

Outline

- Evidence Supporting Treatment as Prevention
- San Francisco Approach and Initial Results
- Uncertainties, Concerns, Limitations
- The Way Forward

HIV in the 1980s

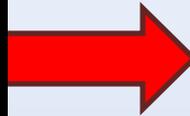
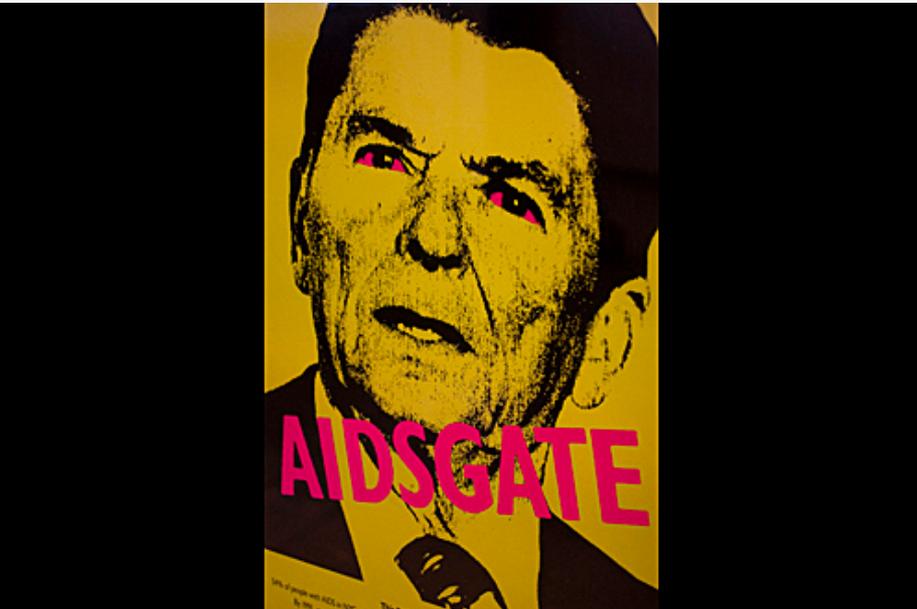


Fear
Discrimination
Stigma
Prevention Controversial
No Testing
No Treatment

Case Finding
Surveillance
Interruption of Transmission
Systematic Treatment & Case Management
Population Based Monitoring

Traditional Public Health Approach

President Reagan to President Obama



Testing technologies: Rapid Test, 4th gen Ag/Ab, VL for Acute, home testing, 1 min. test

Prevention: U.S. success at nearly eliminating perinatal and blood-borne HIV

Wider availability of condoms, syringes

Treatment: Tremendous progress in 1st, 2nd, 3rd generation of ART

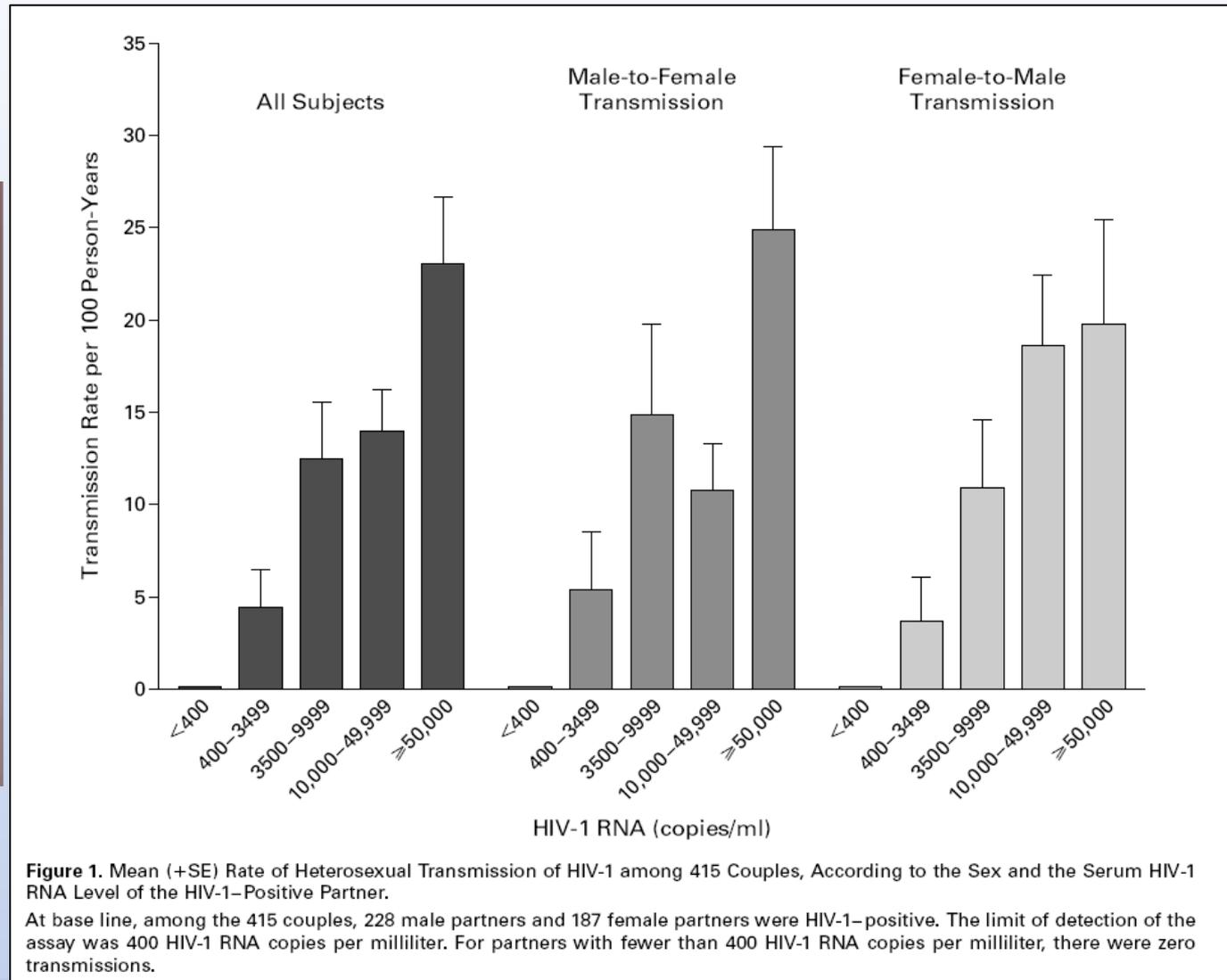


A Pivotal Time



THE EVIDENCE: VIRAL LOAD AND PREVENTION OF TRANSMISSION

Viral Load Directly Predicts HIV Transmission



Universal Testing and ART-Mediated Virologic Suppression Near Eliminates Perinatal Tx

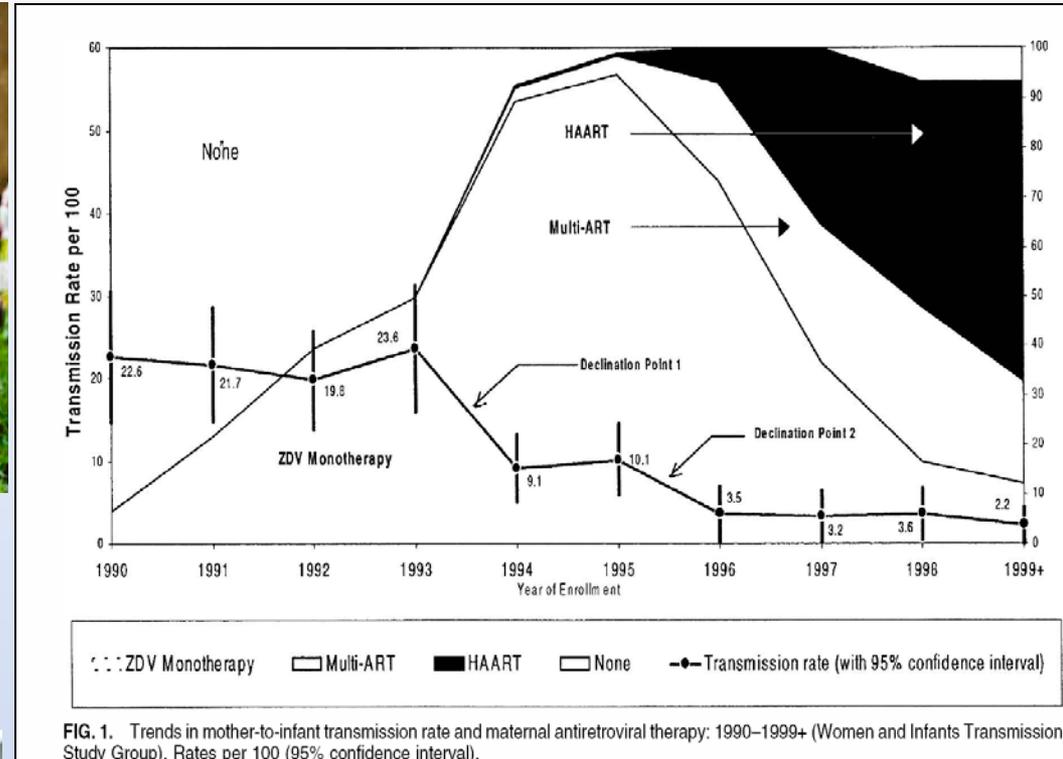


FIG. 1. Trends in mother-to-infant transmission rate and maternal antiretroviral therapy: 1990–1999+ (Women and Infants Transmission Study Group). Rates per 100 (95% confidence interval).

Cooper. JAIDS, 2002.

ART-mediated Virologic Suppression Near Eliminates Sexual Tx

ART and HIV-1 transmission

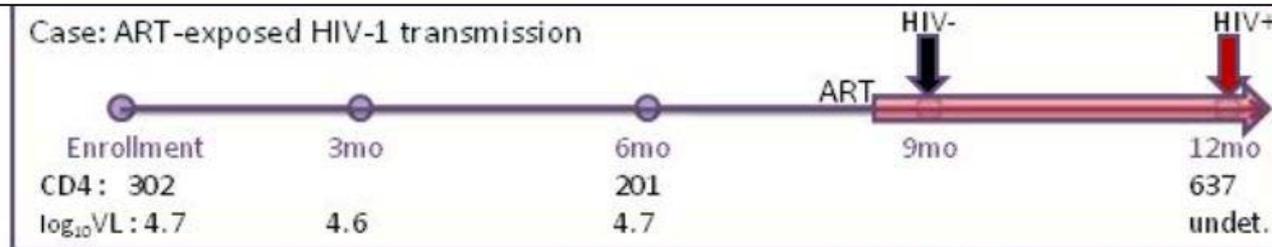
The **NEW ENGLAND**
JOURNAL *of* **MEDICINE**

ESTABLISHED IN 1812

AUGUST 11, 2011

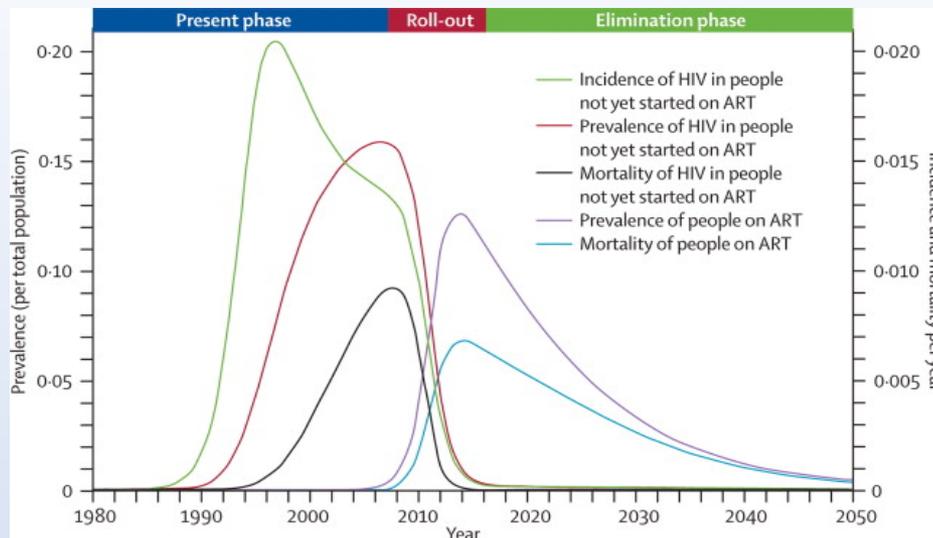
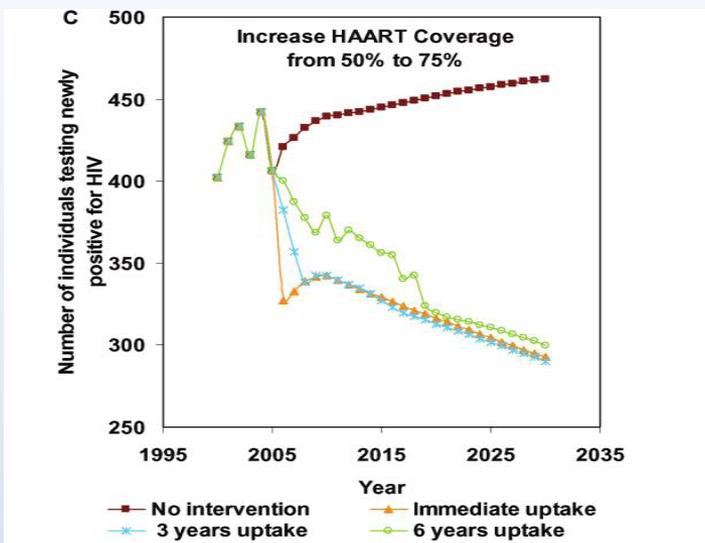
VOL. 365 NO. 6

