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

Min Kim, MPH,
Mike Janson, MPH,
Jennifer N. Sayles, MD, MPH

Los Angeles County Department of Public Health

Office of AIDS Programs and Policy

County of Los Angeles Public Health

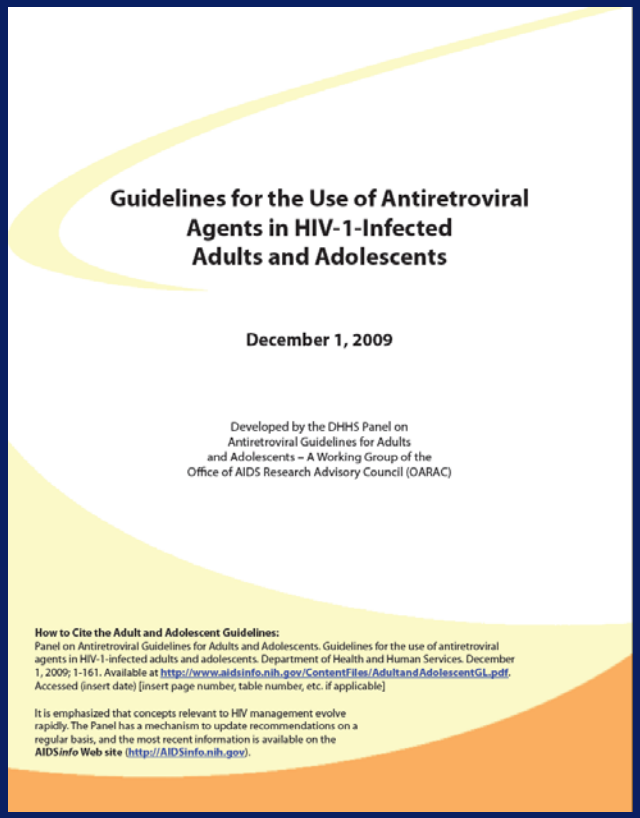
Background: Benefits of ART

- An estimated 21%[1] of those with HIV/AIDS are unaware of their status, and incident HIV infection rates are not declining[2]
- 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 One August 2011

Changes in ART Guidelines


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

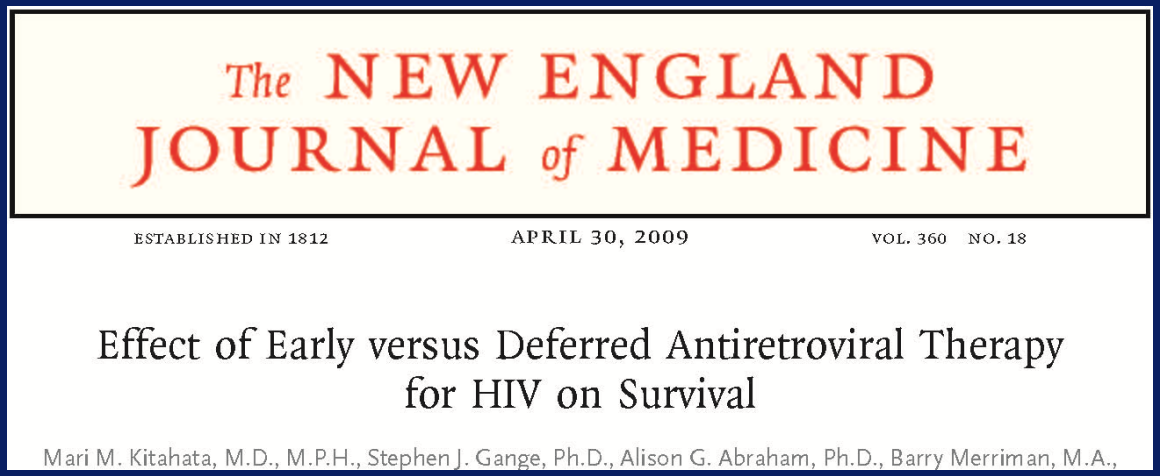
December 1, 2009

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).

- Treat patients w/ CD4 counts b/w 350-500 cells/mm^3 (A/B-II)
- Consider treatment for patients w/ CD4 counts >500 (B/C-III)


The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 APRIL 30, 2009 VOL. 360 NO. 18

Effect of Early versus Deferred Antiretroviral Therapy for HIV on Survival

Mari M. Kitahata, M.D., M.P.H., Stephen J. Gange, Ph.D., Alison G. Abraham, Ph.D., Barry Merriman, M.A.,

- 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

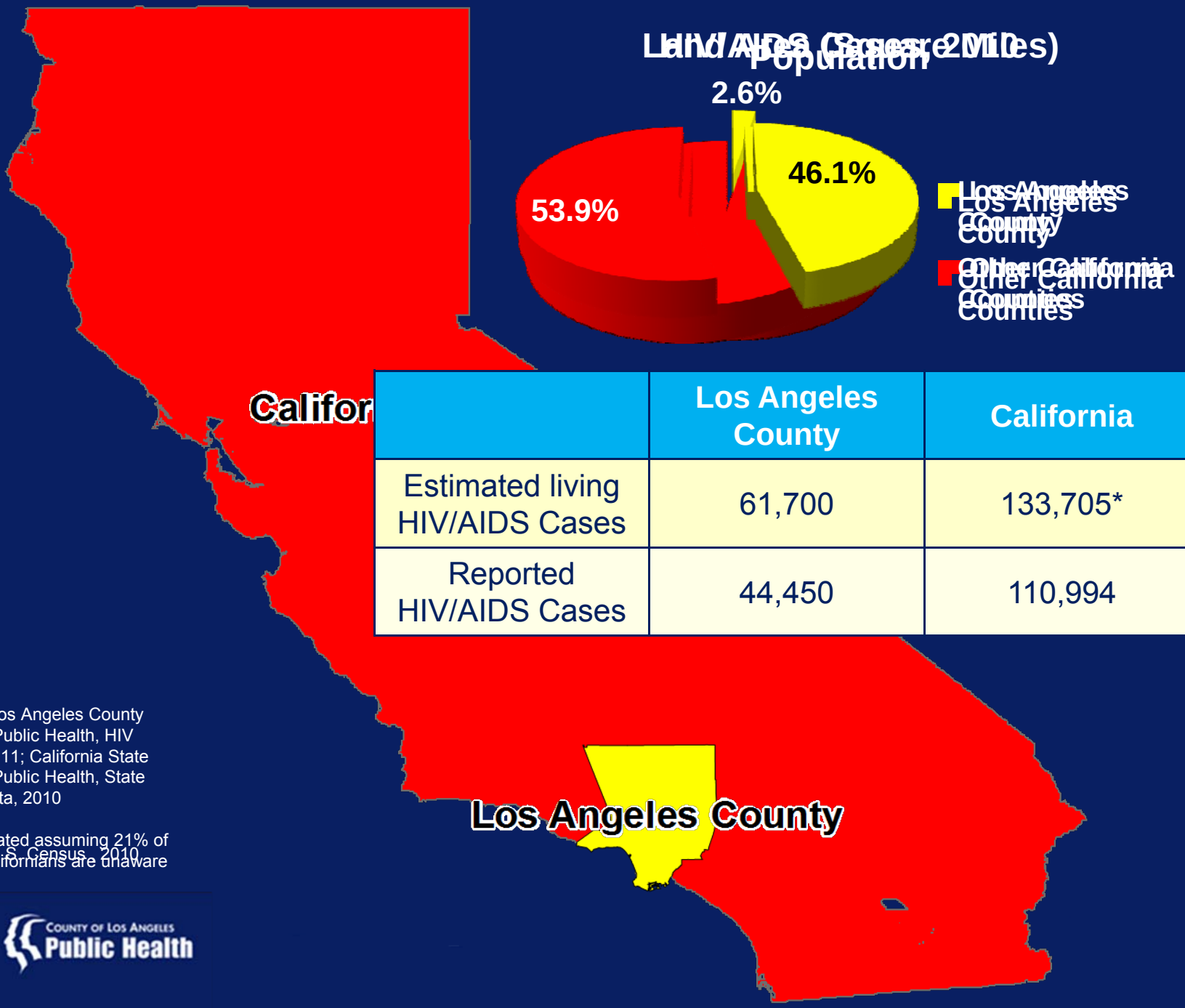
Prevention of HIV-1 Infection with early Antiretroviral Therapy

