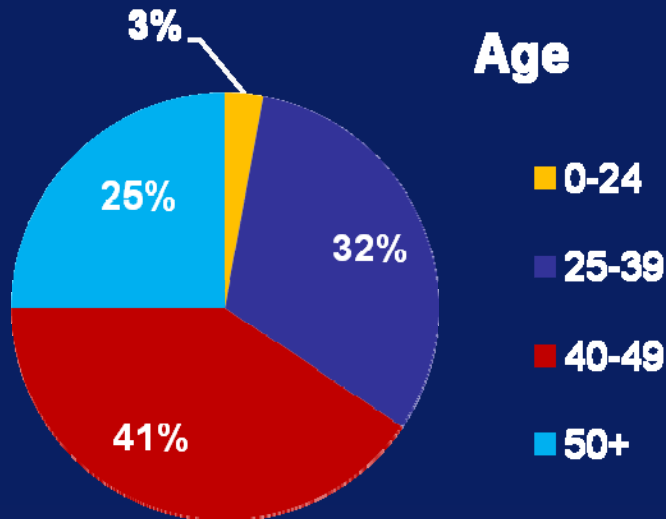


Demographics of RW Sample

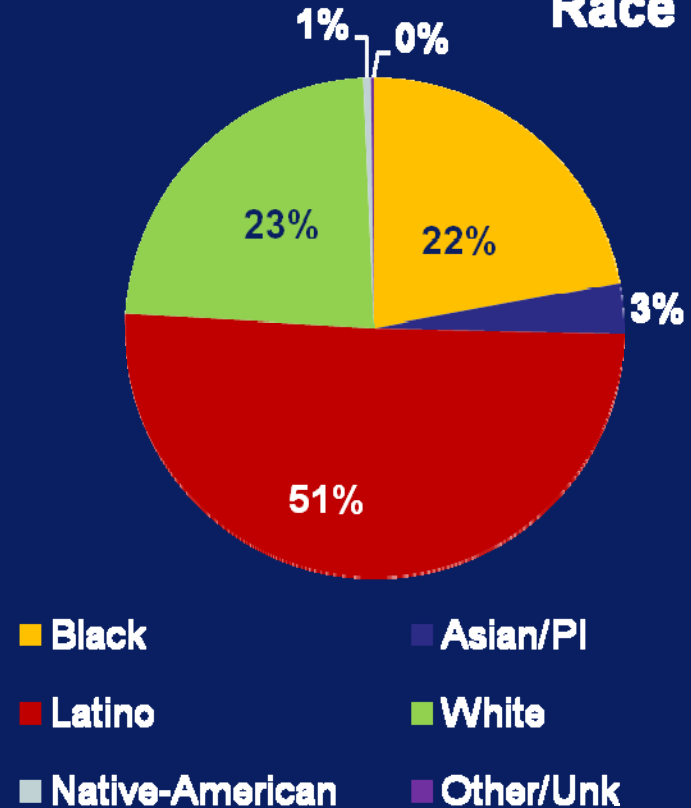
Gender N = 11,397



Age



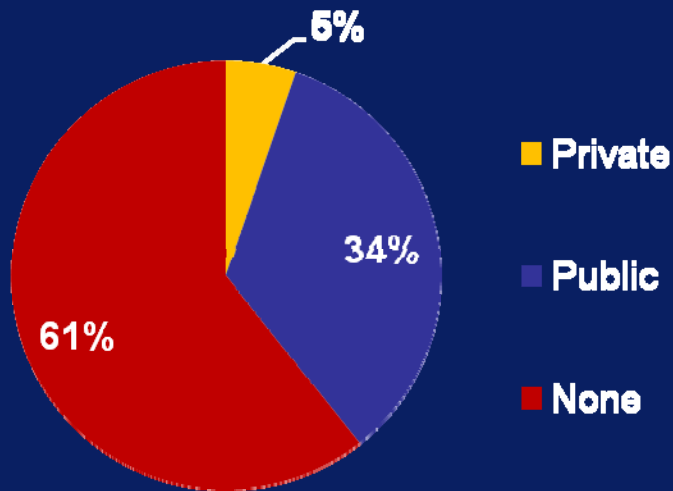
Race



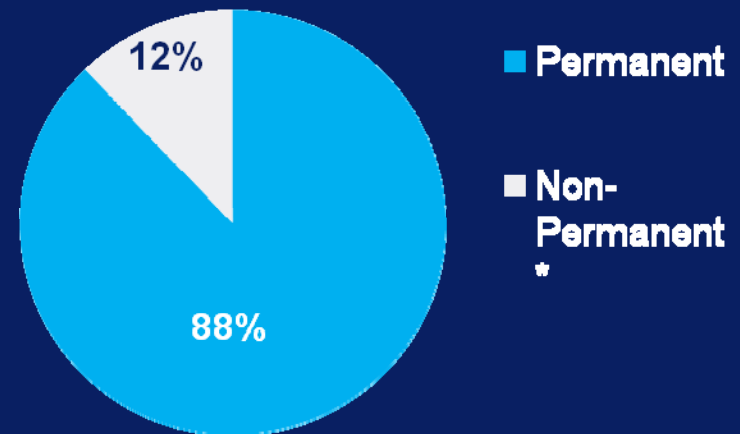
Demographics of RW Sample

Health Insurance

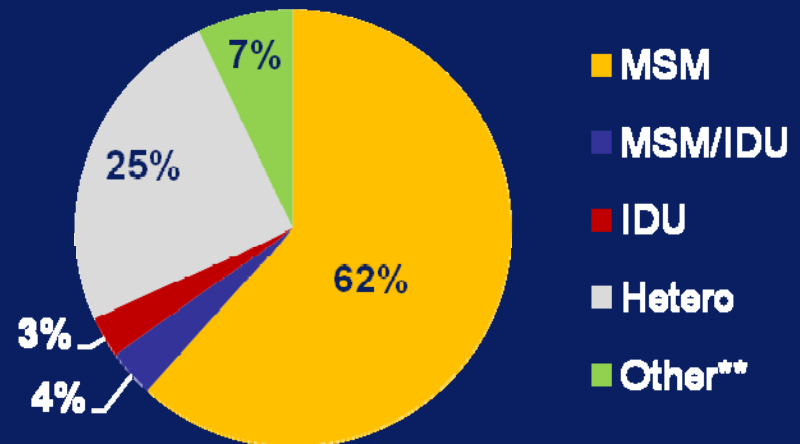
N = 11,397



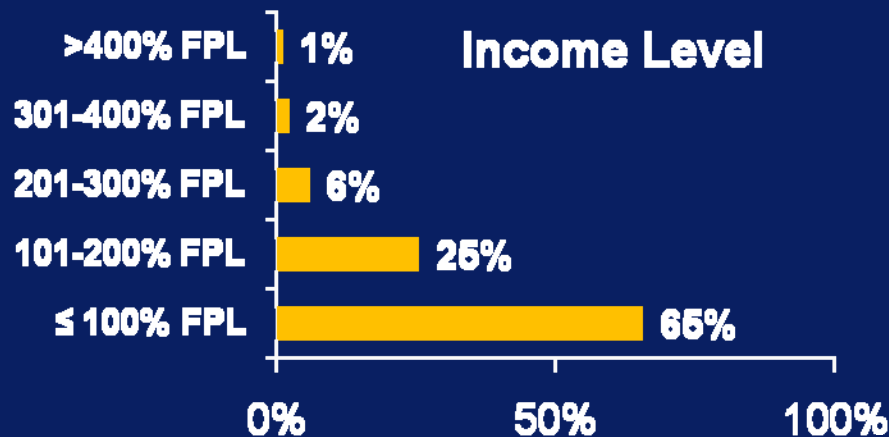
Living Situation



Mode of Exposure



Income Level



* Includes homeless, transitional or other.

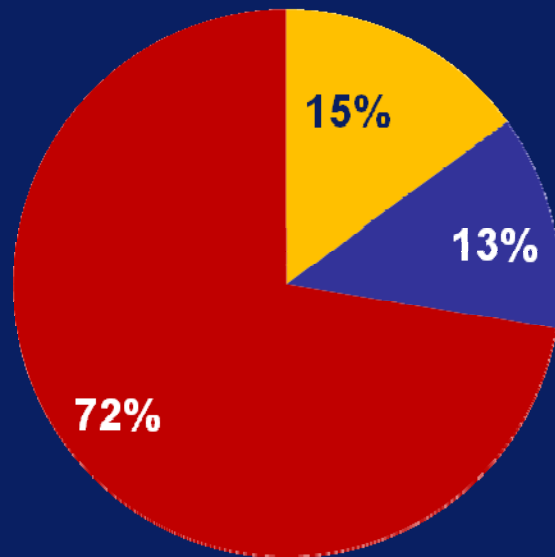