Prevention of HIV-1 Infection with Early Antiretroviral Therapy

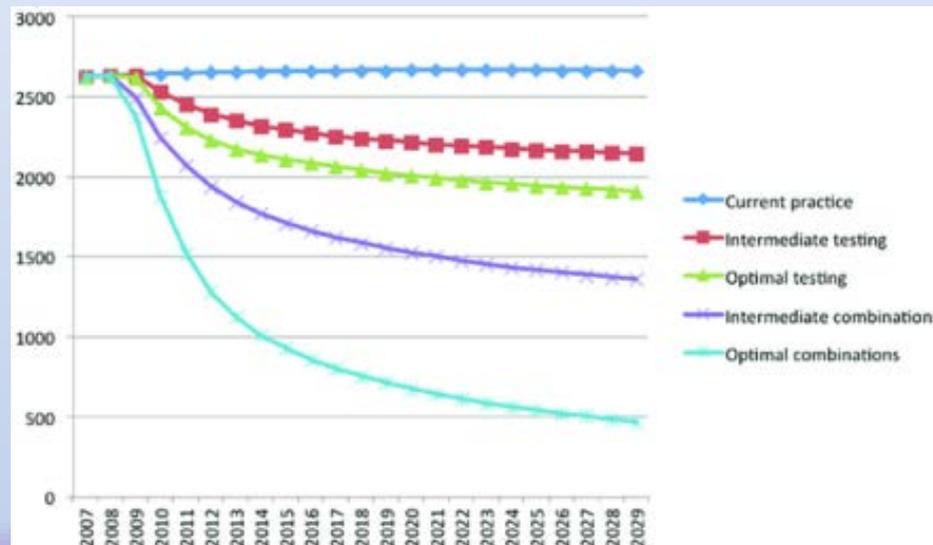


UNIVERSITY OF WASHINGTON
INTERNATIONAL CLINICAL RESEARCH CENTER
PARTNERS IN PREVENTION

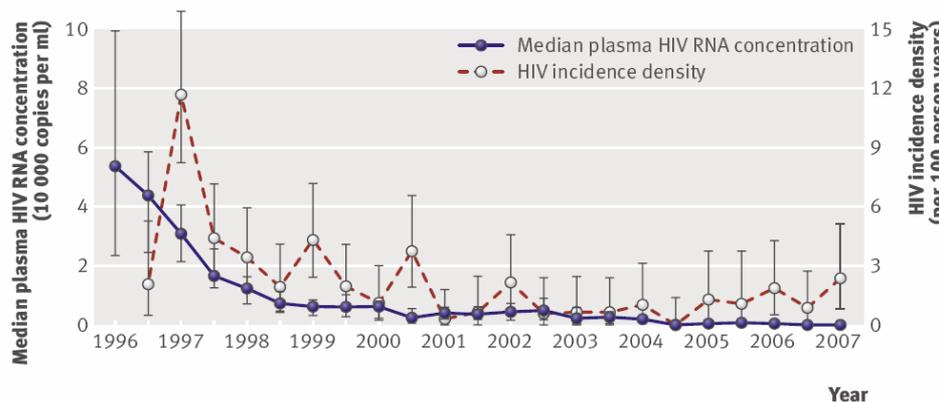
Modeling Suggests ART-mediated Virologic Suppression Reduces HIV Transmission



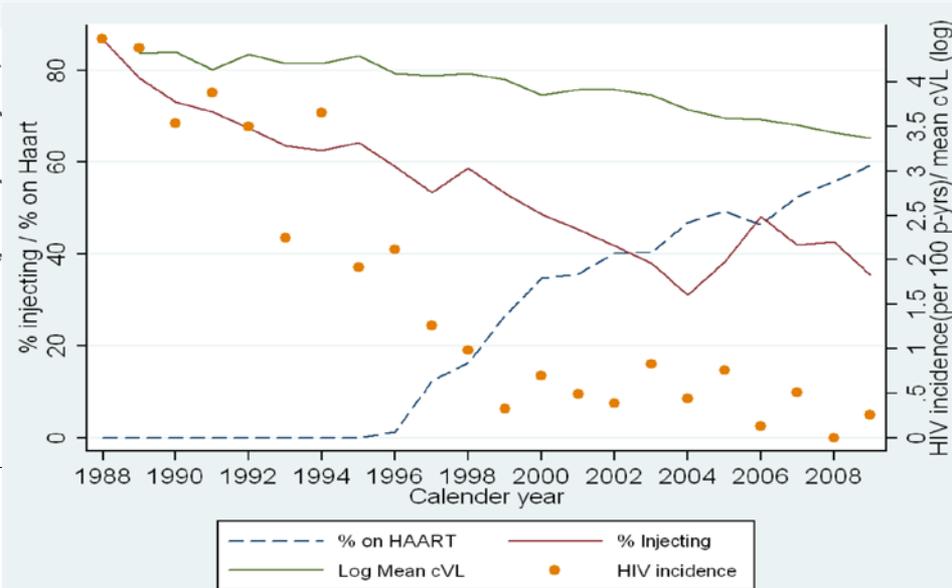
Infections Averted	Tx<500			Tx All			Test & Tx All		
	2014	2019	2029	2014	2019	2029	2014	2019	2029
	1,554	3,102	4,940	2,169	4,550	8,221	2,810	6,040	12,189
Percent Reduction in New Infections	Tx<500			Tx All			Test & Tx All		
	2014	2019	2029	2014	2019	2029	2014	2019	2029
	42%	42%	33%	59%	61%	55%	76%	81%	81%



Two Cohort Studies Demonstrate Reduced Cohort VL predicts decreased HIV Incidence



Estimated community plasma HIV-1 RNA concentrations and HIV incidence density, with 95% confidence intervals, among two parallel cohorts of injecting drug users. HIV incidence first estimated in second half of 1996 as enrolment started in May 1996 and repeat HIV tests to assess incidence were available only after six months of follow-up



Taken together, current observational, modeling, and randomized control data demonstrates that ART-mediated virologic suppression reduces transmission at an individual level and strongly suggests community or population level effect.

PREVALENCE = INCIDENCE X DURATION

*NOT JUST ABOUT PREVALENCE—
ABOUT PREVALENT VIREMIA*

INCIDENCE

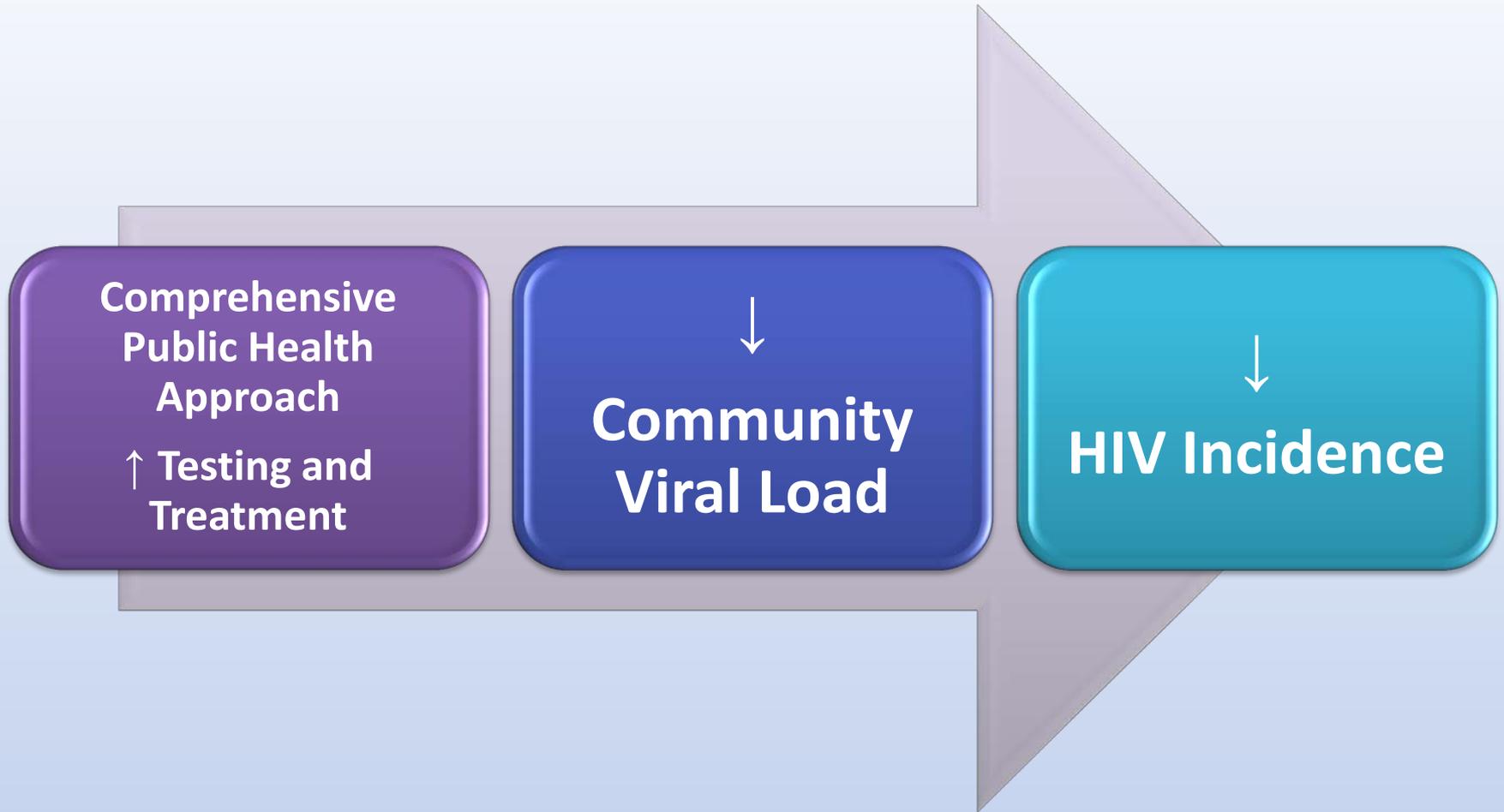


PREVALENCE



DEATH

The Hypothesis: Treatment *IS* Prevention



**WHAT IS GOOD FOR THE INDIVIDUAL IS
GOOD FOR THE COMMUNITY**

JAMA[®]

1998

Treat HIV-1 Infection Like Other Infections—Treat It

Bruce D. Walker, MD; Nesli Basqoz, MD



ART Brought People Back From the Brink



Haitian Patient, before and after Receiving Free Treatment for HIV Infection and Tuberculosis.

The photograph on the left was taken in March 2003, and that on the right in September 2003. Many impoverished patients in rural Haiti and Rwanda now receive comprehensive medical care through public-private partnerships.

Should AIDS be Renamed

“Acquired Inflammatory Disease Syndrome”?

- Untreated HIV disease is associated with increased T cell activation/inflammation
- Treatment dramatically reduces inflammation
- The degree of residual inflammation during HAART is determined in part by CD4 nadir (strong effect < 200)

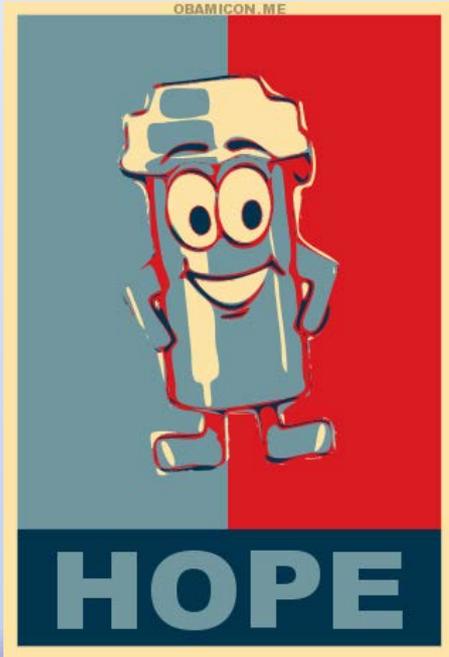
THE VIRUS IS MORE TOXIC THAN THE MEDS

- Old paradigm: Drugs are toxic so defer therapy as long as possible
- New paradigm: Although new drugs are not completely benign, they are less toxic than the virus
- Rather than treating only when there was a strong reason to treat, the default is now to treat unless there is a strong reason not to treat

Universal OFFER of ART on Ward 86 and all SFDPH Community Health Clinics

“All patients, regardless of CD4 count, will be evaluated for initiation of antiretroviral therapy (ART)”

Decision to start ART made by the individual in conjunction with the provider



NYC Recommends AIDS Drugs for Any Person with HIV

NEW YORK (AP) 1 Dec 2011— Health officials in the nation's largest city are recommending that **any residents living with HIV be offered AIDS drugs as soon as the virus is diagnosed**, an aggressive move that has been shown to prolong life and stem the spread of the disease...