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***

Cohen et al. NEJM. July 2011

County of Los Angeles Public Health



Land Area (Square Miles)

Population

	Los Angeles County	California
Estimated living HIV/AIDS Cases	61,700	133,705*
Reported HIV/AIDS Cases	44,450	110,994

Data Source: Los Angeles County Department of Public Health, HIV Surveillance, 2011; California State Department of Public Health, State Surveillance Data, 2010

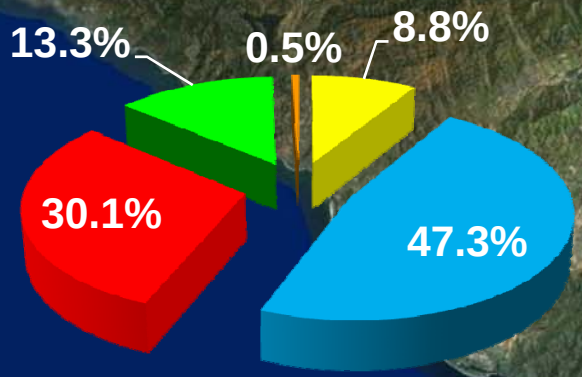
*133,705 calculated assuming 21% of HIV positive Californians are unaware of their status.

Data Source: U.S. Census, 2010

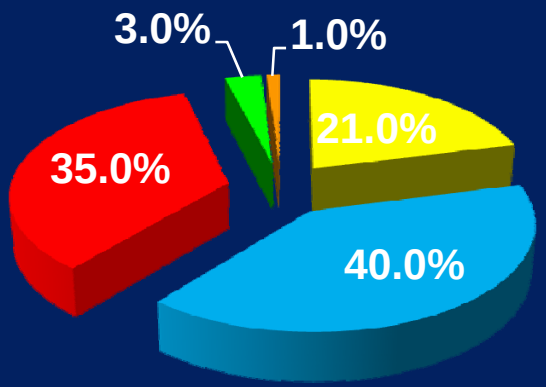
County of Los Angeles Public Health

Population	Estimated HIV/AIDS Cases
9,848,011	61,700

Overall, Race/Ethnicity



HIV/AIDS Cases



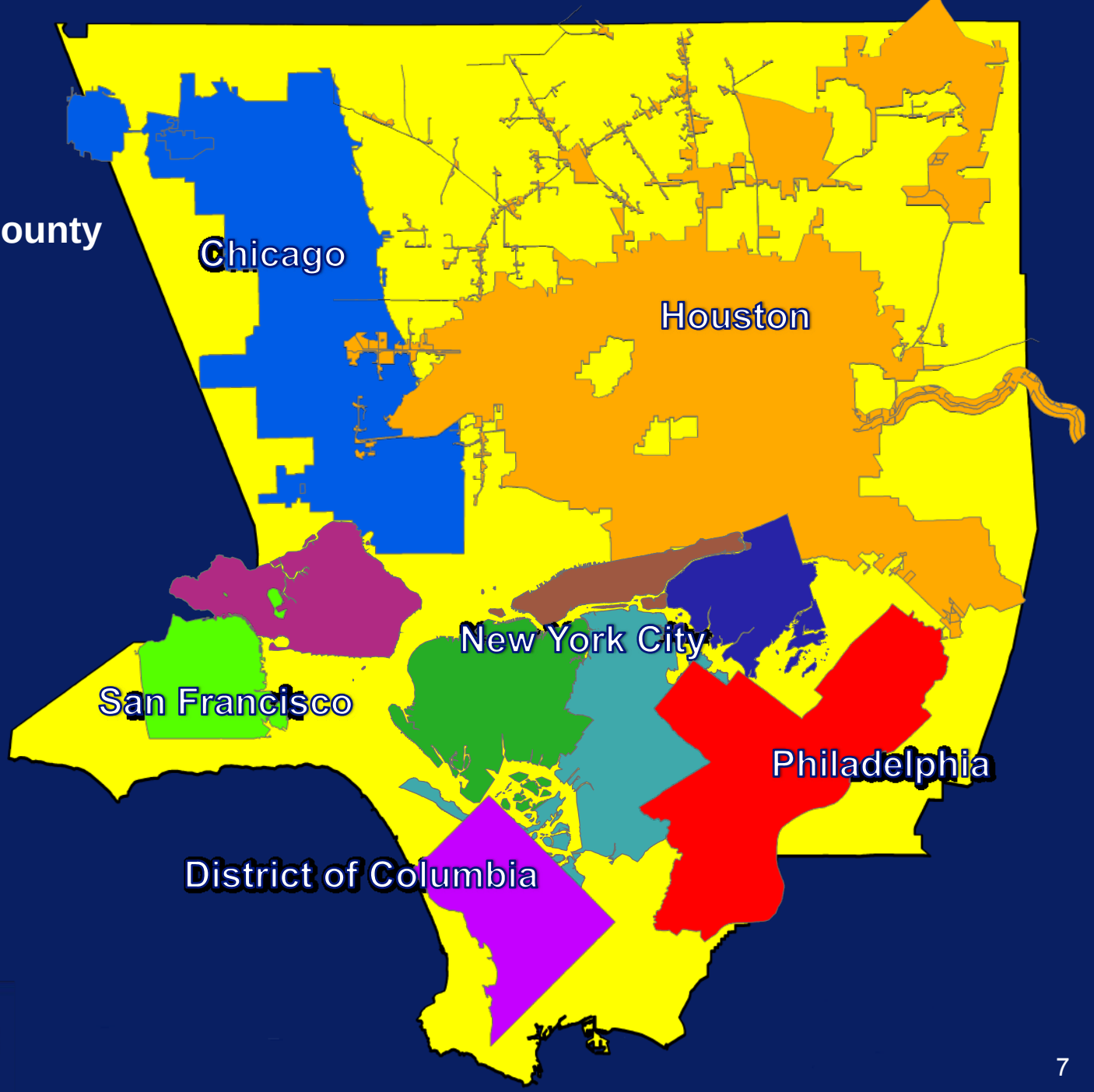
- Black
- Latino
- White
- Asian/PI
- NA/AI

Lancaster
Palmdale
Santa Clarita
Los Angeles County
Sherman Oaks
Burbank
Pasadena
West Hollywood
Los Angeles
Pomona
Santa Monica
Inglewood
Whittier
Torrance
Compton
Long Beach

Data Source: U.S. Department of Commerce, 2010; Los Angeles County Department of Public Health, HIV Surveillance, 20111

County of Los Angeles Public Health

Los Angeles County



Data Source: U.S. Census Bureau, Topologically Integrated Geographic Encoding and Referencing system, 2009. Maps Drawn at 1:750,000 scale.