** Other includes transmission via: perinatal, tranfusion, hemophilia, other, unknown/unreported



Behavioral Characteristics of RW Sample

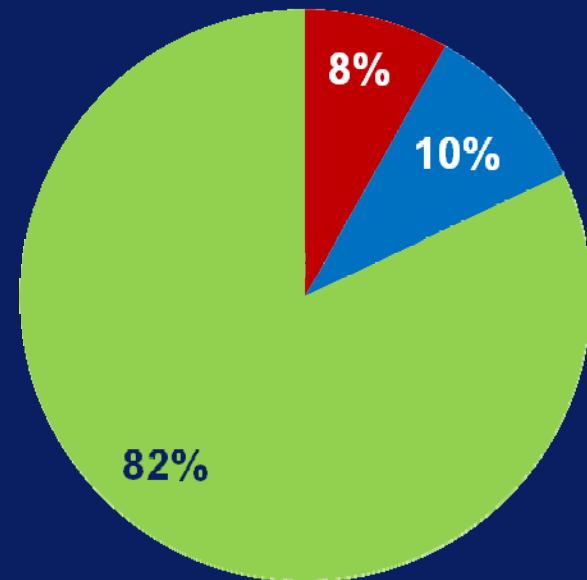
N = 11,397

Substance Abuse History*



■ Recently Used ■ Ever Used ■ Never Used

Incarceration History**



■ Recently Incarcerated
■ Ever Incarcerated
■ Never Incarcerated

* Includes any substances used. Recent use refers to last 12 months, and ever use refers to greater than 1 yr. ago.