NYC Mayor
Michael Bloomberg



Photo copyright: Inga Sarda-Sorensen

Empire State building glowing red for World AIDS Day 2011



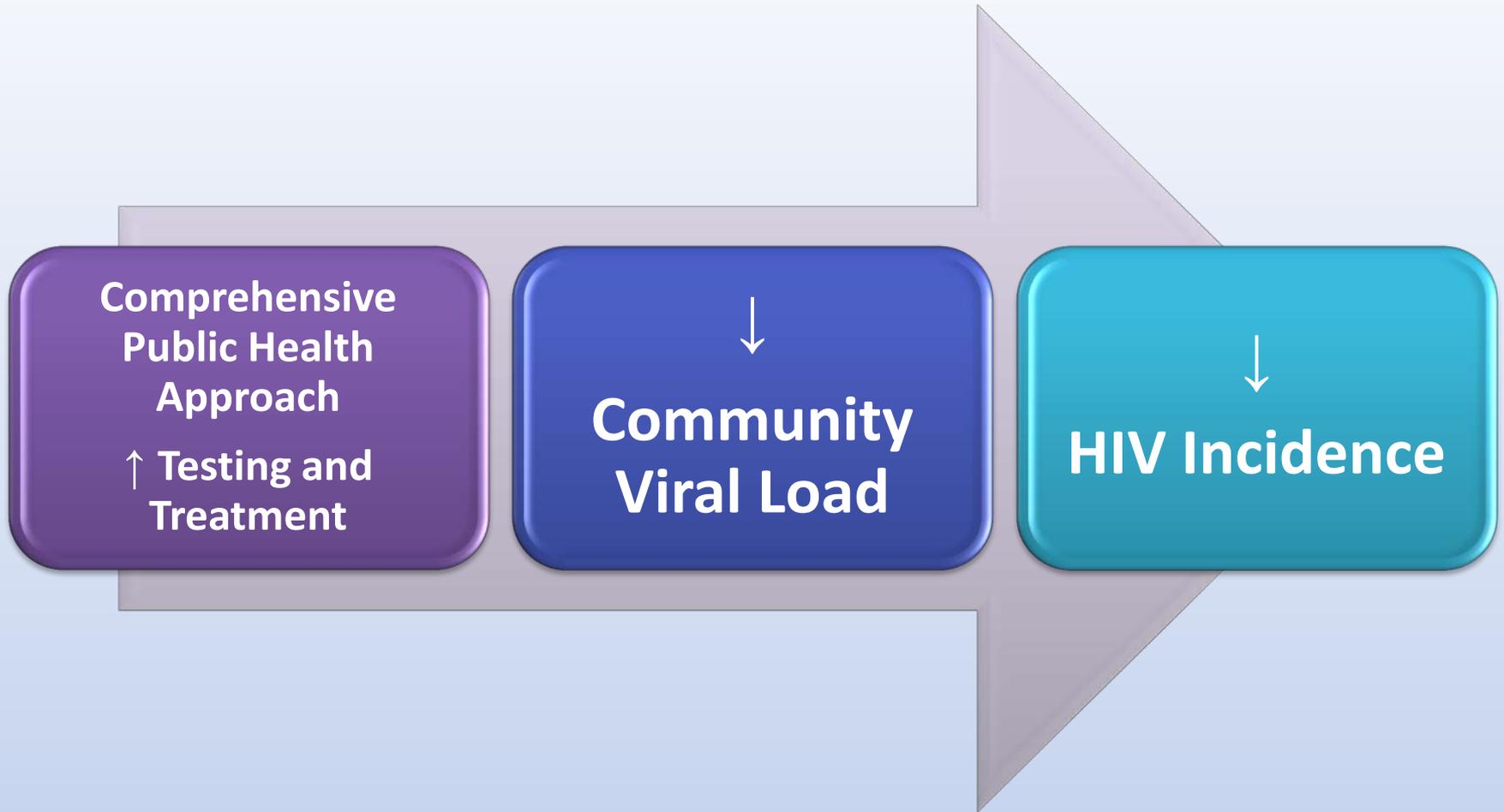
Dr. Tom Farley
NYC Health Commissioner



DHHS March 2012: *ART is recommended for ALL HIV-Infected individuals*

- Strength depends on CD4 strata:
 - CD4<350 AI (Strong; RCT)
 - CD4 <350- <500 All (Strong, Obs nRT)
 - CD4>500: BIII (Moderate, Expert)
- Effective ART reduces sexual transmission
- Heterosexual AI (Strong RCT)
- All other risk groups AIII (Strong, Expert)

The Hypothesis: Treatment IS Prevention





NATIONAL HIV/AIDS STRATEGY FOR THE UNITED STATES



There are three primary goals of the NHAS:

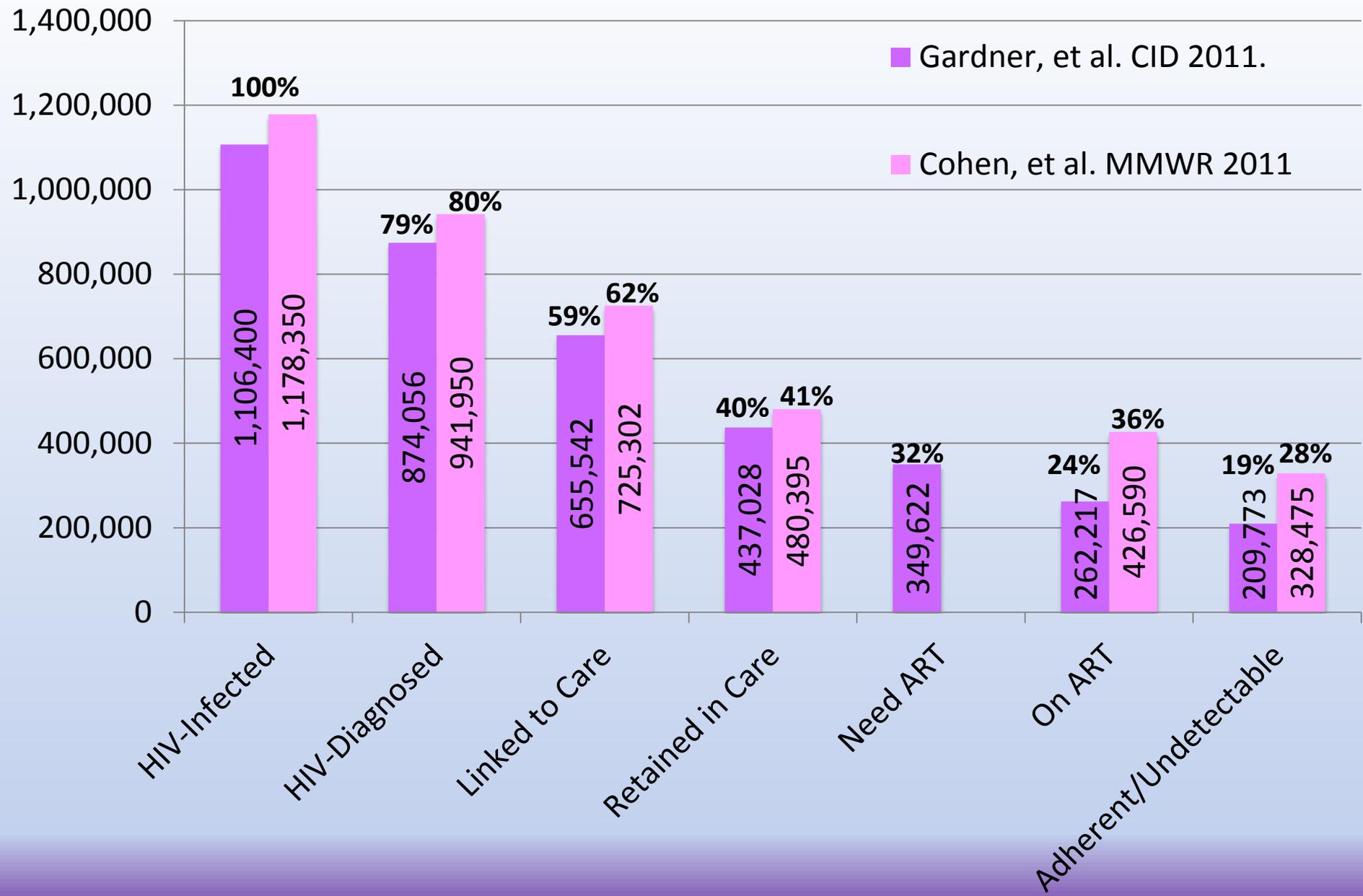
- Reducing HIV incidence
- Increasing access to care and optimizing health outcomes
- Reducing HIV-related health disparities

12 Cities Project and ECHPP:

Enhanced Comprehensive HIV Prevention Planning and Implementation for Metropolitan Statistical Areas Most Affected by HIV/AIDS

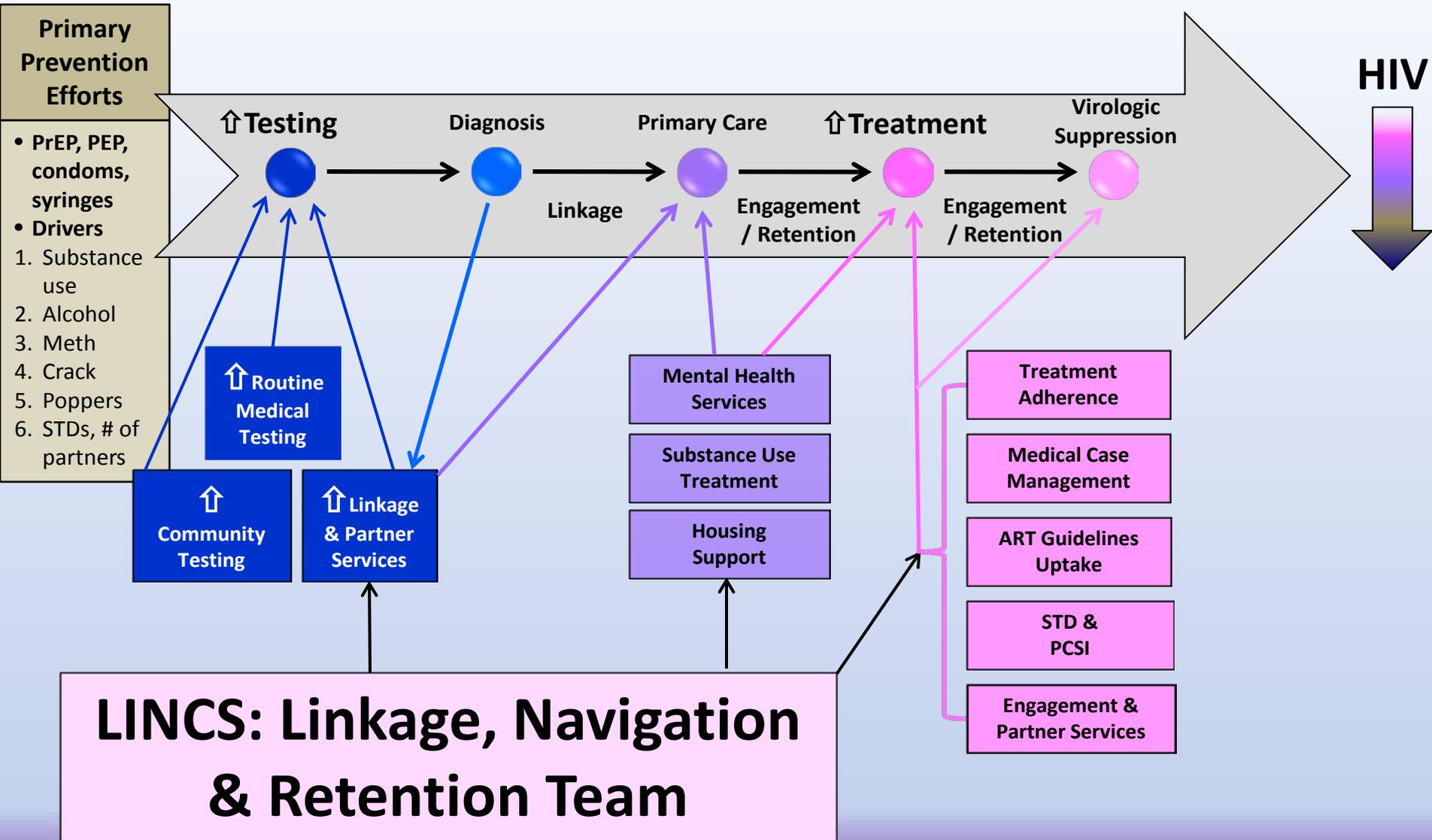


Major Challenges in U.S. Implementation Cascade



SAN FRANCISCO HIV/AIDS STRATEGY AND EVALUATION APPROACH

San Francisco's Approach to Maximizing the Continuum of Prevention, Care and Treatment