County of Los Angeles Public Health

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

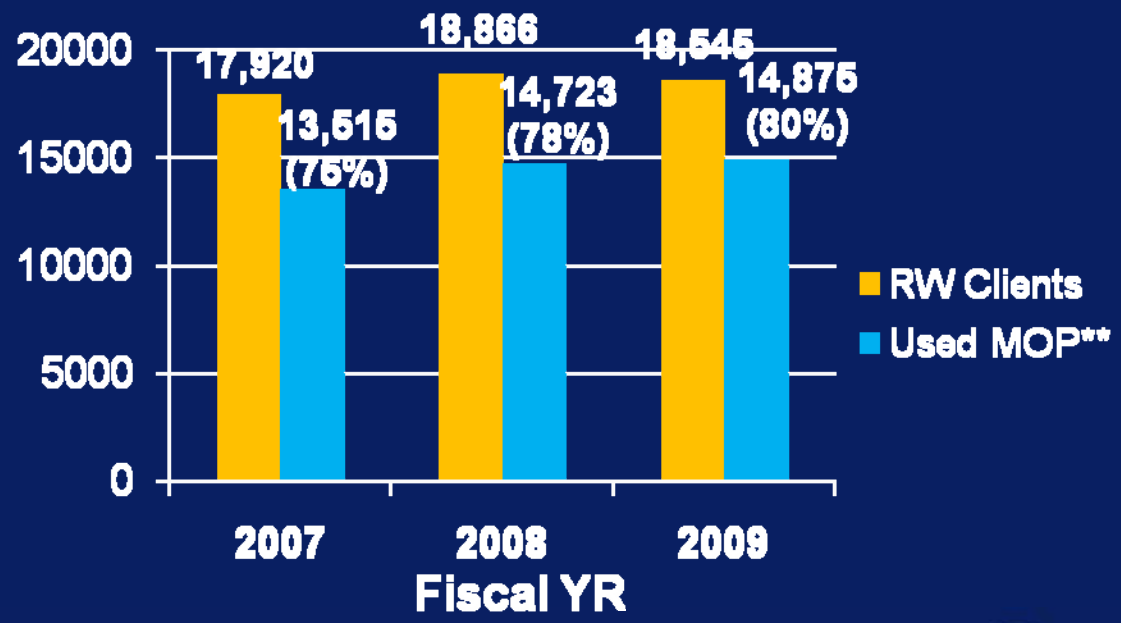
Objectives:

- Assess geographic, demographic differences in ART coverage
- Model behavioral, clinical, demographic predictors of VL