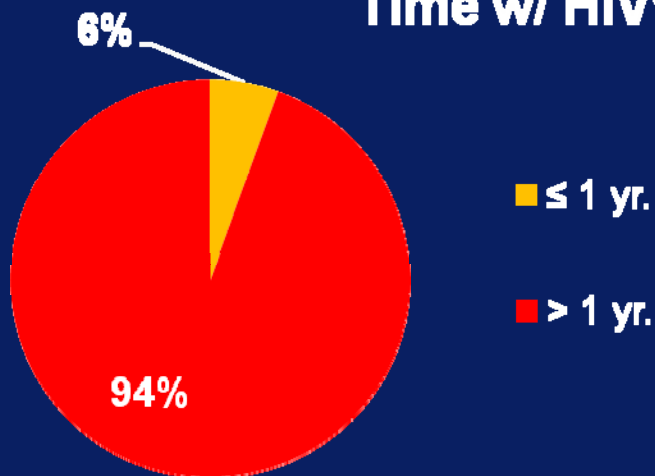
** Recent incarceration is within last 2 yrs., and ever incarceration refers to greater than 2 yrs. ago.



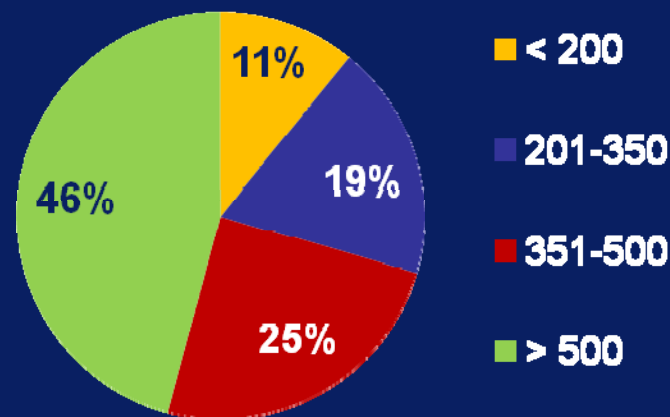
Clinical Characteristics of RW Sample

N = 11,397

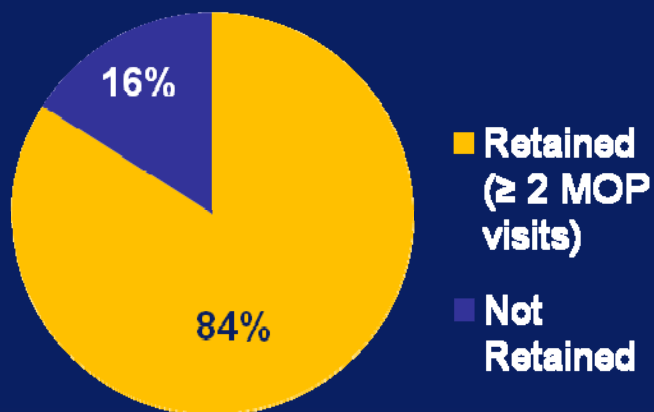
Time w/ HIV*



CD4 Count



Retention in Care**



* Based on self-report time since diagnosis.

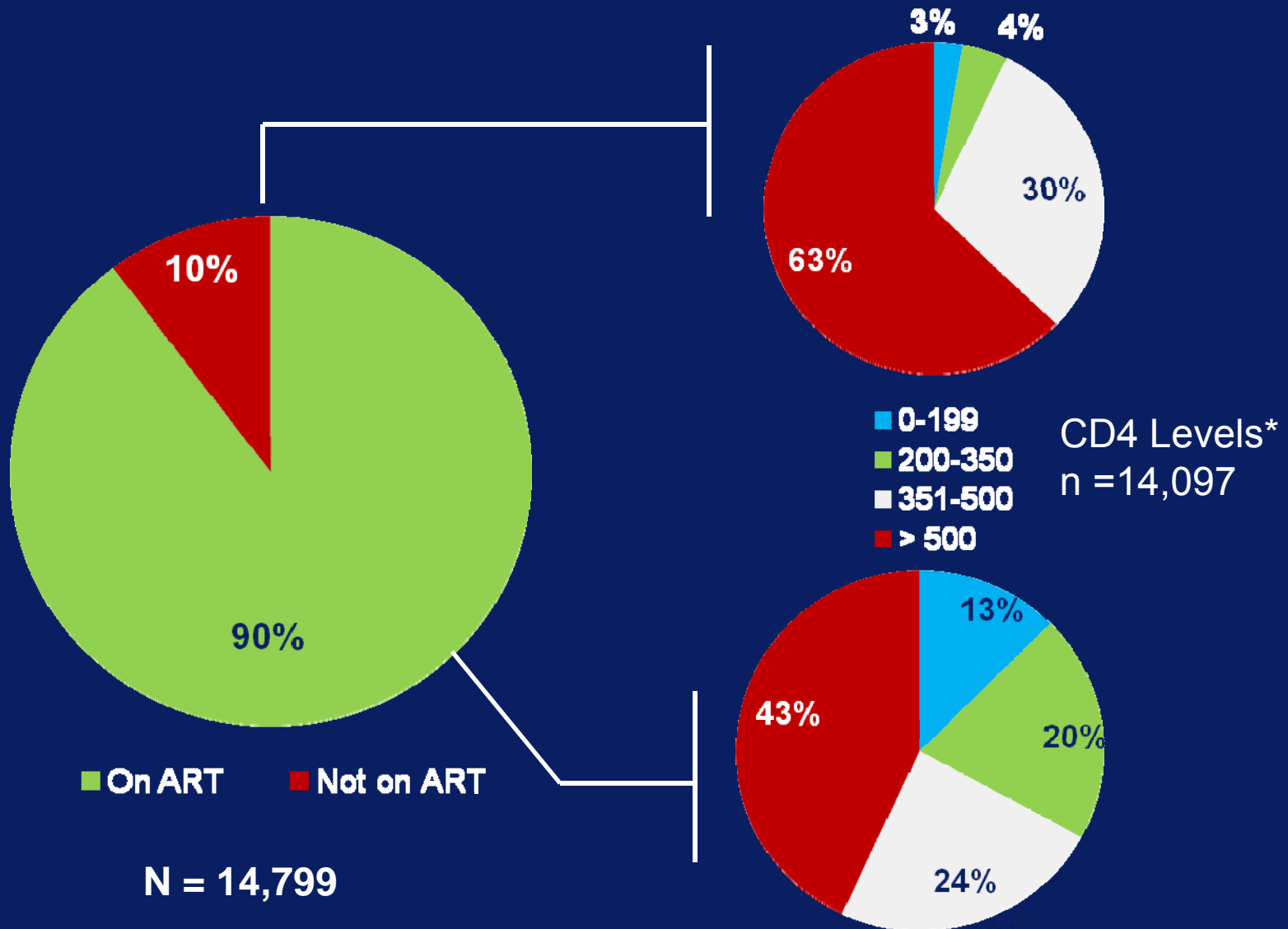
** Retention in care is defined as 2 or more medical outpatient visits 3 months apart in one year.