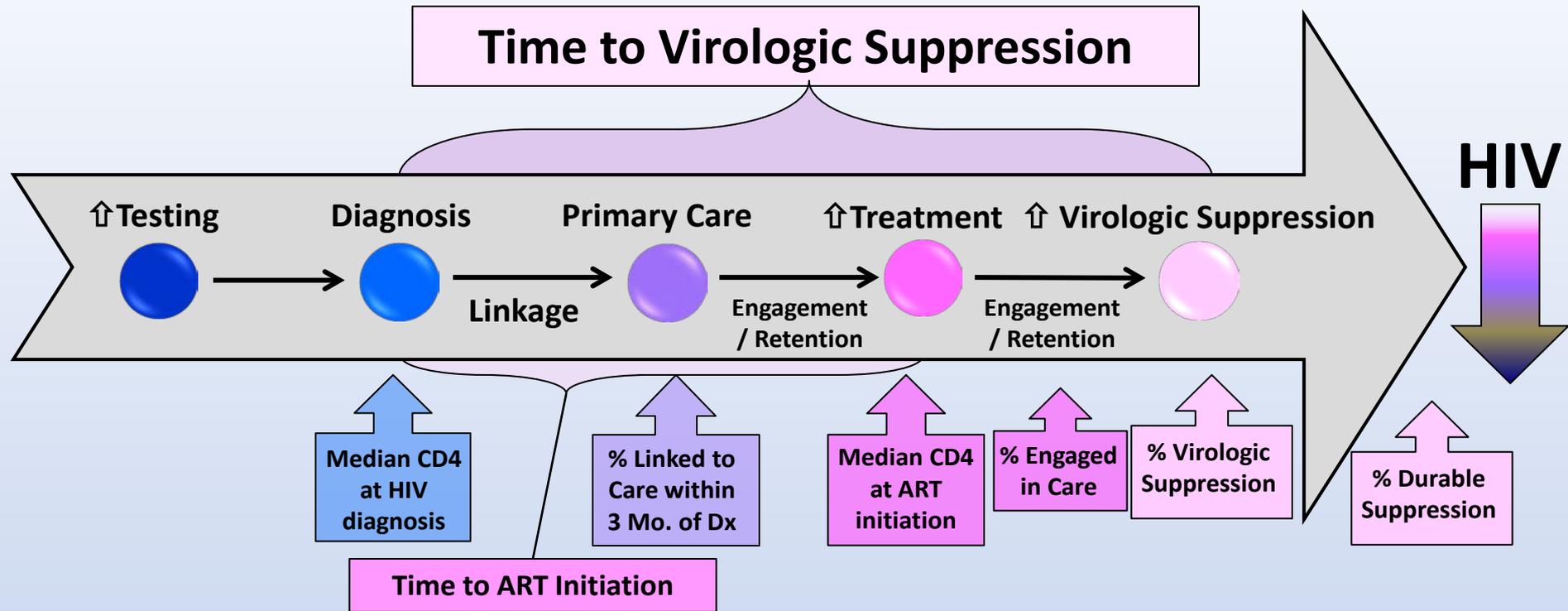
When the data are in hand, we should use it!



“But once the data are in hand, it is the failure to use those data for public health purposes that must be justified.” (Fairchild, 2007)

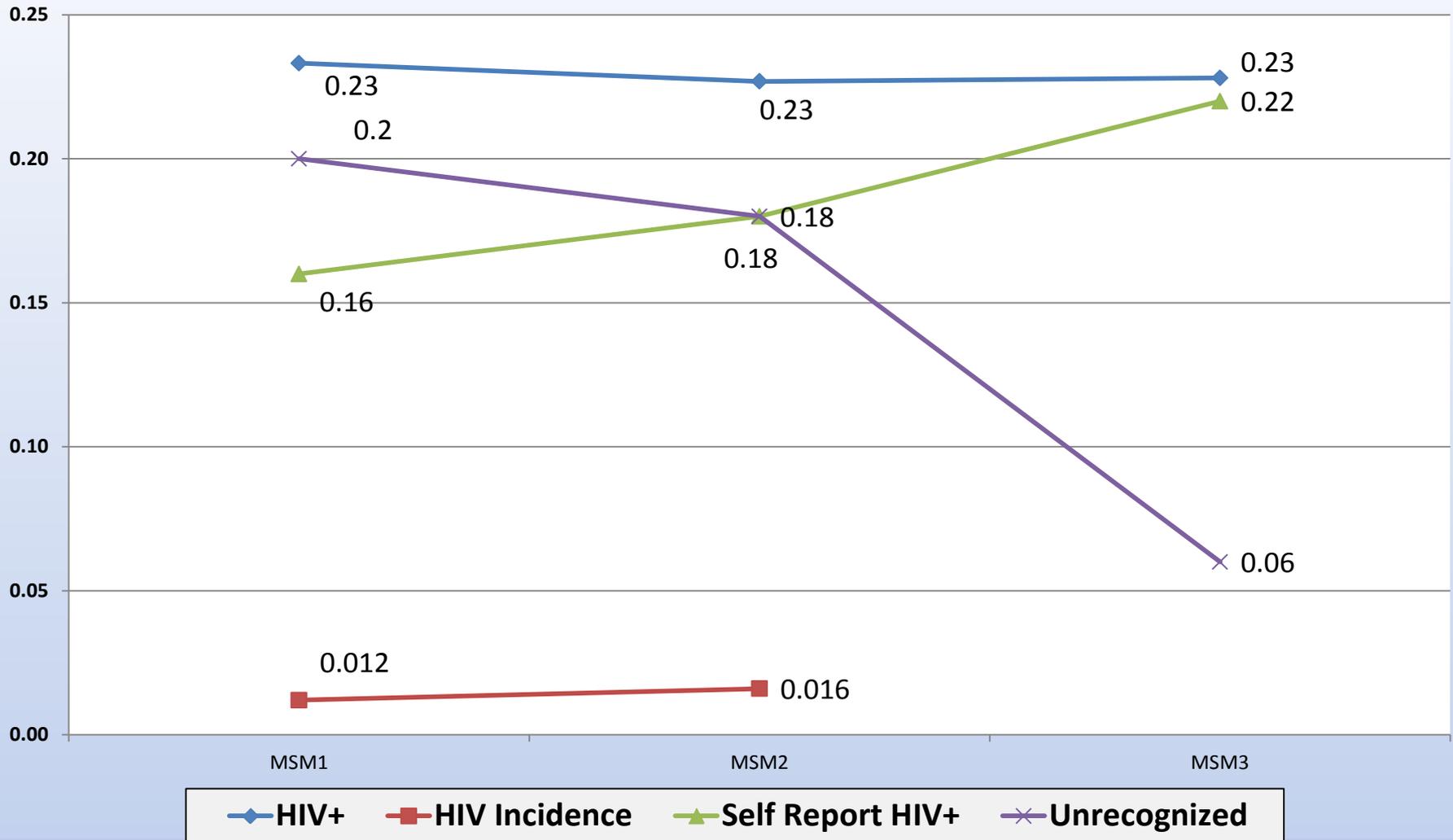
- Surveillance data and other data could not only be used to monitor and evaluate, but for real-time quality improvement: ***Maximize Cascade***
 - Prior Diagnosis
 - Current and past location of care: Medical records
 - Treatment history, co-infections, resistance
 - For Linkage, Engagement, Retention & Re-Engagement

Using San Francisco's Surveillance Data to Evaluate Our Continuum of Prevention, Care and Treatment



**Community Viral Load: Unified
Marker of Prevention and Treatment**

HIV prevalence, incidence, self-report and unrecognized infections: 2004-2011



* MSM3 Incidence not complete

Testing (Now)

Populations by Race/Ethnicity	United States	San Francisco
Total	182	388
White	239	426
Other/Unknown	180	464
African American	175	351
Hispanic/Latino	160	328
Asian/Pacific Islander	225	319





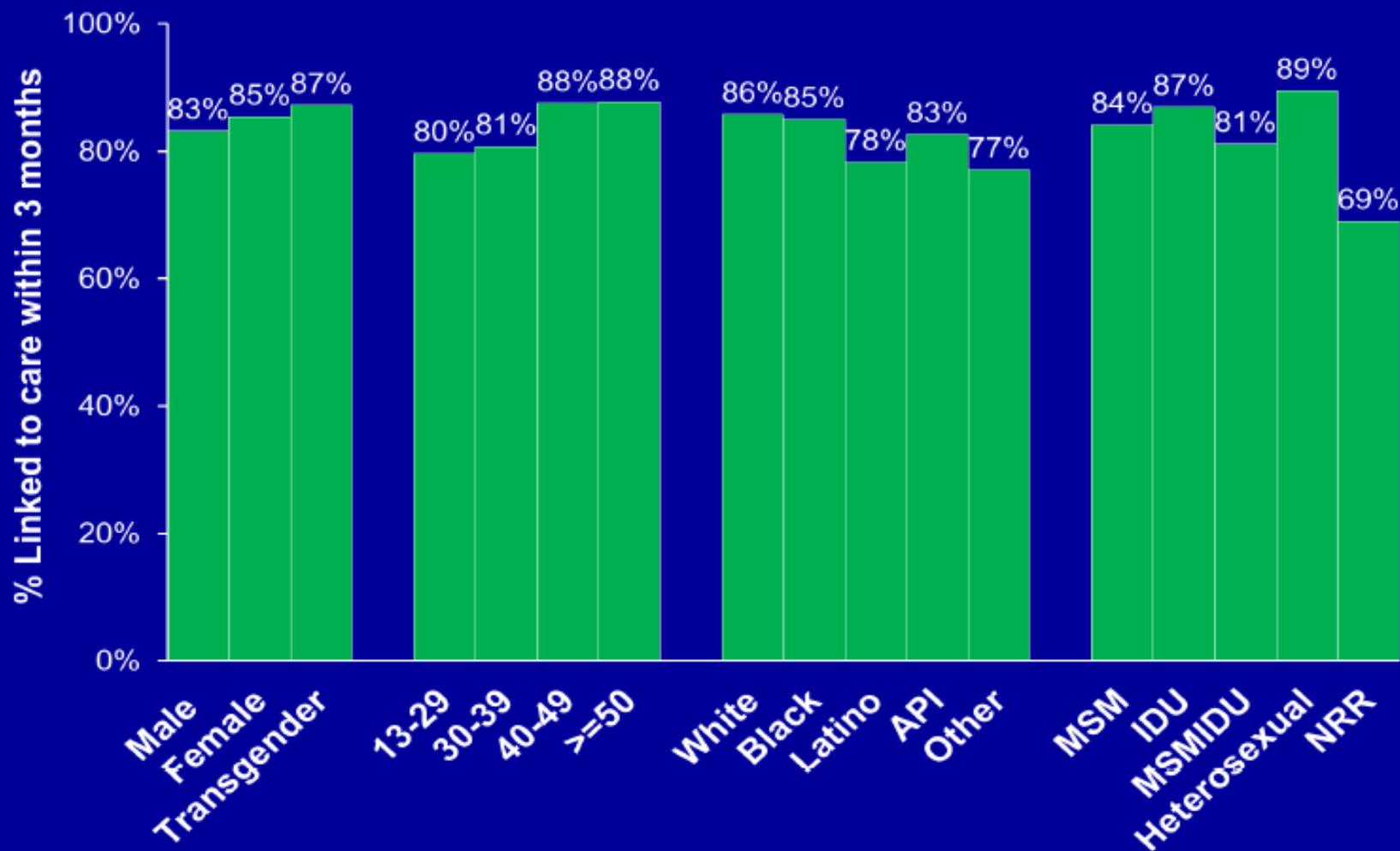
CDC HIV Surveillance Supplemental Report, Volume 16, Number 1
 SFPD HIV Epidemiology 2010 Annual Report