County of Los Angeles Public Health

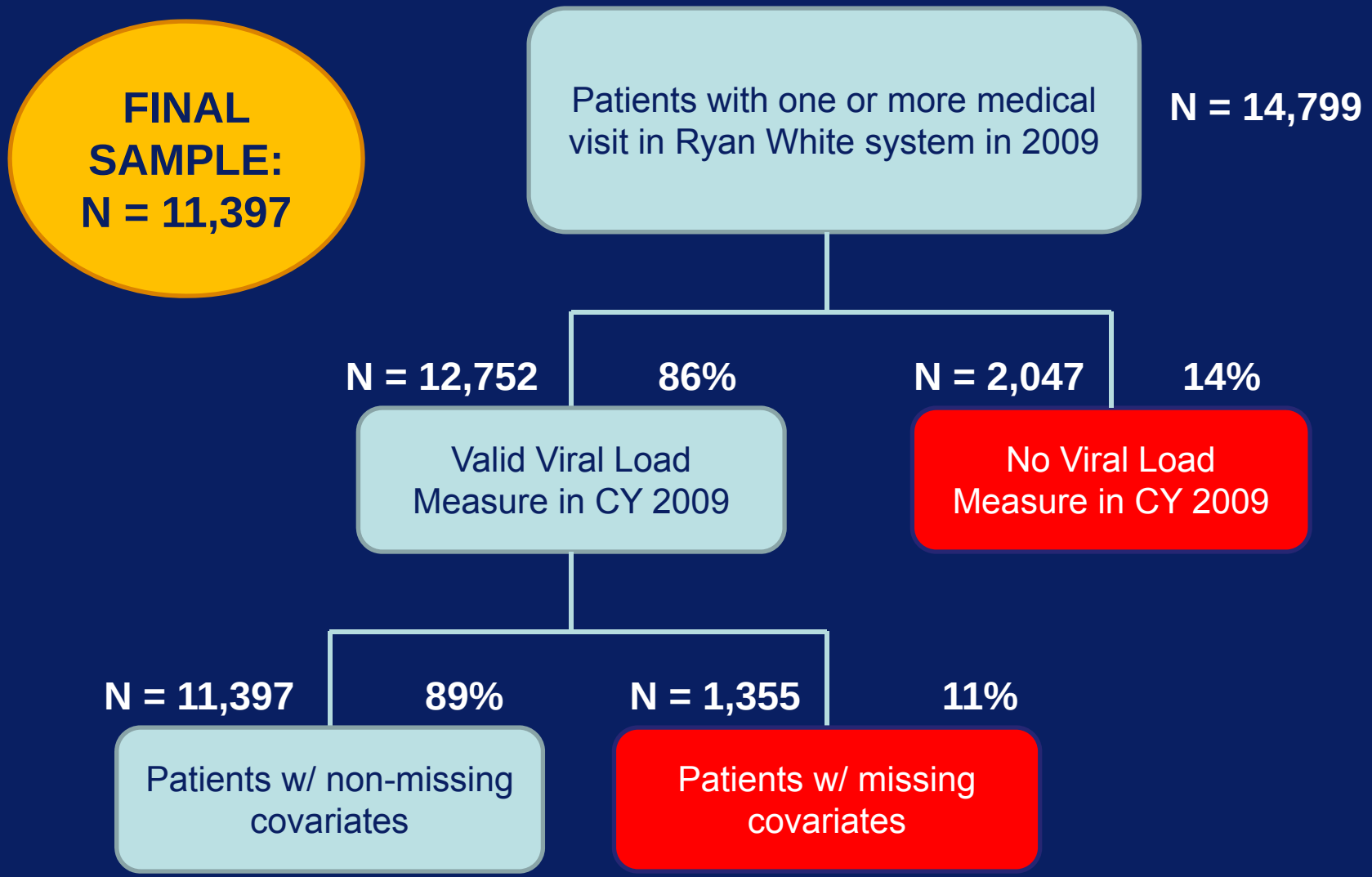
Ryan White Population in LAC

- 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



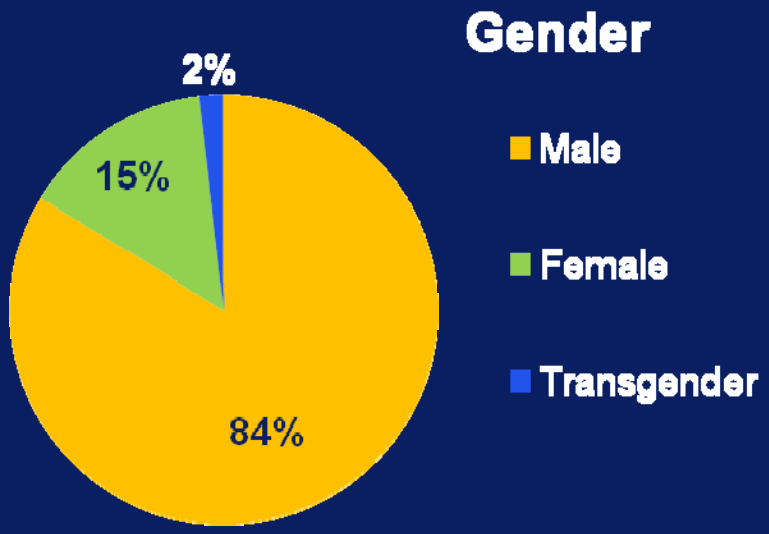
Methods: Variable Definitions

- **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

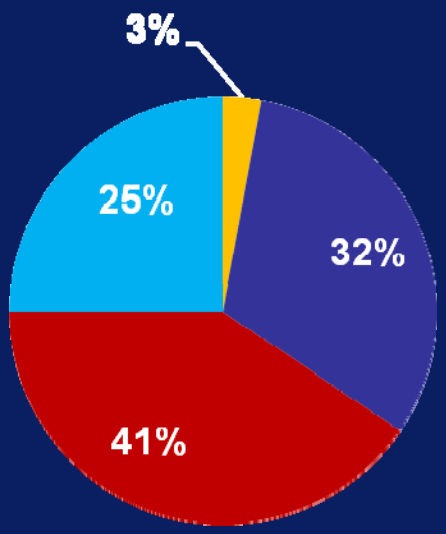
Methodology – Analysis

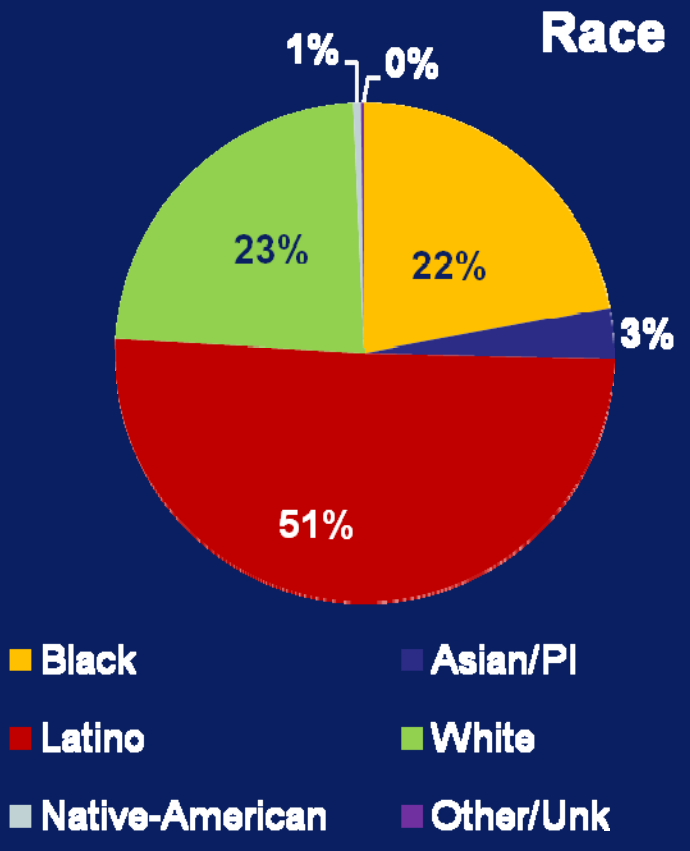
- Timeframe: Jan. 1 – Dec. 31, 2009
- Data Source: Casewatch Millenium
  - administrative and clinical data: demographics, insurance, income, health history, utilization, lab data.
- Analysis plan:
  - Frequencies and Chi Squares to determine ART coverage and variations in detectable VL on ART
  - Frequencies and bivariates 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