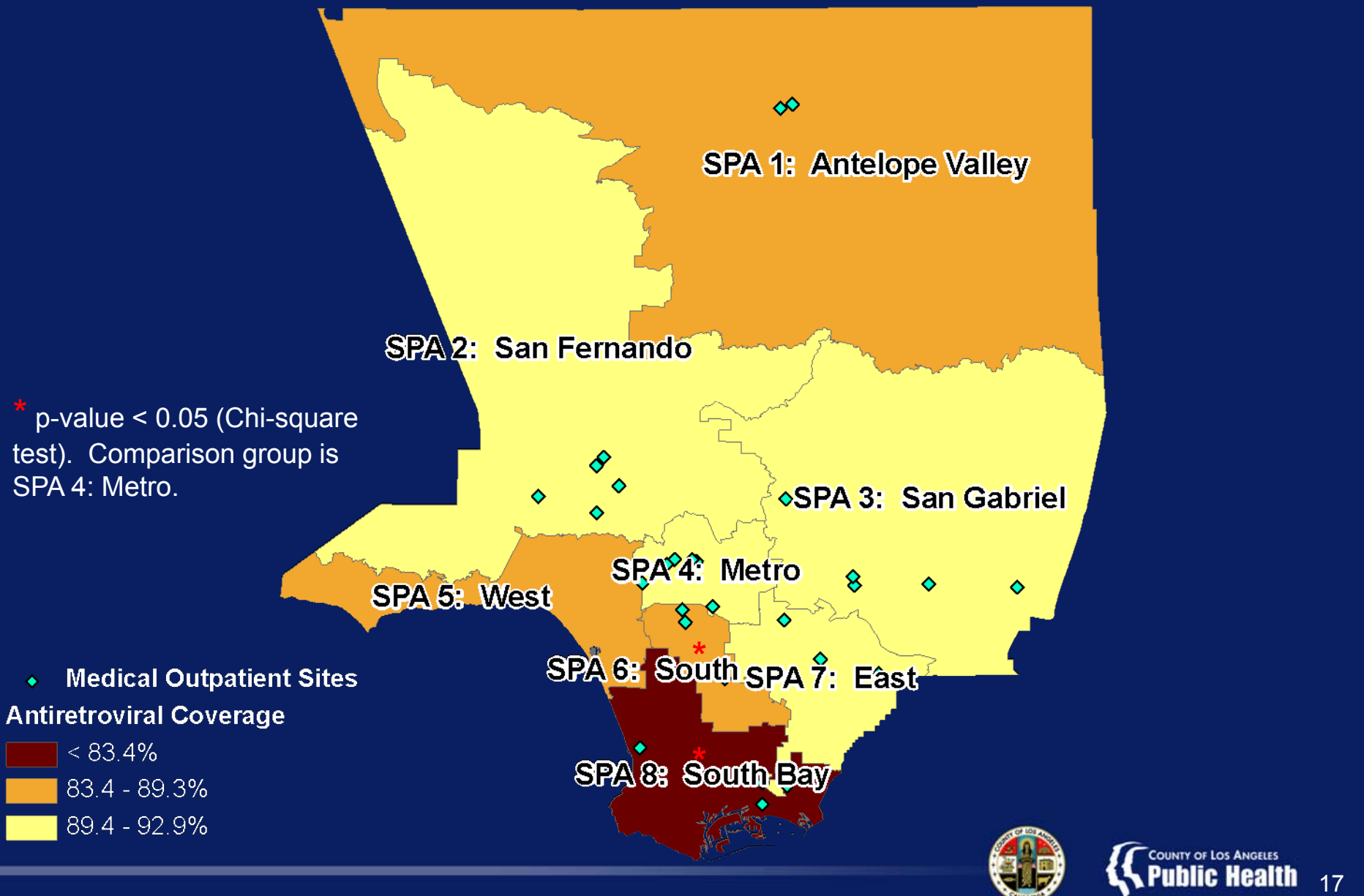
ART Coverage in RW System



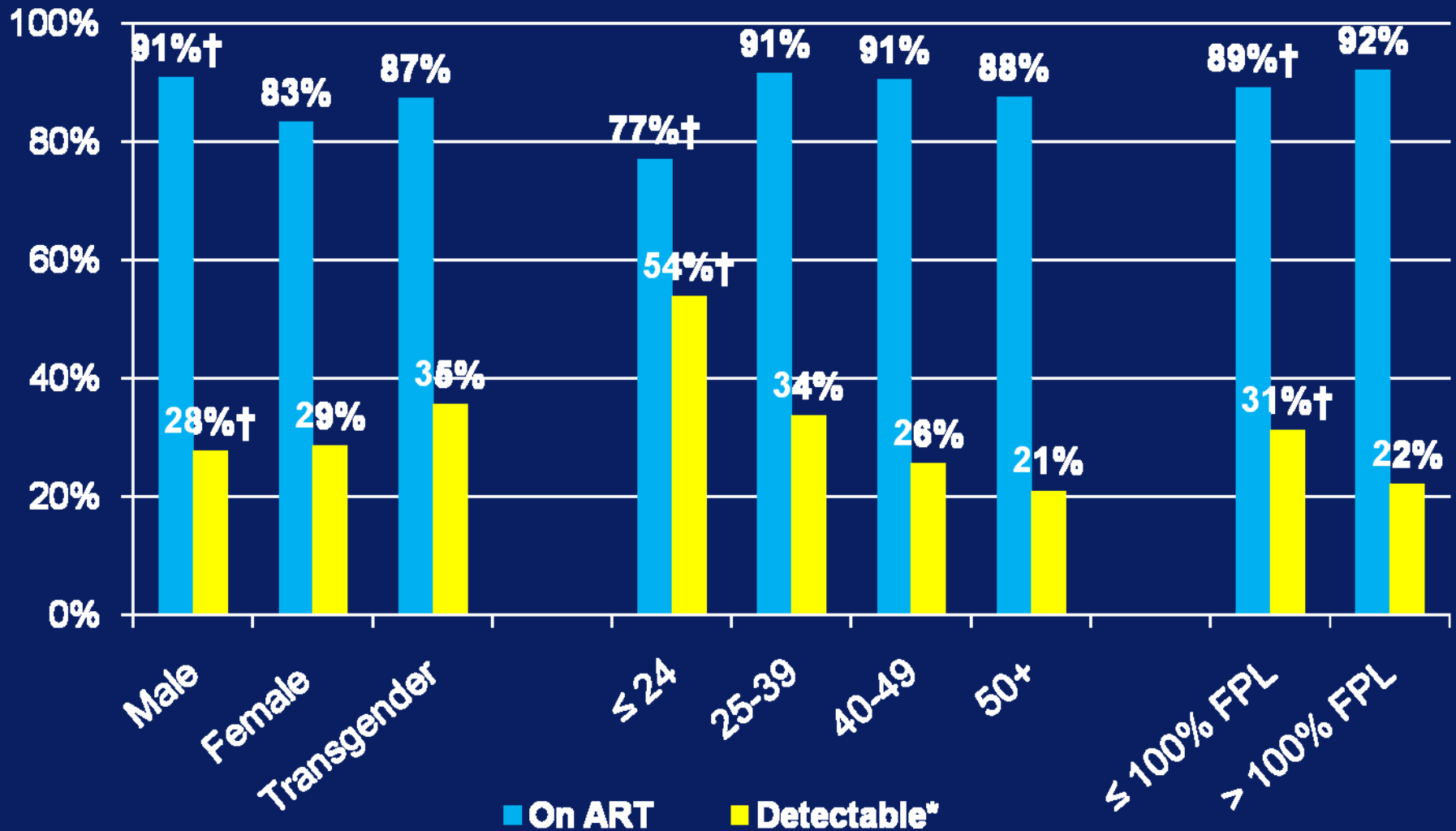
ART Utilization in RW Sample



Geographic Distribution of ART Coverage



ART Use in RW Sample