Linkage

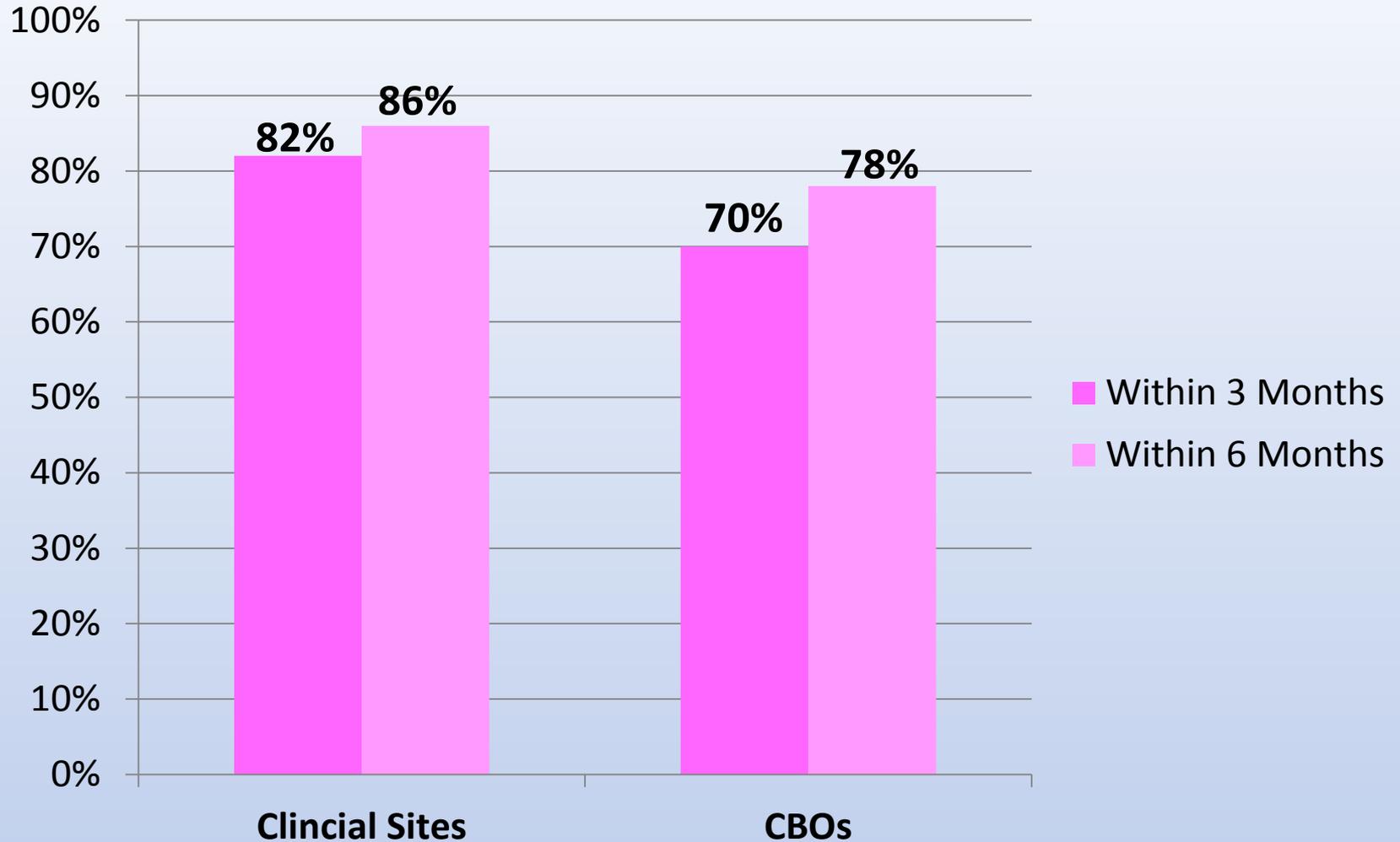
**% of PLWHA linked to medical care within
3 months after diagnosis**

– Surveillance: CD4, VL

Figure 1: Proportion of persons diagnosed with HIV between 2008-2010 who were linked to care within 3 months of diagnosis



Linkage at SFDPH Sites

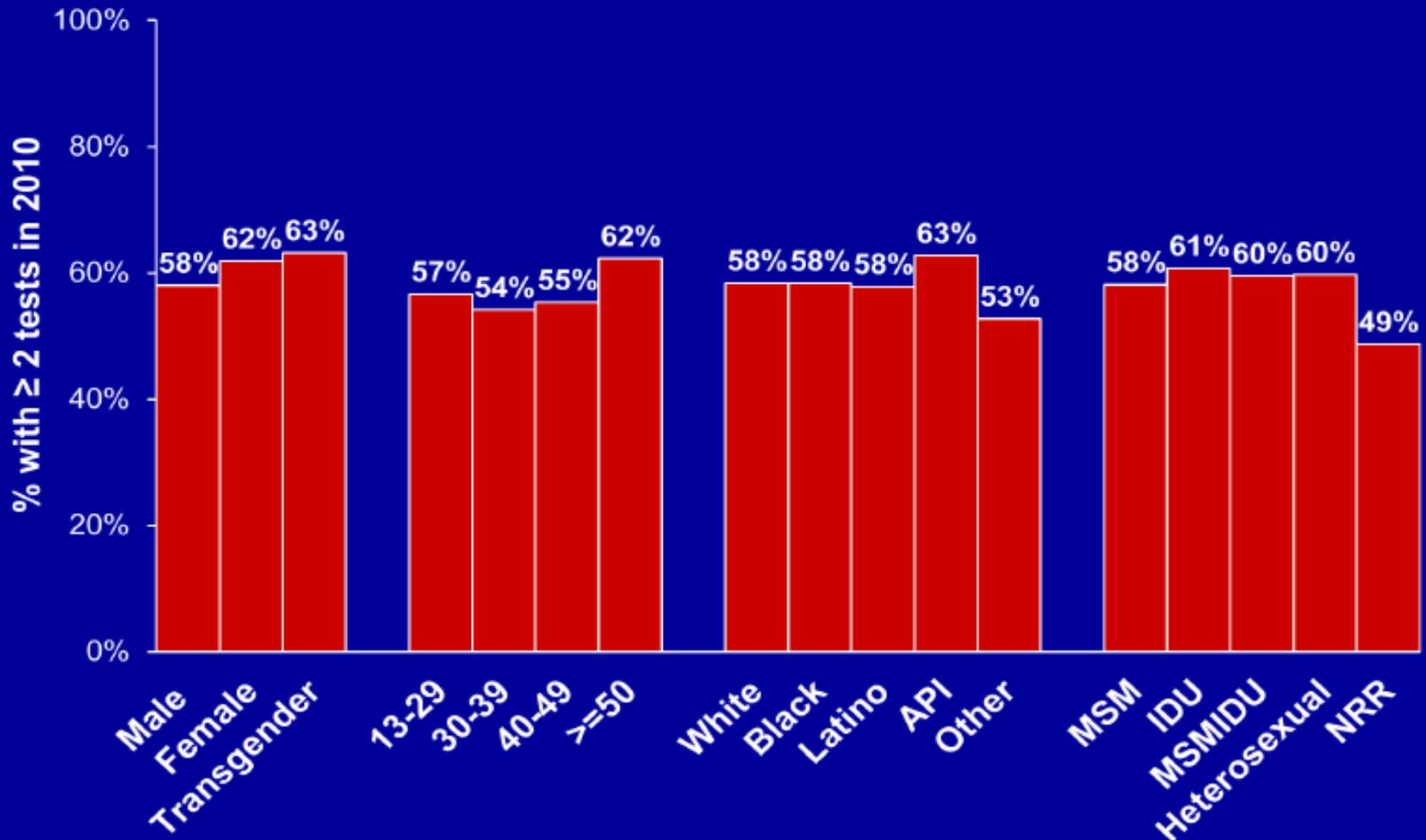


Engagement in Care

Engagement in Care

- Primary care visit frequency in time period (Clinic EMR)
- Missed visits
- ER visits or hospitalizations

Figure 2: Proportion of persons living with HIV as of 12/31/2010 who had ≥ 2 tests in 2010

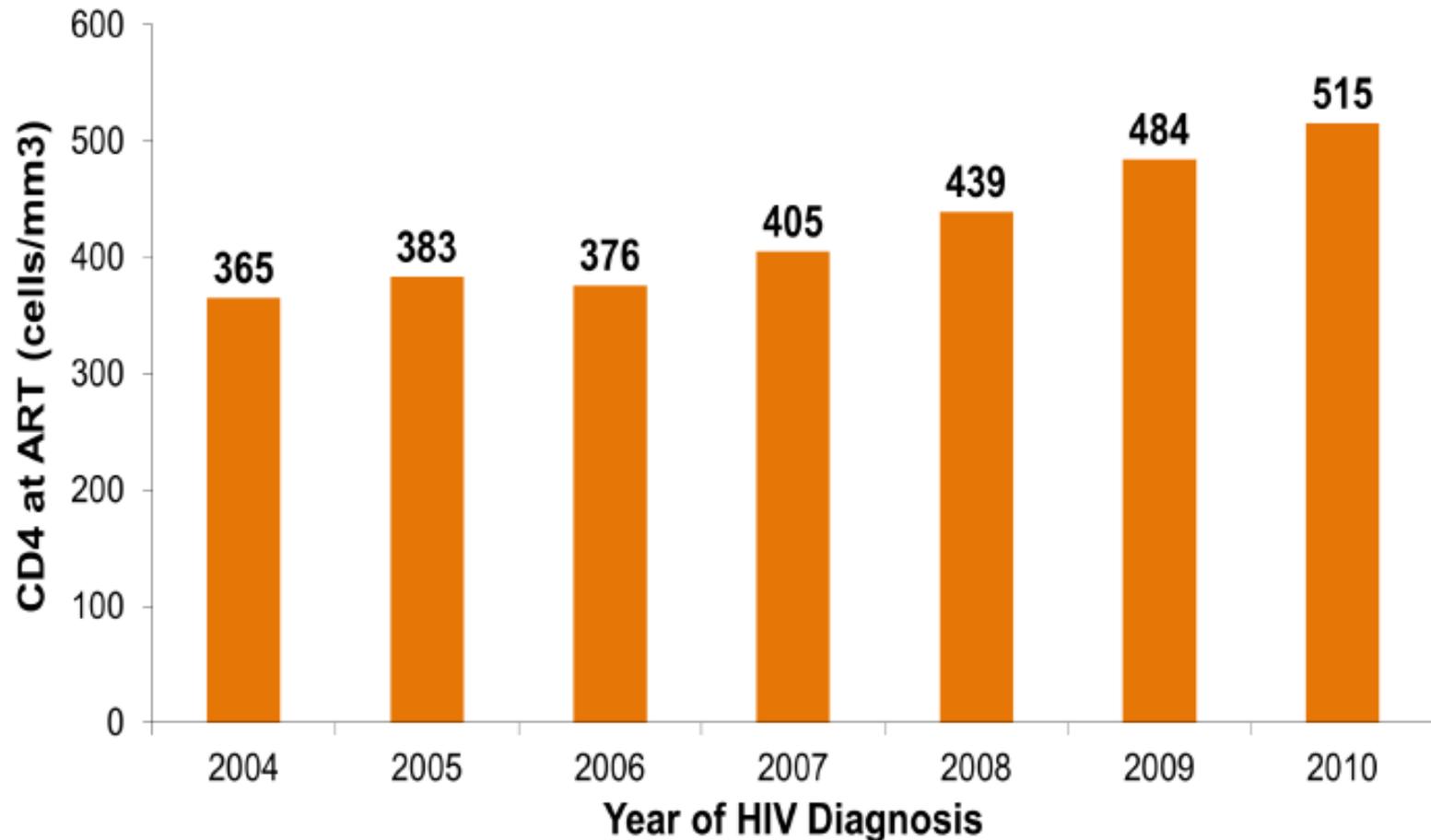


Treatment Indicators

- Median CD4 at treatment initiation
- Time from diagnosis to ART initiation
- Percent in continuous care with CD4>350
- Percent with CD4<500 on ART (active surveillance or linkage with insurance, pharmacy/EMR, claims)
- Percent undetectable who have been on ART 12 months (EMR, ART data)
- Mortality

Trends in Antiretroviral Treatment Initiation Among Persons Diagnosed with HIV in San Francisco, 2004-2010

Figure 2: Median CD4 count at ART initiation among persons with CD4 >350 at time of HIV diagnosis



Trends in Antiretroviral Treatment Initiation Among Persons Diagnosed with HIV in San Francisco, 2004-2010