N = 11,397



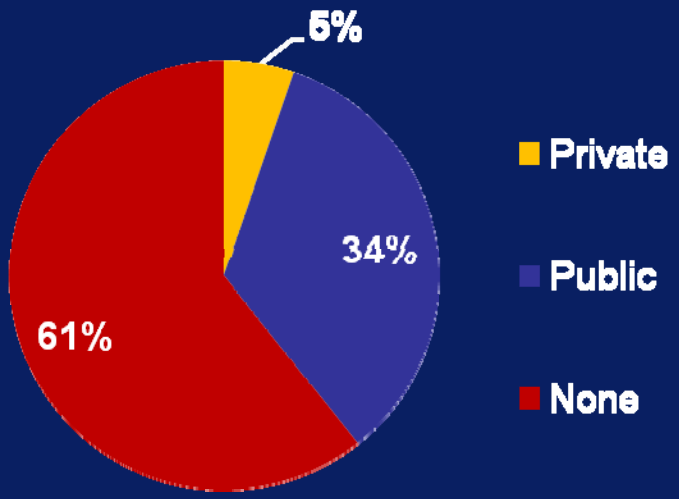


Source: *Casewatch CY 2009*

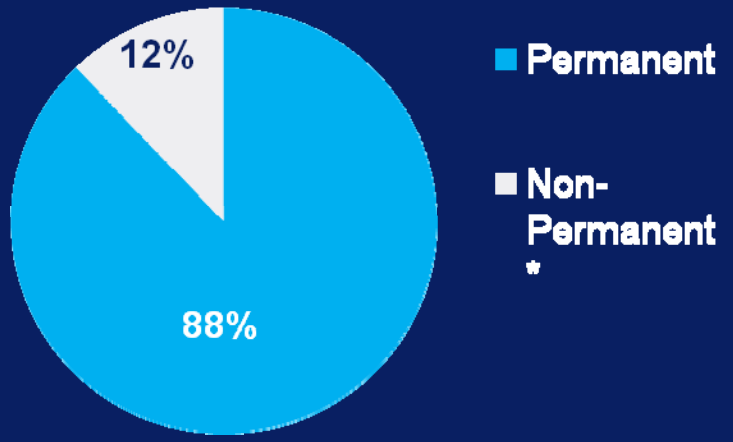
Demographics of RW Sample

N = 11,397

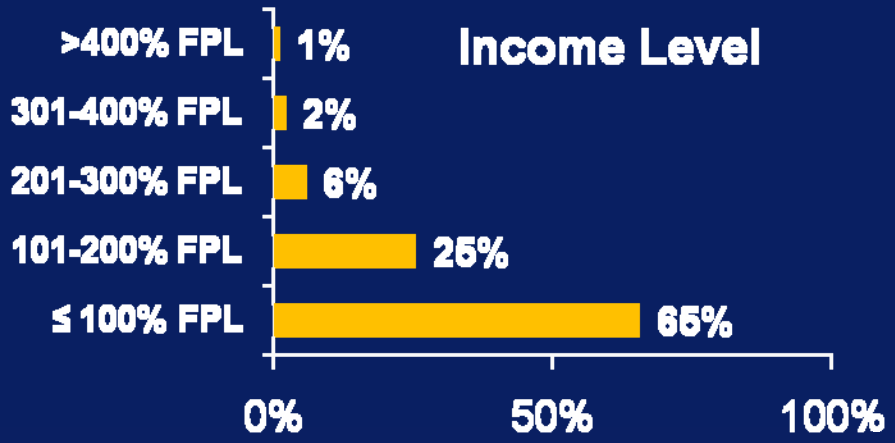
Health Insurance



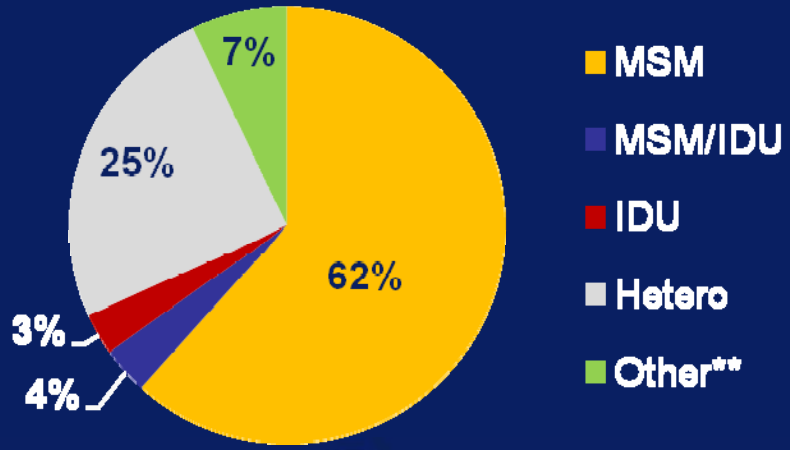
Living Situation



Income Level



Mode of Exposure



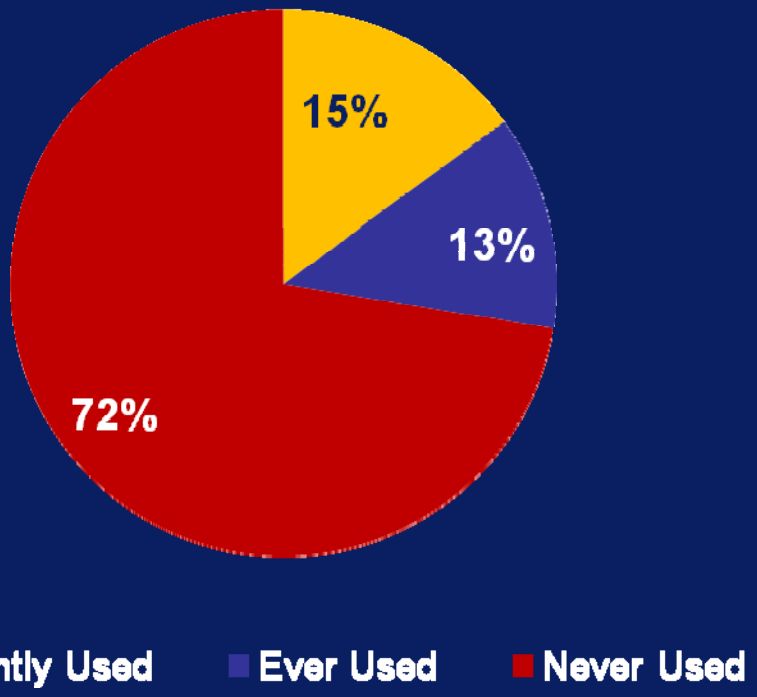
* Includes homeless, transitional or other.

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

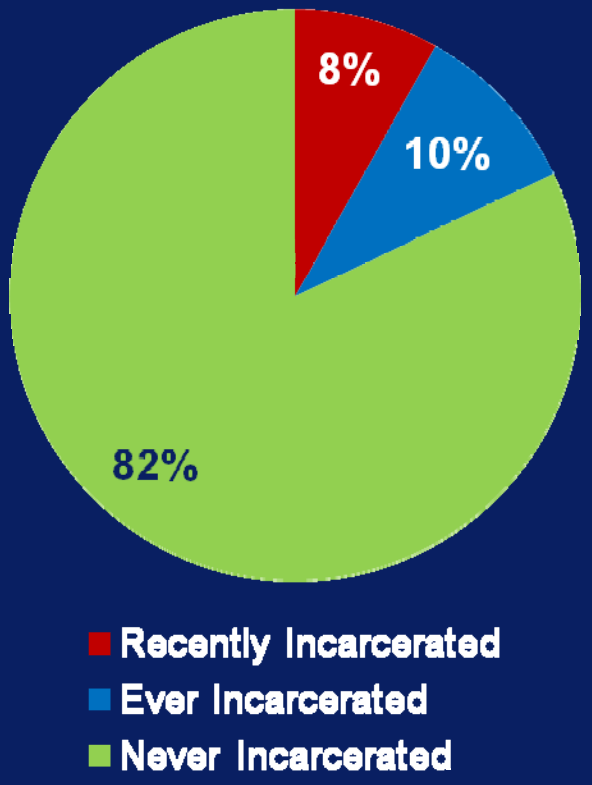
Behavioral Characteristics of RW Sample

N = 11,397

Substance Abuse History*



Incarceration History**

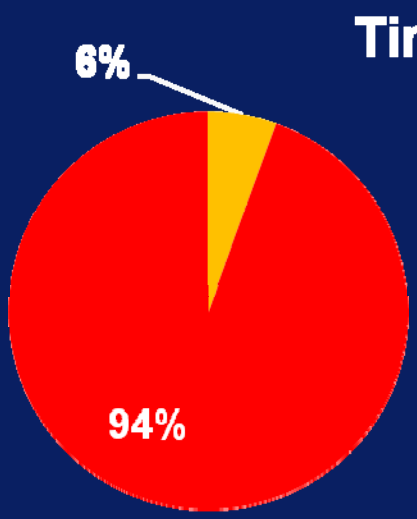


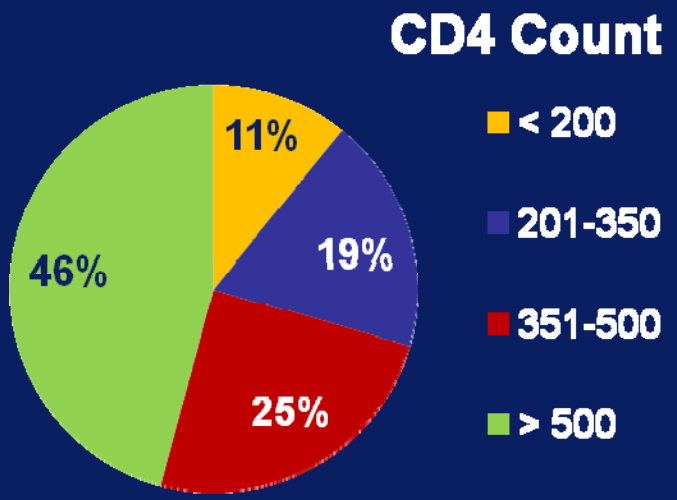
* Includes any substances used. Recent use refers to last 12 months, and ever use refers to greater than 1 yr. ago.