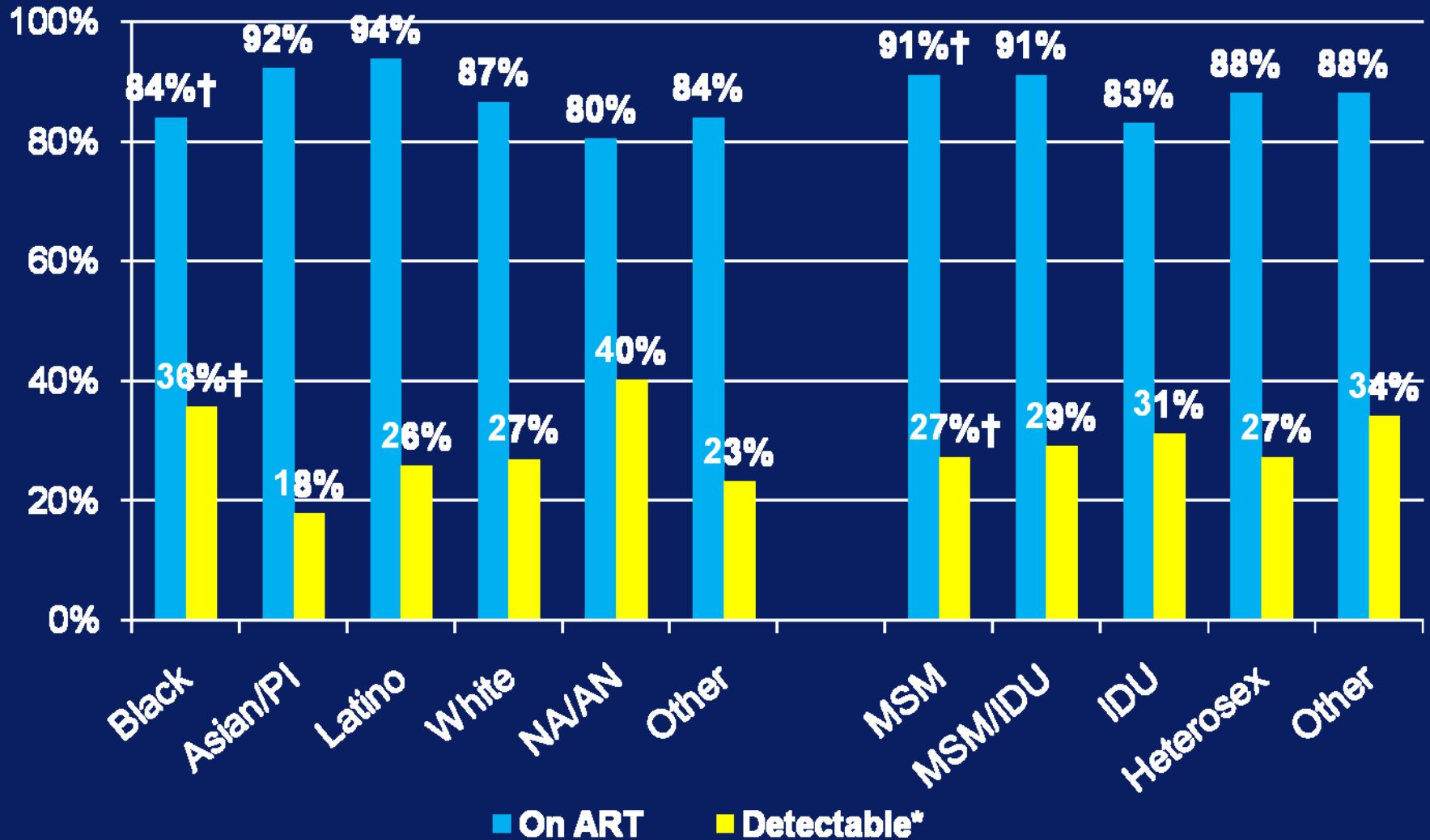
Source: Casewatch CY2009: Data limited to RW Client w/ 1 or more MOP visit.

* Detectable is a subset of those on antiretroviral therapy with ≥ 200 copies/mL.