Figure 1: Kaplan-Meier time to ART initiation by year of HIV diagnosis

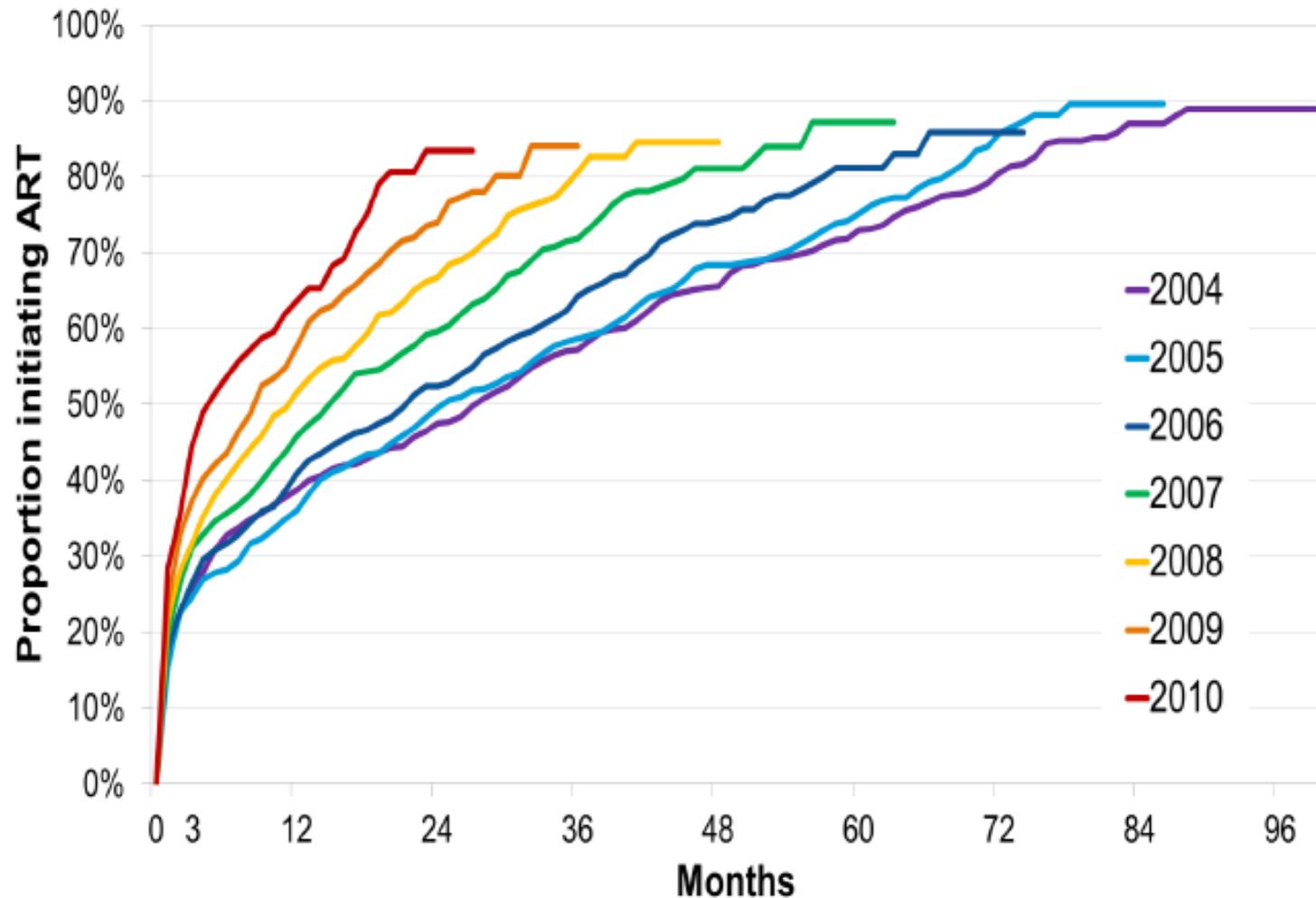
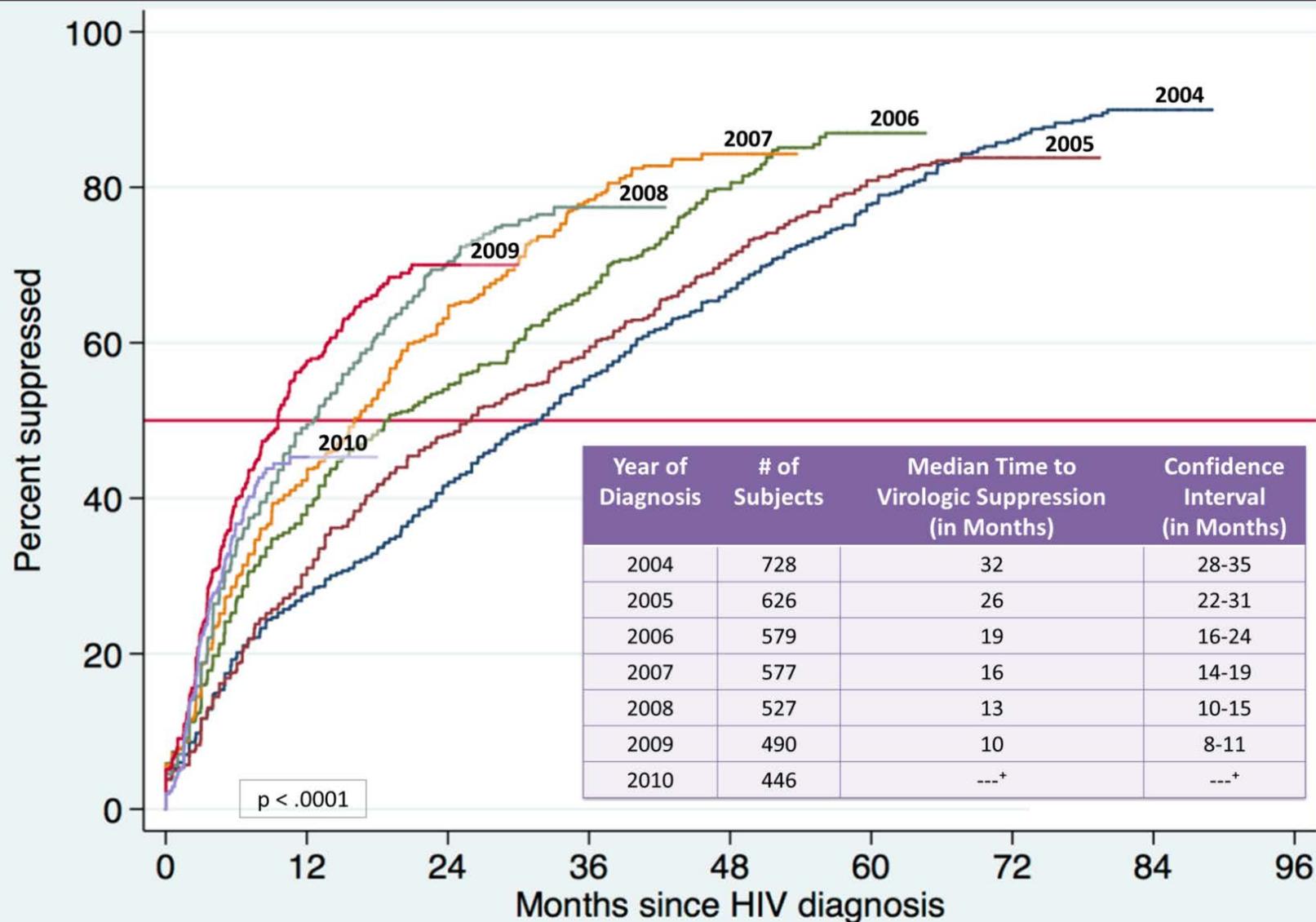


FIGURE 1: MEDIAN TIME IN MONTHS FROM HIV DIAGNOSIS TO VIROLOGIC SUPPRESSION AMONG PERSONS DIAGNOSED WITH HIV, 2004-2010, SAN FRANCISCO

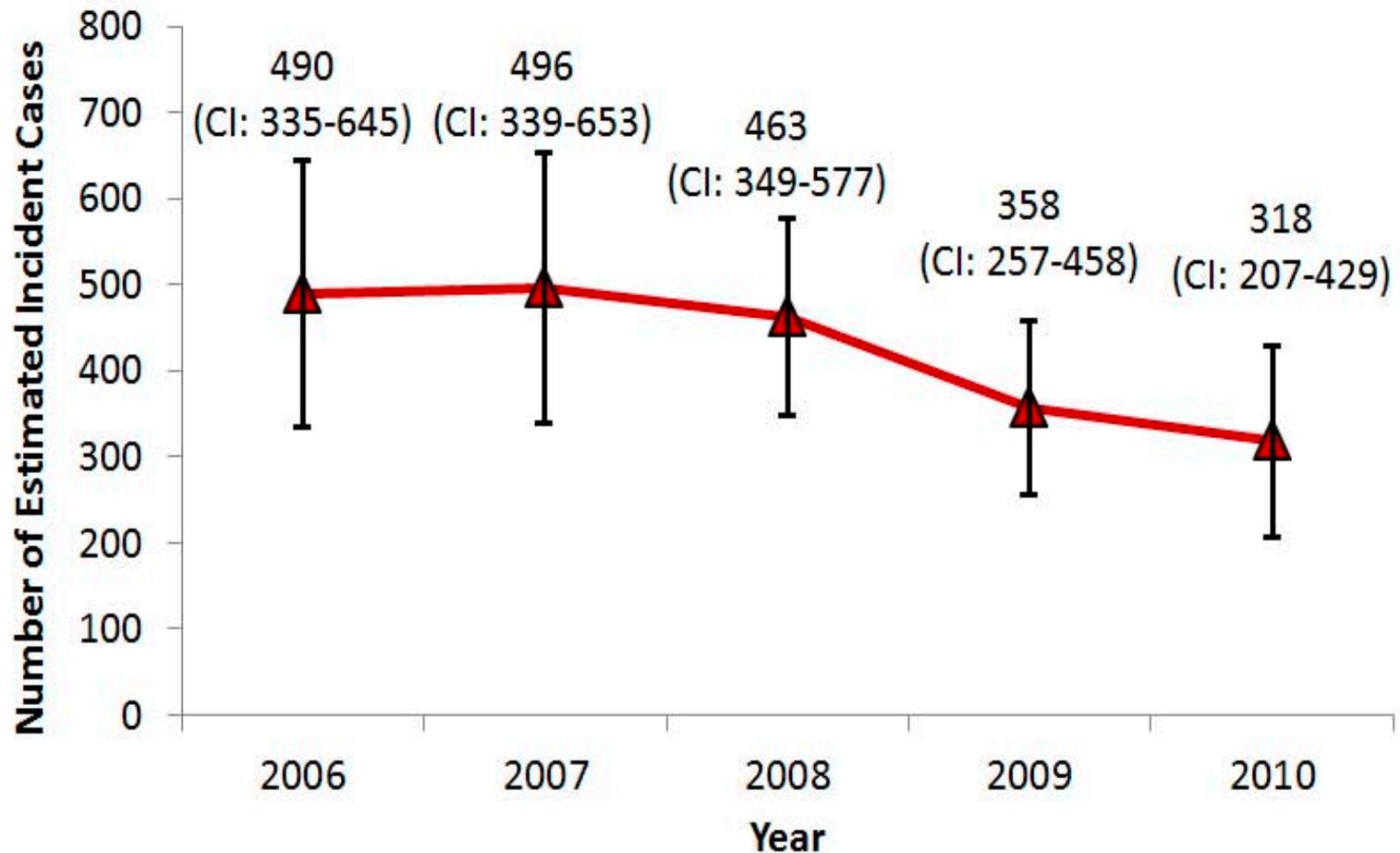


*Median time to suppression was undefined for 2010 (the K-M curve does not cross 50%)

Engagement in Care

- **Surveillance of CD4/VL monitoring frequency**
 - Proportion in continuous care (2 or more visits in preceding 12 months at least 3 months apart)

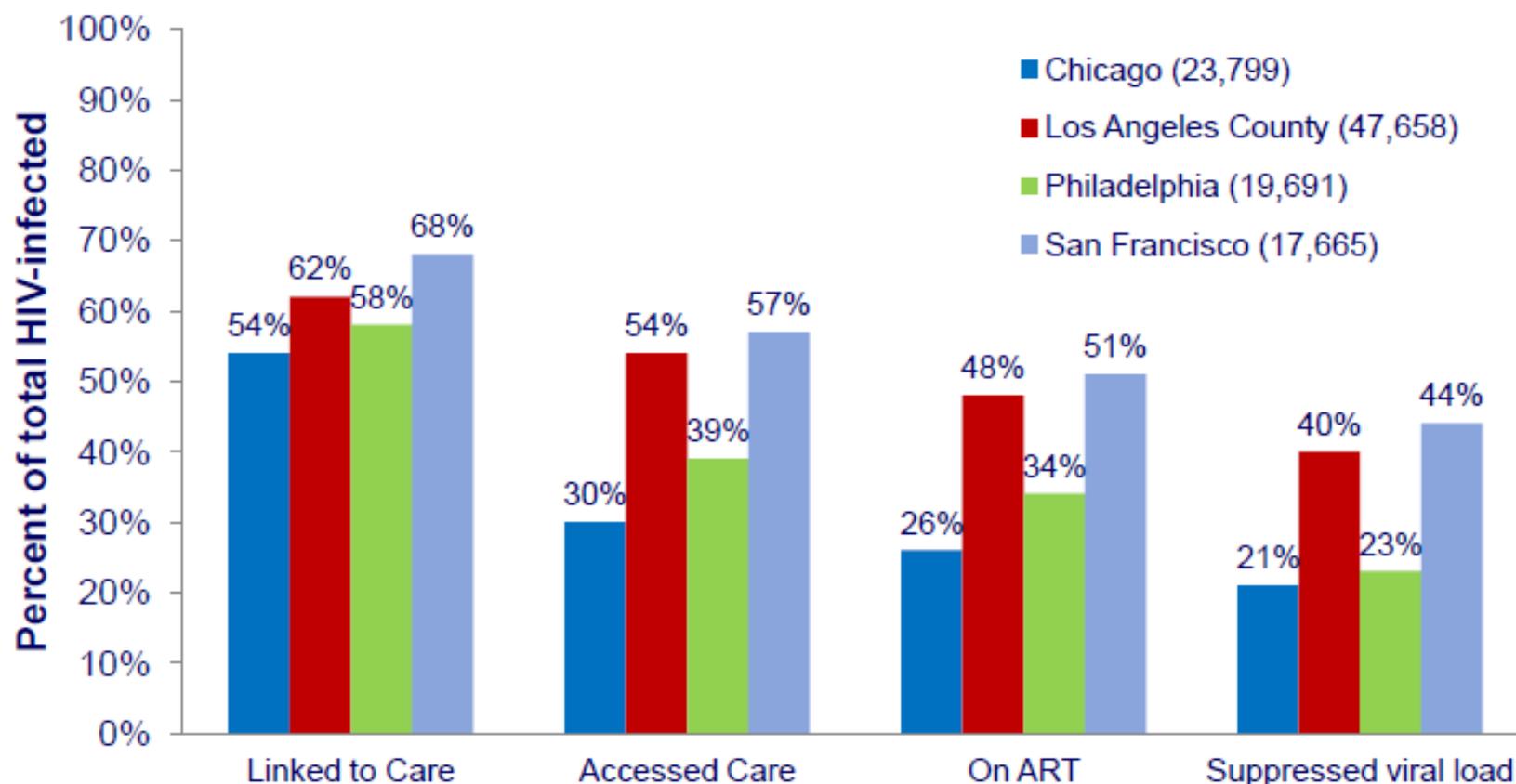
Estimated number of new HIV infections 2006-2010, San Francisco



Source: HIV Epidemiology Section, San Francisco Department of Public Health. HIV/AIDS Epidemiology Annual Report 2011, September 2012: 8.