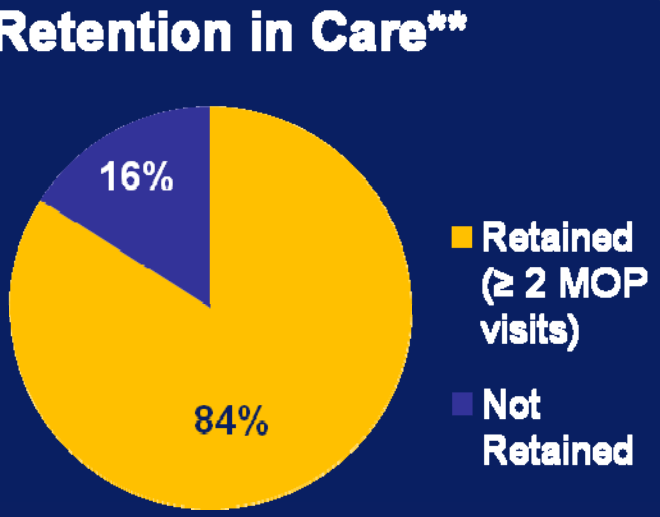
** Recent incarceration is within last 2 yrs., and ever incarceration refers to greater than 2 yrs. ago.

Clinical Characteristics of RW Sample

N = 11,397





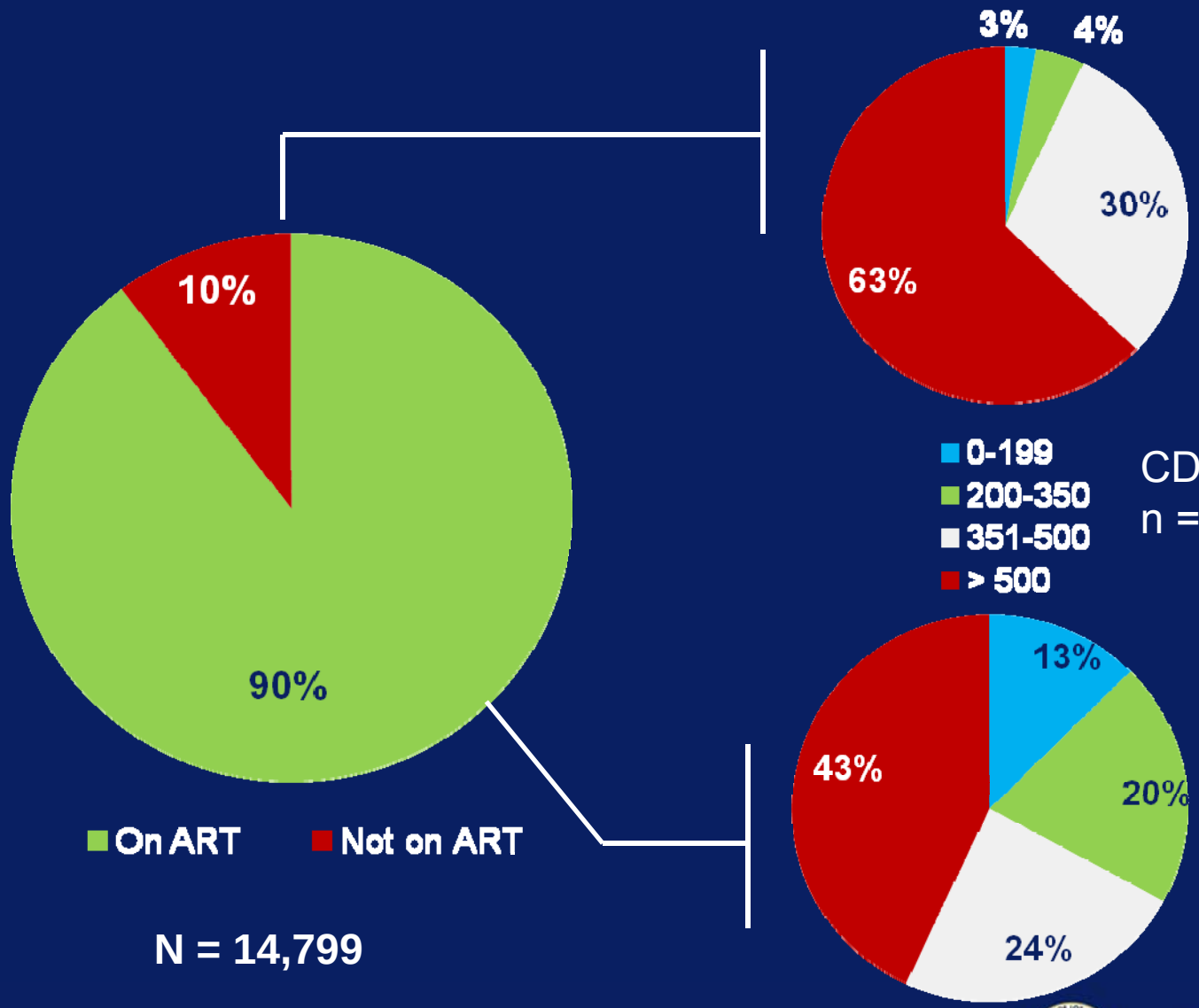


* Based on self-report time since diagnosis.