† Chi-square p-value < 0.05 for whole category



ART Use in RW Sample



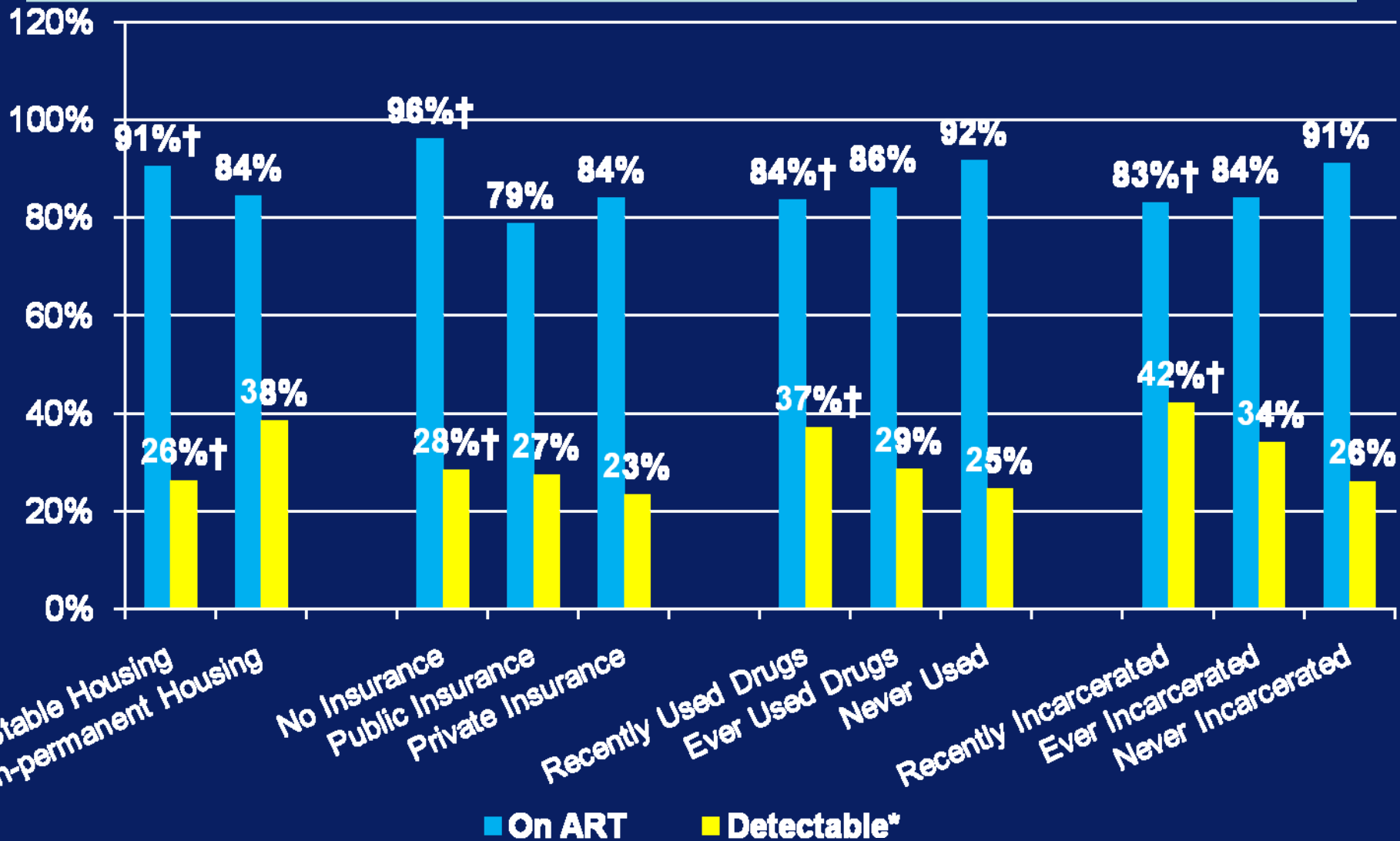
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HIV Viral Load in RW System

