

AIDS in America

Youth HIV Rate High, Testing Low, CDC Says

This report is part of a 12-month Clinical Context series.

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By Michael Smith, North American Correspondent, MedPage Today

Published: November 27, 2012

Reviewed by Dori F. Zaleznik, MD; Associate Clinical Professor of Medicine, Harvard Medical School, Boston

Youths ages 13 through 24 accounted for more than a quarter of new HIV infections in 2010 in the U.S. – about 12,000 cases – but only a third of that age group had ever been tested for the virus, the CDC reported.

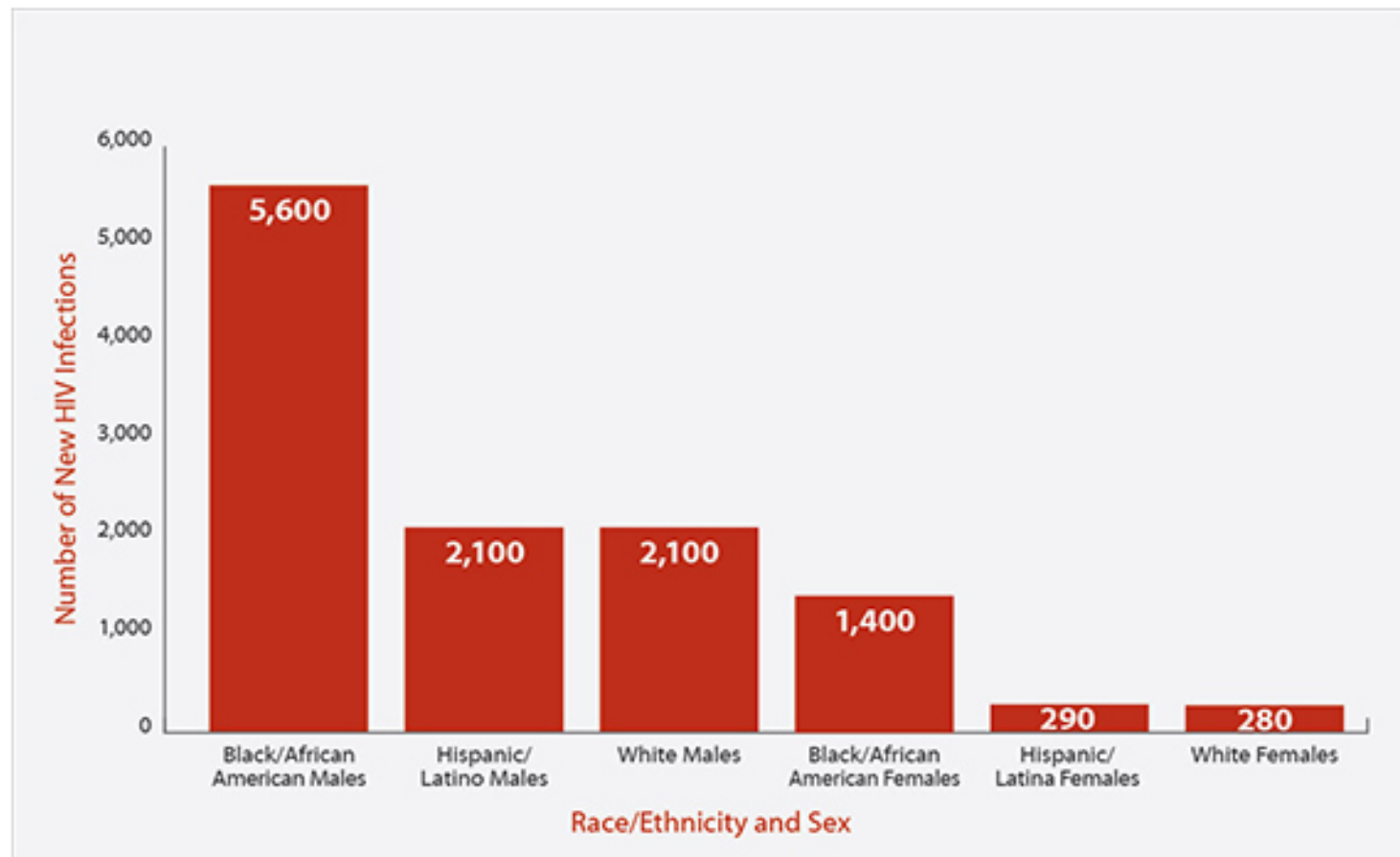
Noting that the lifetime cost of care for a person with HIV is about \$400,000, he said: "Every month we are accruing about \$400 million of healthcare costs – and every year \$5 billion – from preventable infections in youth."

Among newly infected youth, 57.4% were African American, 19.6% were Hispanics, and 19.5% were white.

Male-to-male sexual contact accounted for 72.1% of infections, while 19.8% were because of heterosexual contact. Injection drug use accounted for 4%, and 3.7% of infections were due to a combination of male-to-male sex and injection drug use.