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

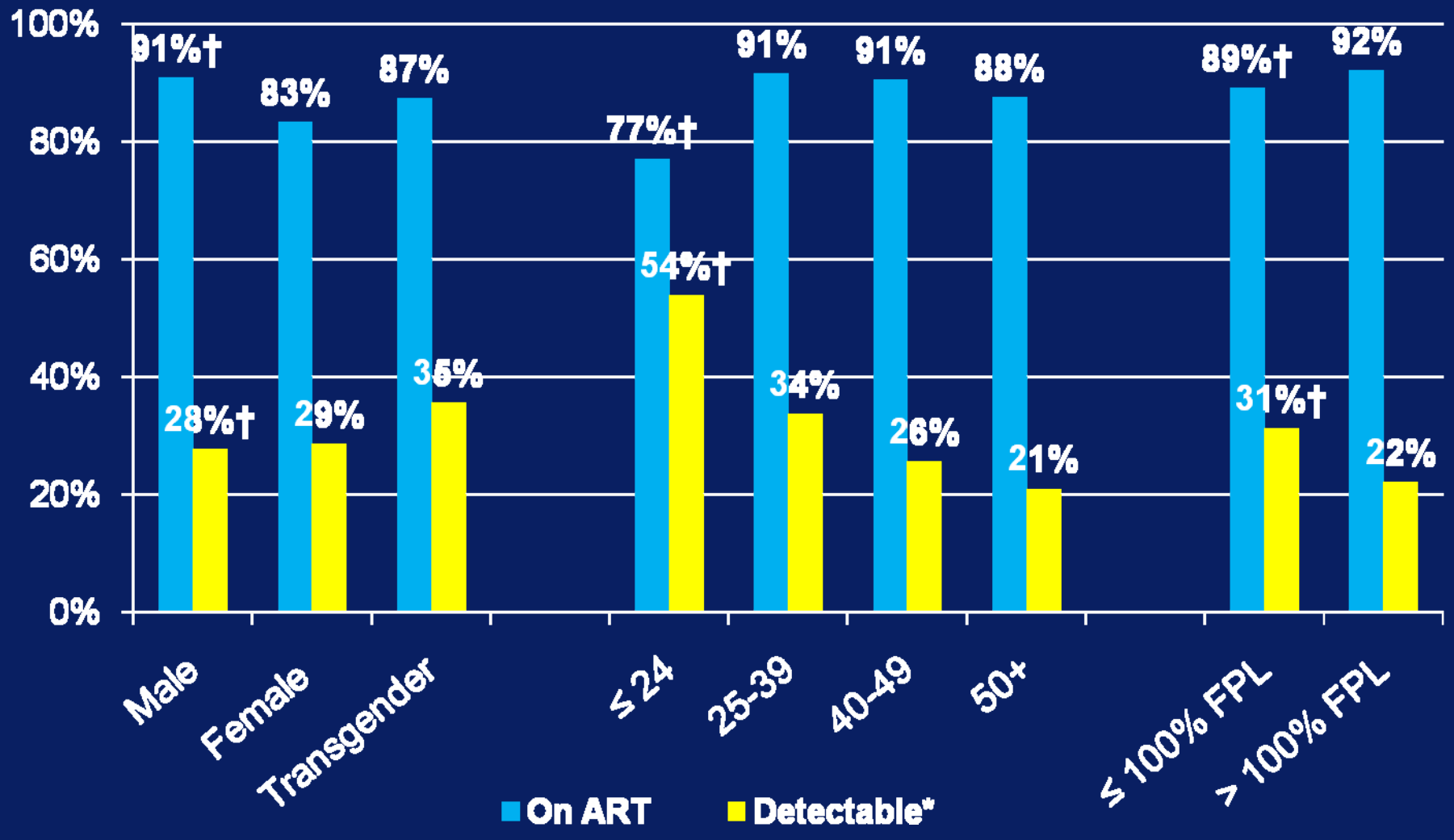
ART Coverage in RW System

ART Utilization in RW Sample



Geographic Distribution of ART Coverage

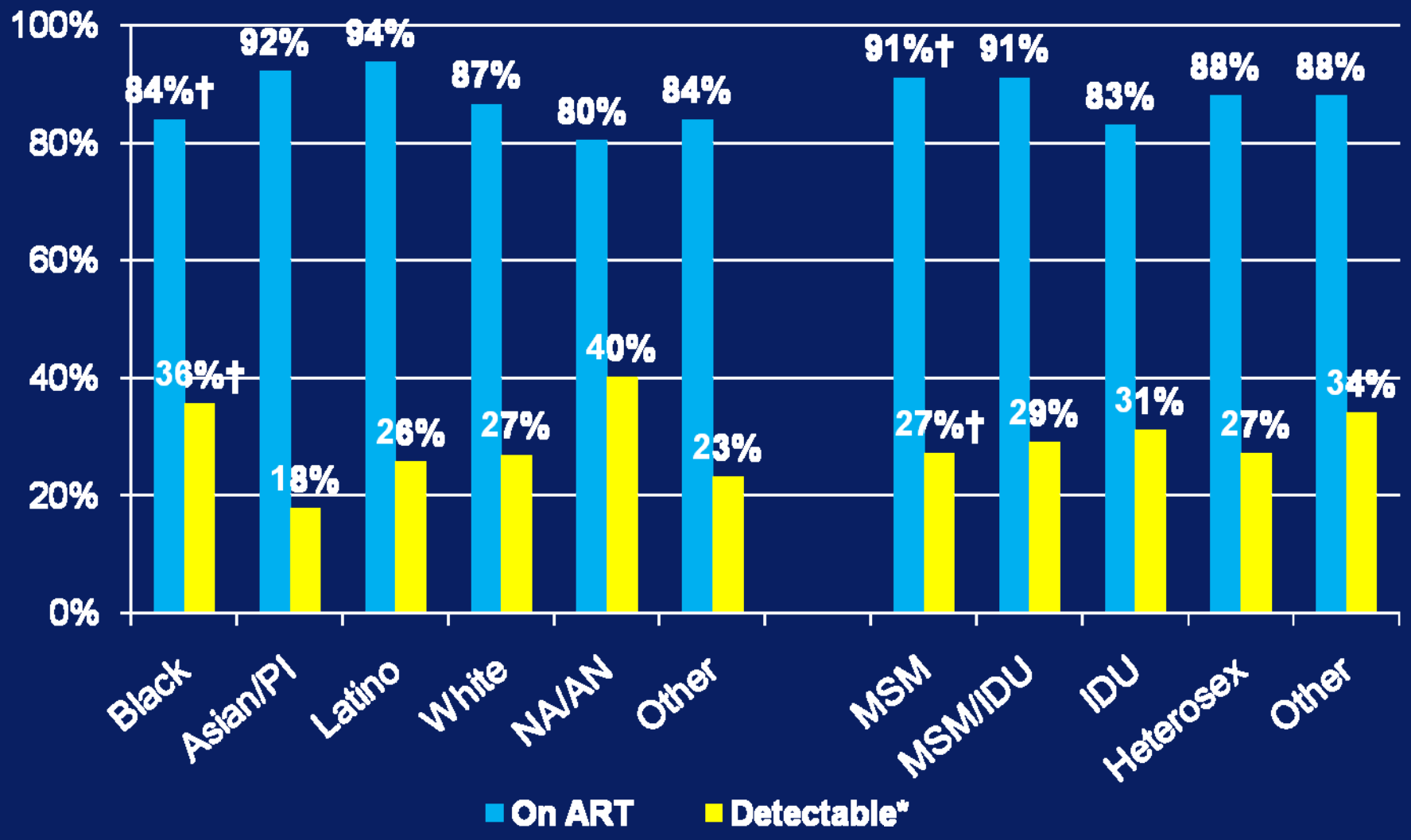
ART Use in RW Sample



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

County of Los Angeles Public Health

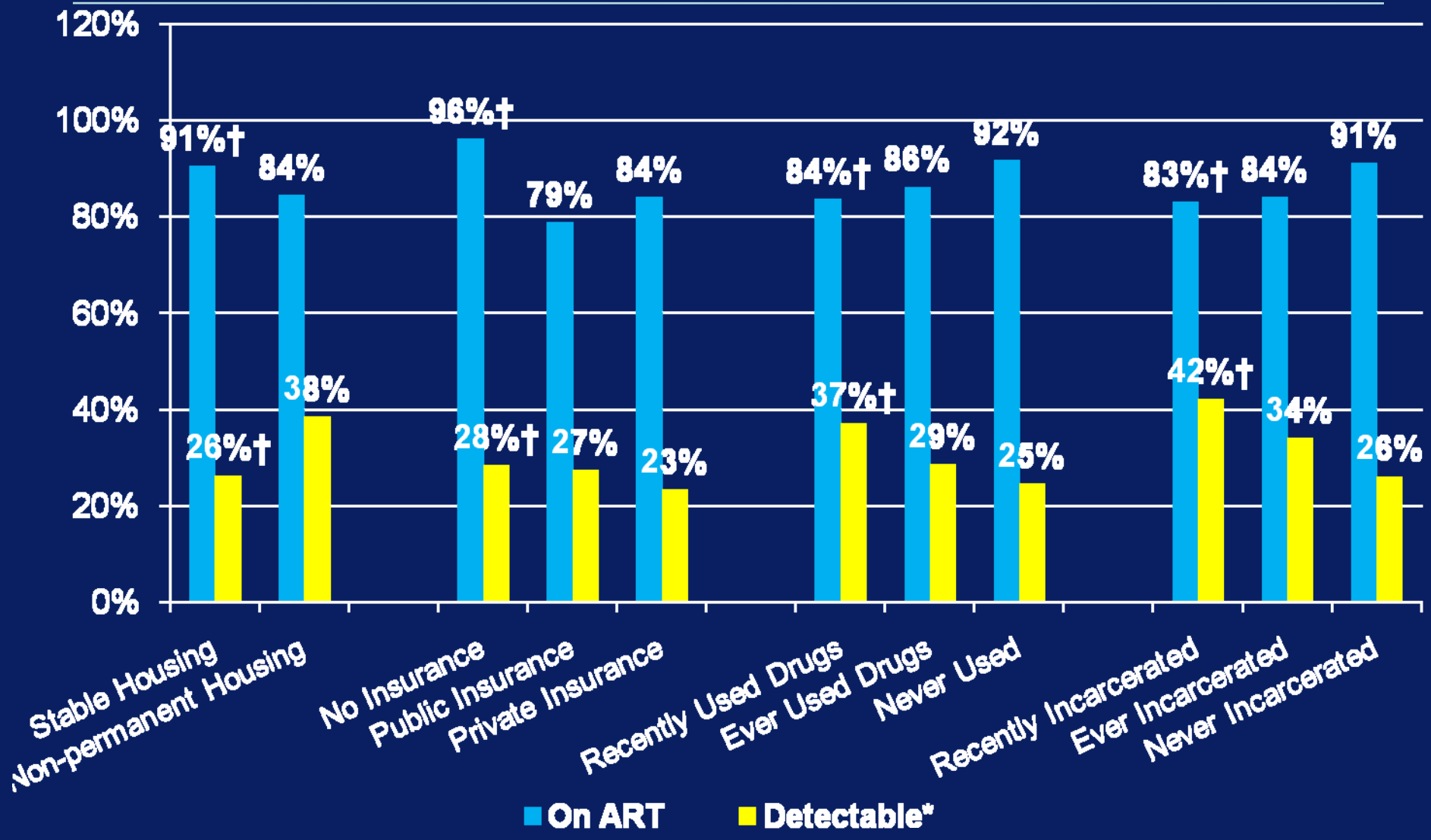
ART Use in RW Sample



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

County of Los Angeles Public Health

ART Use in RW Sample

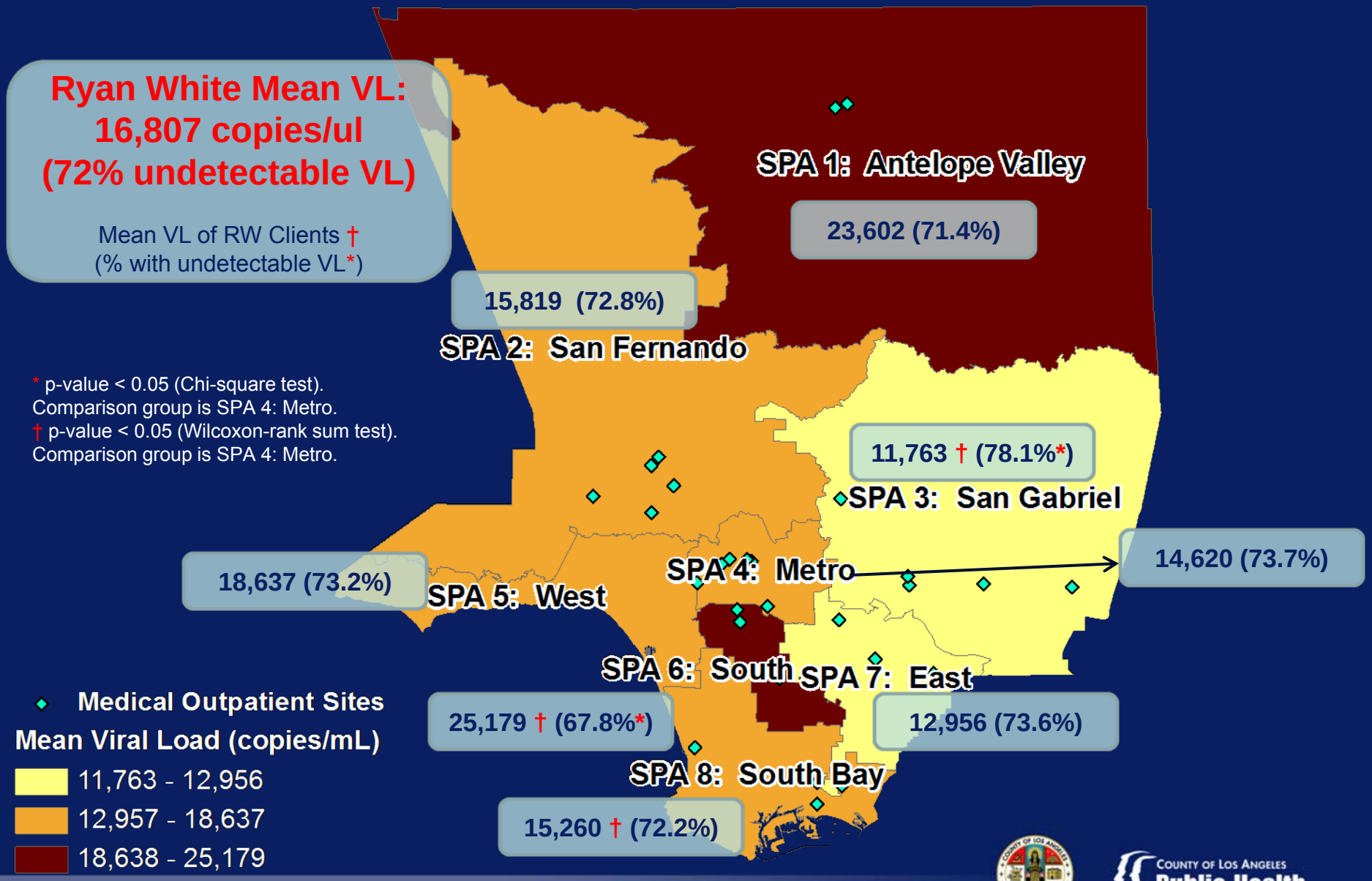


Source: *Casewatch CY2009:* Data limited to RW Client w/ 1 or more MOP visit.
* Detectable is a subset of those on antiretroviral therapy with ≥ 200 copies/mL.
† Chi-square p-value < 0.05 for whole category

County of Los Angeles Public Health

HIV Viral Load in RW System

Geographic Distribution of Mean VL



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

* Detectable VL is ≥ 200 copies/mL

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 (≤ 1 yr.)	**1.35**	**1.17 – 1.54**
Incarceration Hx (never incarcerated = reference)		
Recently incarcerated (≤ 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

Office of AIDS Programs and Policy Contact Information

Jennifer N. Sayles, MD, MPH
Medical Director
Office of AIDS Programs and Policy
Los Angeles County Department of Public Health

Phone: (213) 351-8264
Email: jsayles@ph.lacounty.gov