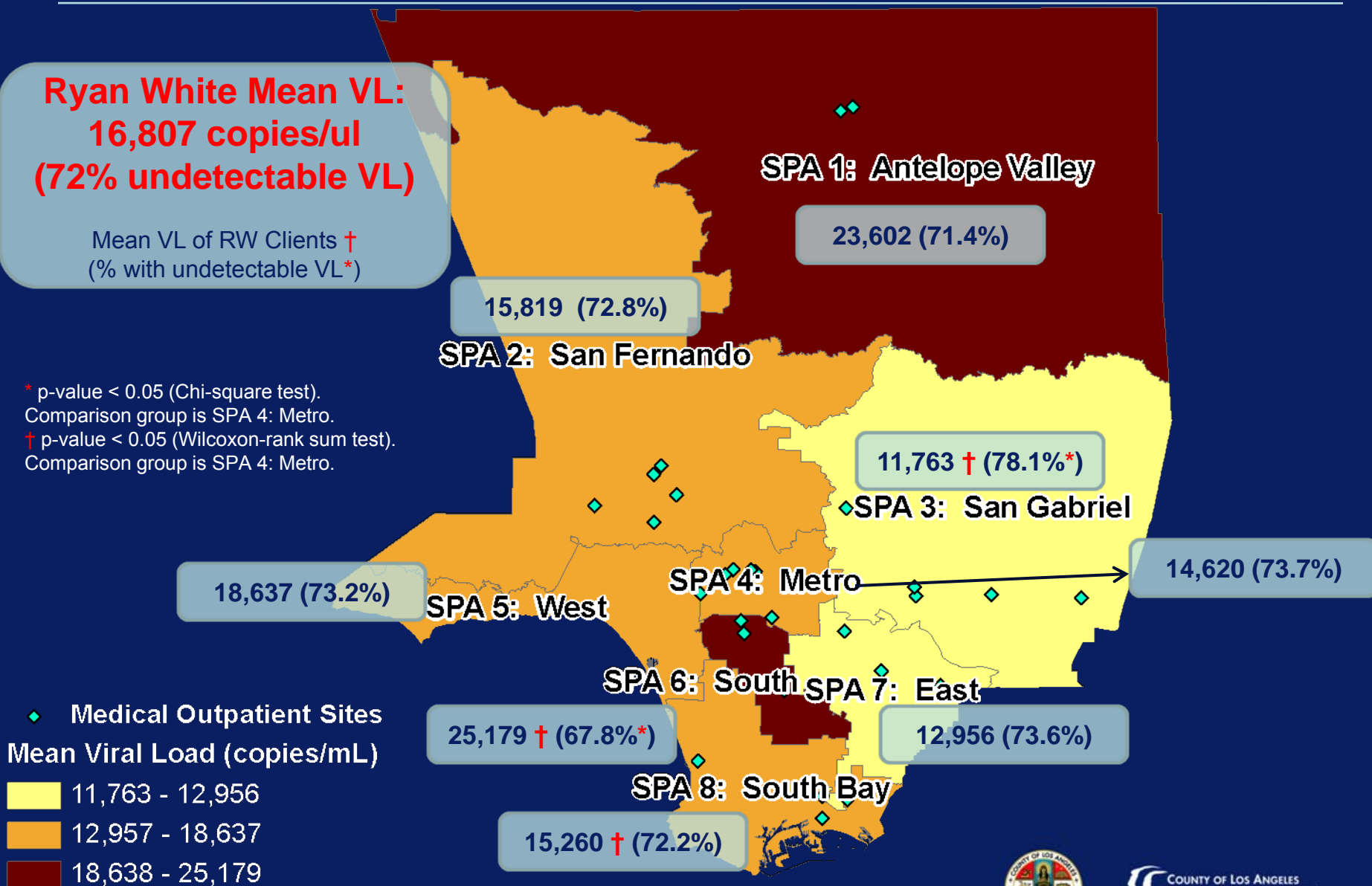


Geographic Distribution of Mean VL

**Ryan White Mean VL:
16,807 copies/ul
(72% undetectable VL)**

Mean VL of RW Clients †
(% with undetectable VL*)

* p-value < 0.05 (Chi-square test).
Comparison group is SPA 4: Metro.
† p-value < 0.05 (Wilcoxon-rank sum test).
Comparison group is SPA 4: Metro.



◆ Medical Outpatient Sites
Mean Viral Load (copies/mL)

- 11,763 - 12,956
- 12,957 - 18,637
- 18,638 - 25,179



Multivariate Model for Detectable* HIV Viral Load

- Multivariate Logistic Regression with dependent variable: Detectable VL
- Independent covariates include:
 - Gender
 - Race
 - Age
 - Poverty
 - Time w/ HIV
 - Housing
 - Insurance
 - Substance Use
 - Incarceration
 - Mode of Exposure
 - On ART
 - CD4 Levels
 - Retention in Care



Demographic Factors Associated with Detectable VL (N = 11,397)

Characteristic	Adjusted OR	95% CI
Gender (Male = reference)		
Female	1.26	1.07 – 1.48
Transgender	1.08	0.78 – 1.50
Race (White = reference)		
African-American	1.42	1.25 – 1.63
Asian/Pacific-Islander	0.59	0.43 – 0.79
Latino/Hispanic	0.87	0.77 – 0.98
Native American	1.44	0.79 – 2.62
Age (50+ = reference)		
Youth (13-24 yrs.)	3.36	2.60 – 4.34
Age 25-39 yrs.	1.87	1.65 – 2.13
Age 40-49 yrs.	1.24	1.10 – 1.40



Demographic Factors Associated With Detectable VL (N = 11,397)

Characteristic	Adjusted OR	95% CI
Poverty (> 100% FPL = reference) ≤ 100% Federal Poverty Level (FPL)	1.28	1.15 – 1.41
Housing status (Permanent Housing = reference)		
Homeless	1.05	0.91 – 1.20
Health Insurance (no insurance = reference)		
Private (HMO, PPO)	0.75	0.61 – 0.93
Public (MediCal, Medicare, Medicaid)	0.69	0.62 – 0.77



Behavioral Factors Associated With Detectable VL (N = 11,397)

Characteristic	Adjusted OR	95% CI
HIV Exposure Mode (heterosexual = reference)		
MSM	1.15	0.99 – 1.31
MSM/IDU	1.28	0.98 – 1.67
IDU	0.98	0.75 – 1.28
Other	1.23	1.01 – 1.49
Substance Abuse Hx* (never used = reference)		
Recently used (\leq 1 yr.)	1.35	1.17 – 1.54