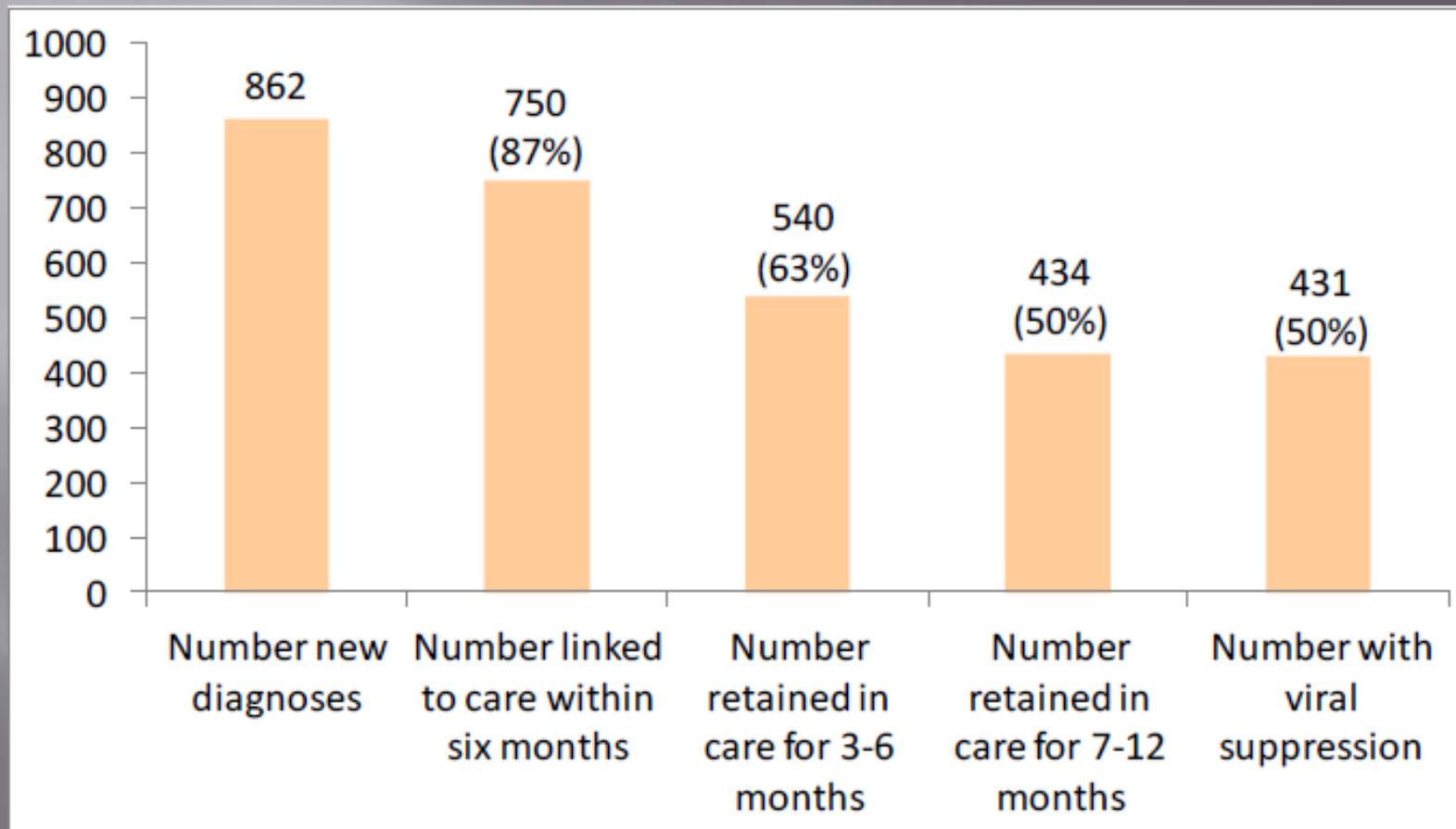
Linkage, Access, ART Use and Viral Suppression in Four Large Cities in the United States, 2009

Figure 1: Percentage of estimated number of HIV-infected persons* in stages of continuum of HIV care in four large United States cities through December 2009



* Includes people diagnosed with HIV in 2008 and living with HIV through 2009 and an estimated additional 20% who are unaware of their infection.

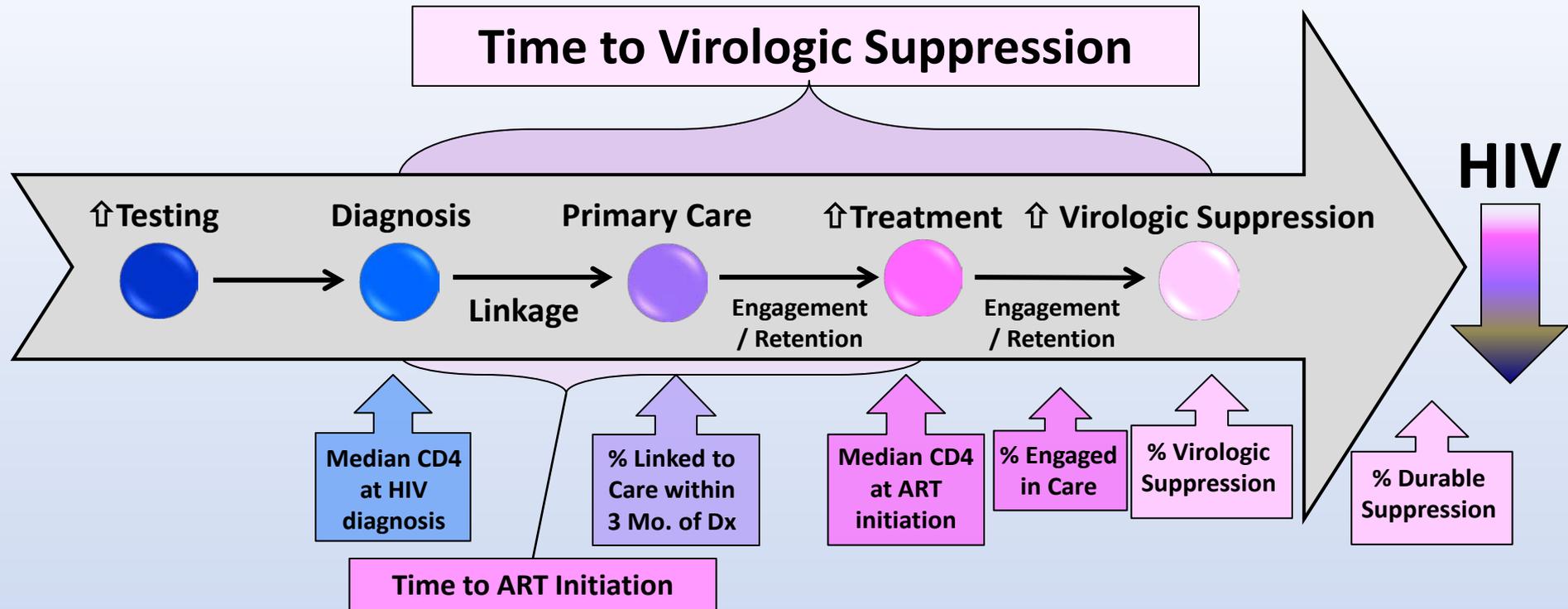
Spectrum of engagement in care among people diagnosed with HIV, 2009-2010, San Francisco



Spectrum of Engagement in Care HIV diagnosed 2009-2010

Outcome	Groups where outcome was less frequent
Linked to care within 6 months	<ul style="list-style-type: none">•MSM IDU•Persons unknown transmission risk•No health insurance•Housing status unknown
Retained in care at 3 to 6 months	<ul style="list-style-type: none">•Unknown insurance status
Virus suppressed (≤ 200 copies/ml) within 12 months	<ul style="list-style-type: none">•Younger age groups•MSM IDU•Persons unknown transmission risk•No health insurance or unknown status•Homeless or unknown housing status

Using San Francisco's Surveillance Data to Evaluate Our Continuum of Prevention, Care and Treatment



**Community Viral Load: Unified
Marker of Prevention and Treatment**

Definition of CVL

Aggregate biomarker of a community's viral burden over a specific time period

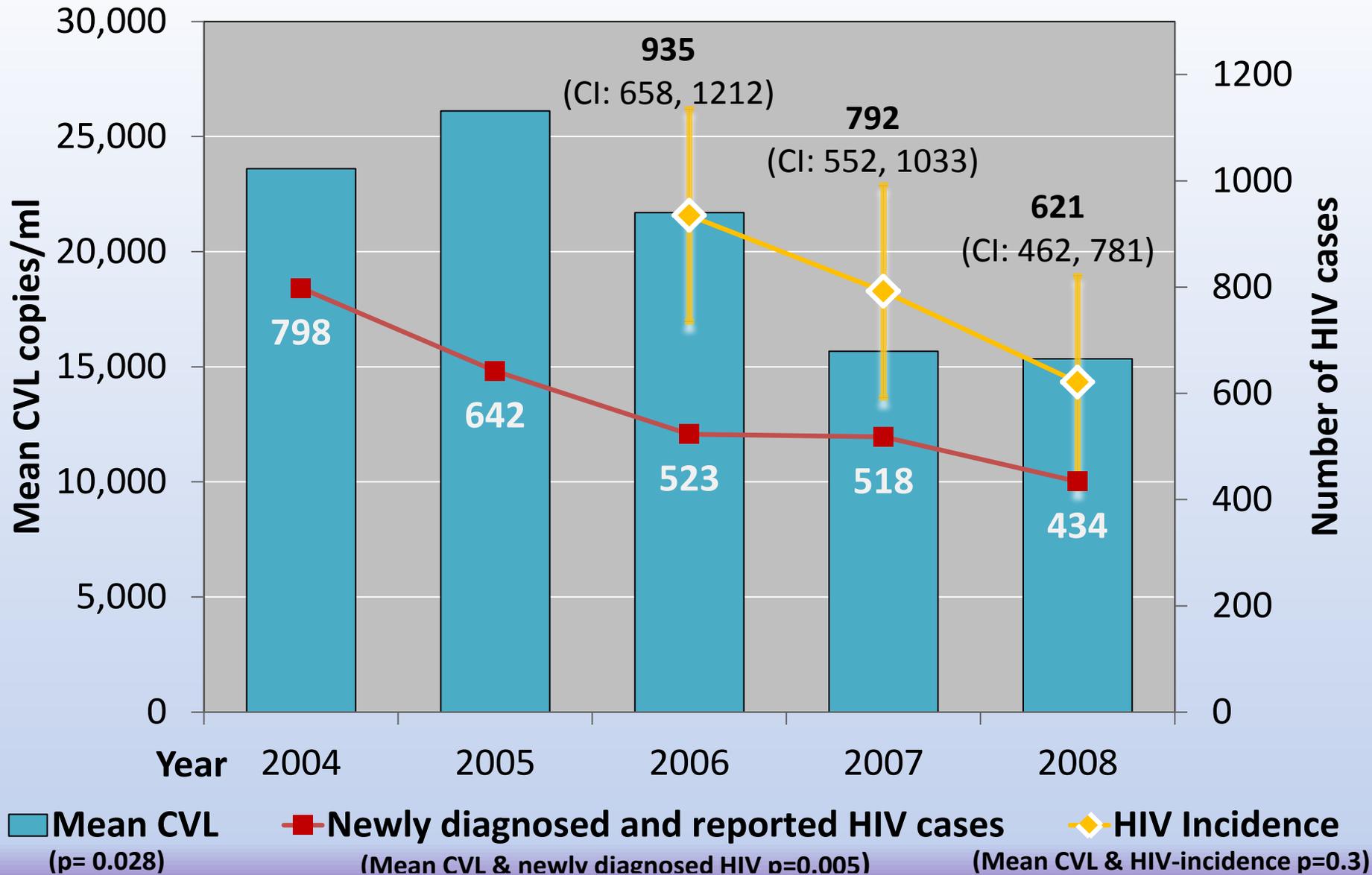
1. Indicator of a community's level of infectiousness or viral burden and transmission probability
2. Measure of the effectiveness of combination HIV prevention care and treatment interventions
3. Proximal marker for HIV incidence and potential epidemic propagation.

CVL Disparities, SF 2004-2008

Overall	N	(%)	Mean CVL*
San Francisco	12,512	(100)	23,348
Sub-groups	N	(%)	Mean CVL*
Latino	1822	(15)	26,744
African-American	1825	(15)	26,404
Women	786	(6)	27,614
Transgender	291	(2)	64,160
IDU	1011	(8)	33,245
MSM-IDU	1791	(14)	36,261
Not on treatment	2924	(23)	40,056
Not engaged in care	4637	(37)	36,992

*(p<0.001 by Kruskal-Wallis test) in mean CVL by treatment history, race/ethnicity, age, gender, HIV transmission risk category, insurance status, and clinical status.