Incarceration Hx (never incarcerated = reference)		
Recently incarcerated (\leq 2 yrs.)	1.33	1.12 – 1.58
Ever incarcerated ($>$ 2 yrs.)	1.26	1.08 – 1.47

* Substances include any substances



Clinical Factors Associated with Detectable VL (N = 11,397)

Characteristic	Adjusted OR	95% CI
Antiretroviral Medication (not on ART = reference)		
Currently on ART	0.52	0.44 – 0.60
CD4 Levels (> 500 = reference)		
< 200	7.55	6.54 – 8.72
201 – 350	2.75	2.43 – 3.11
351 - 500	1.75	1.56 – 1.96
Time w/ HIV (> 1 yr. = reference)		
≤ 1 yr.	2.50	2.10 – 2.99
Retention in Care (fallen out = reference)		
Retained in Care (≥ 2 MOP Visits)	0.52	0.46 – 0.58



Summary of Findings

- Overall ART coverage rates for those in care in RW system were high (90%), however 27% of those on ART still had detectable VL
 - There were significant differences in ART coverage and detectable VL by geography and demographics
- 72% of sample had undetectable VL, factors associated with having a detectable VL included:
 - Gender, race, age, poverty, health insurance, substance abuse history, incarceration history, ART, CD4 count, time with HIV, retention in care



Limitations

- Sample limited to RW population
 - Analysis includes only patients who receive RW medical care, not generalizable to entire population of persons living with HIV/AIDS in LA County
- Analysis does not include out of care population, who are likely to have highest viral loads and not be on ART
- Not able to account for time to achieve VL suppression for those starting new ART regimens



Conclusions

- Analysis provides important information that may inform strategies to utilize ART as a prevention tool in Los Angeles County
- Interventions to address access and adherence to ART among youth, African Americans, substance users, and recently incarcerated populations are urgently needed
- Geographic distribution of VL will be used to further target HIV prevention and testing programs for LA County



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