Mean CVL and New HIV Infections, 2004-2008



Community Viral Load Disparities

Figure 1: Spatial Distribution of Mean CVL in San Francisco, 2004-08

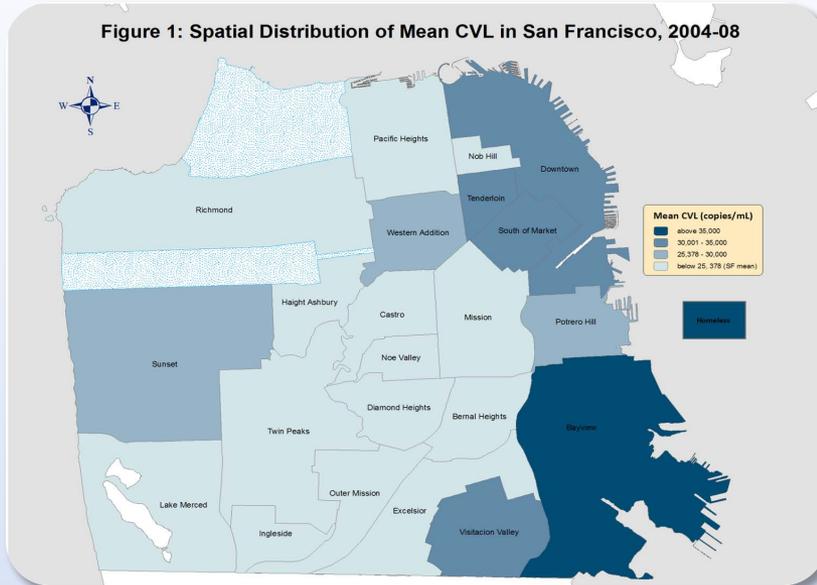


Figure 3: Spatial Distribution of Poverty in San Francisco, 2000

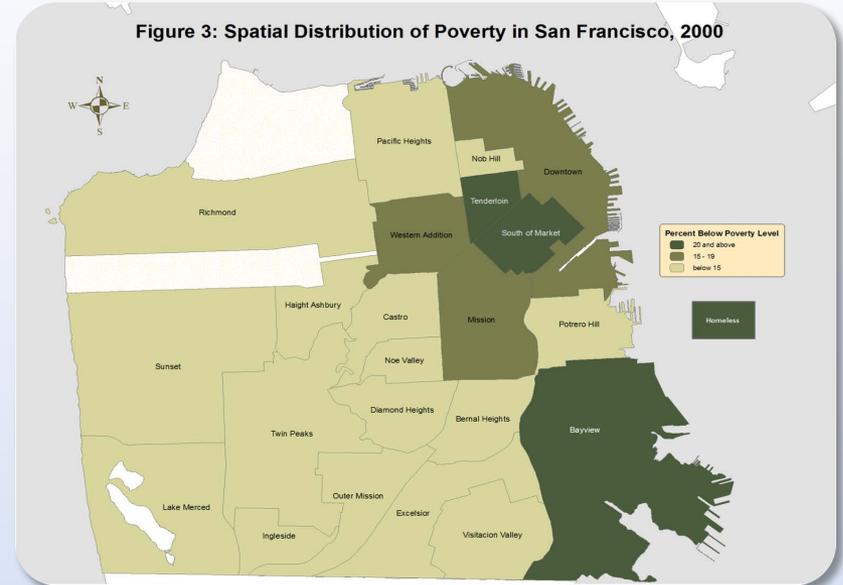
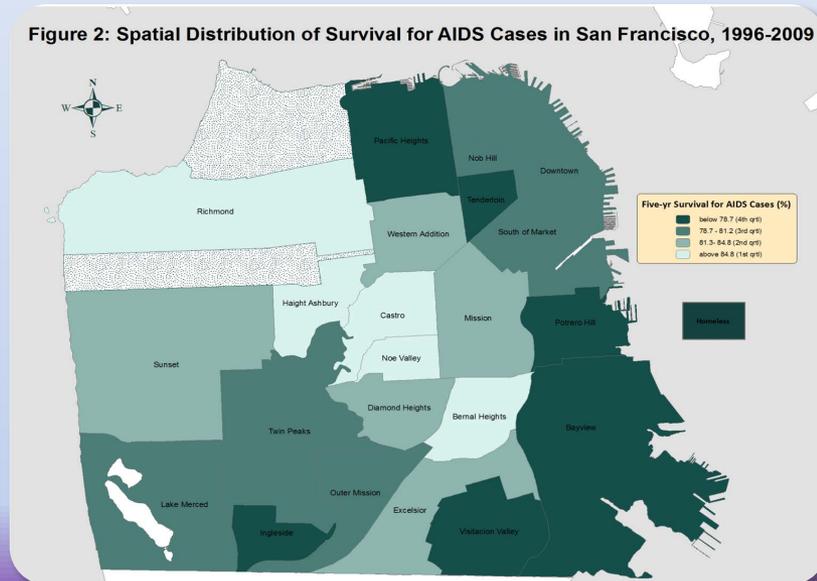


Figure 2: Spatial Distribution of Survival for AIDS Cases in San Francisco, 1996-2009



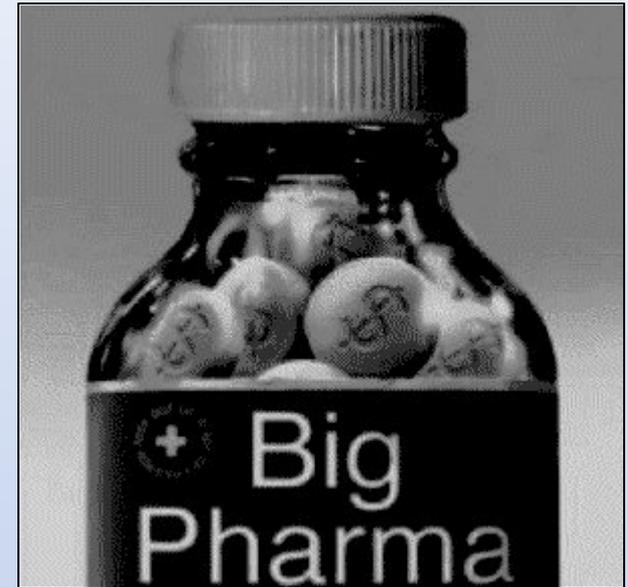
- Even in relatively richly-resourced San Francisco, disparities in CVL track with poor 5-year survival and neighborhood concentration of poverty
- CVL may be a useful marker for public health departments to target resources and address geographic disparities in HIV transmission and survival

UNCERTAINTIES, CONCERNS, LIMITATIONS

“Test & Treat,” or “High-Impact Combination Prevention,” or the “Medical Model”...

POZ

“Medical Ethics and the Rights of People with HIV Under Assault”
by Sean Strub



“Going too far to battle AIDS? Drug experiment on blacks looms in Washington, D.C.” by Terry Michael, *Washington Post*, March 17 2010

**“Si-w bay medikaman san manje,
se lave men, siye até”**



**“Giving drugs without food is
like washing your hands and
drying them in the dirt.”**

Patient Care is More than ART Provision

- Primary care provider (NP, Int Med, FP, ID/HIV)
- Social workers
 - Screening and referral for substance use or mental health concerns (HIV Specialty Psychiatry/Psychology)
 - Housing, disability, benefits (including ADAP enrollment)
- **Pharmacist lead ART adherence program**
 - 1:1 assessments of barriers, education, medicine reviews, ongoing monitoring
- Patient education program and support groups
- **Linkage to care/retention support team (PHAST)**
- *Could not be done without political will → Healthy SF covers undocumented; System of Prevention*

Simply Testing and Treating will not eliminate the epidemic...

- Risk Behavior
- Adherence
- **Resistance**
- Social Justice
- Health Equity
- Co-morbidities
- Competing Priorities

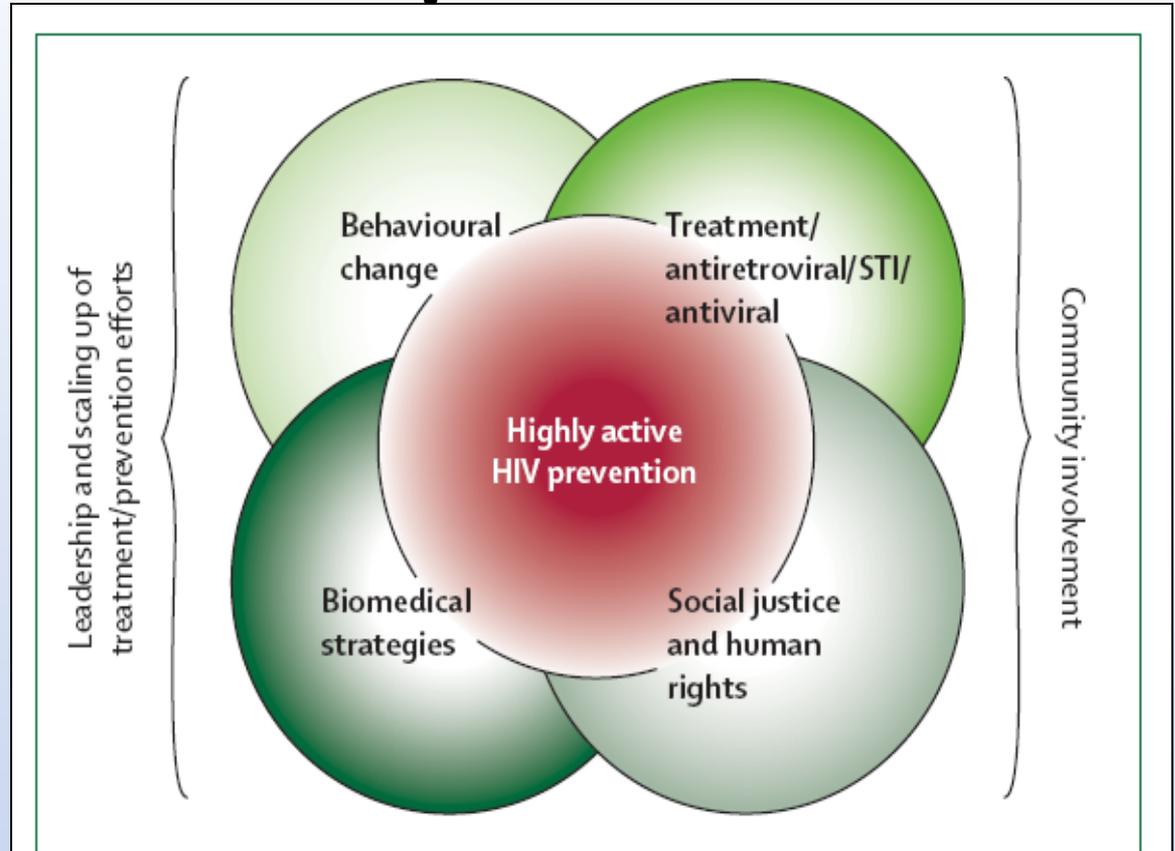


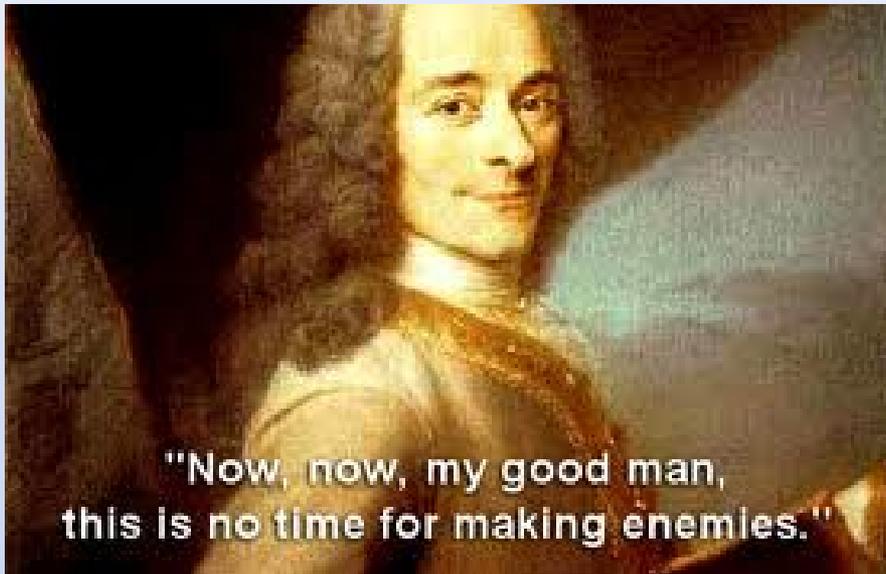
Figure 1: Highly active HIV prevention

This term was coined by Prof K Holmes, University of Washington School of Medicine, Seattle, WA, USA.⁵ STI=sexually transmitted infections.

Let Not the Perfect Be the Enemy of the Good!

“The perfect is the enemy of the good.”

–Voltaire, 1772



THE WAY FORWARD



"We do the best we can with what we know, and when we know better, we do better" - Maya Angelou



“It would be an extraordinary failure of global will and conscience if financial constraints and false dichotomies truncated our ability to begin to end AIDS just when the science is showing that this goal is achievable.”

-Diane Havlir and Chris Beyrer, AIDS 2012

Acknowledgments

People living with HIV/AIDS in San Francisco



SFDPH

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