Among males, 87.1% of infections were attributed to male/male sex, while among females, 85.7% were attributed to heterosexual contact.

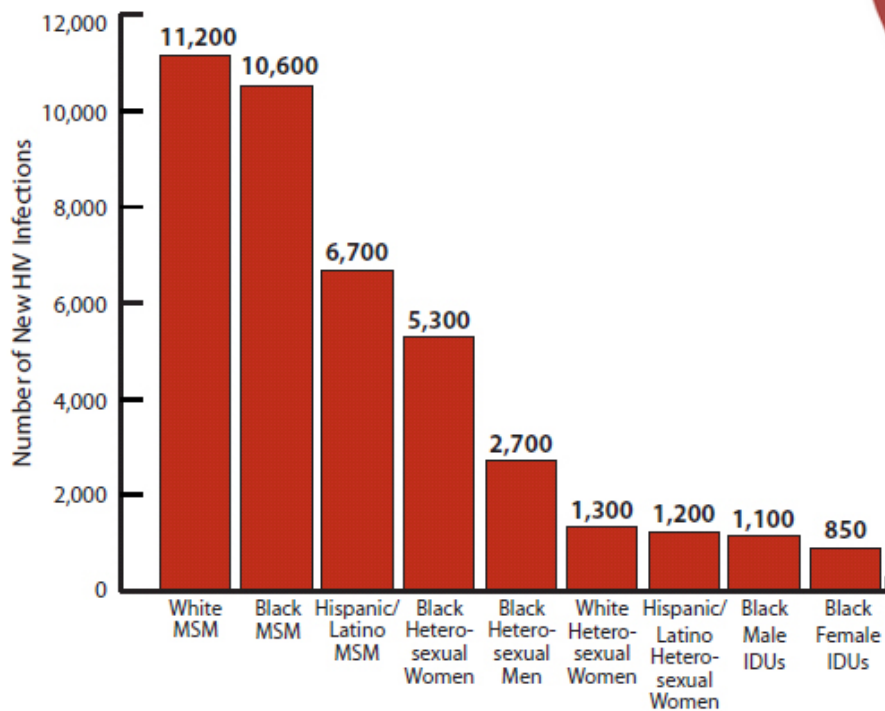
Estimates of New Infections Among Youth Aged 13-24 Years, by Race/Ethnicity and Sex, United States, 2010



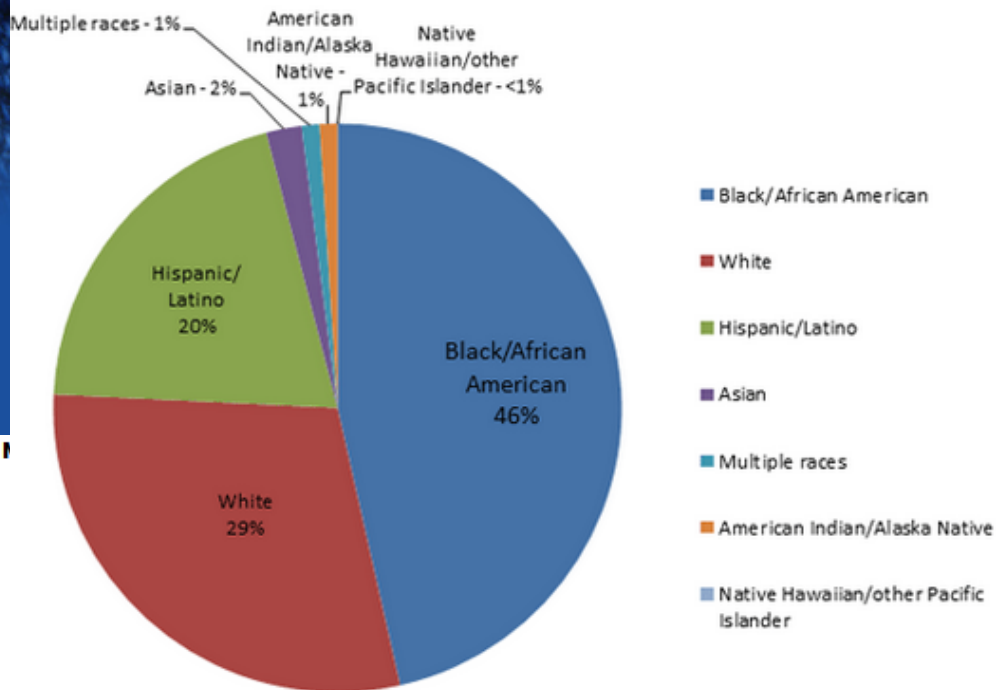
Source: CDC. [Estimated HIV incidence in the United States, 2007-2010](#) . *HIV Surveillance Supplemental Report 2012;17(4).*



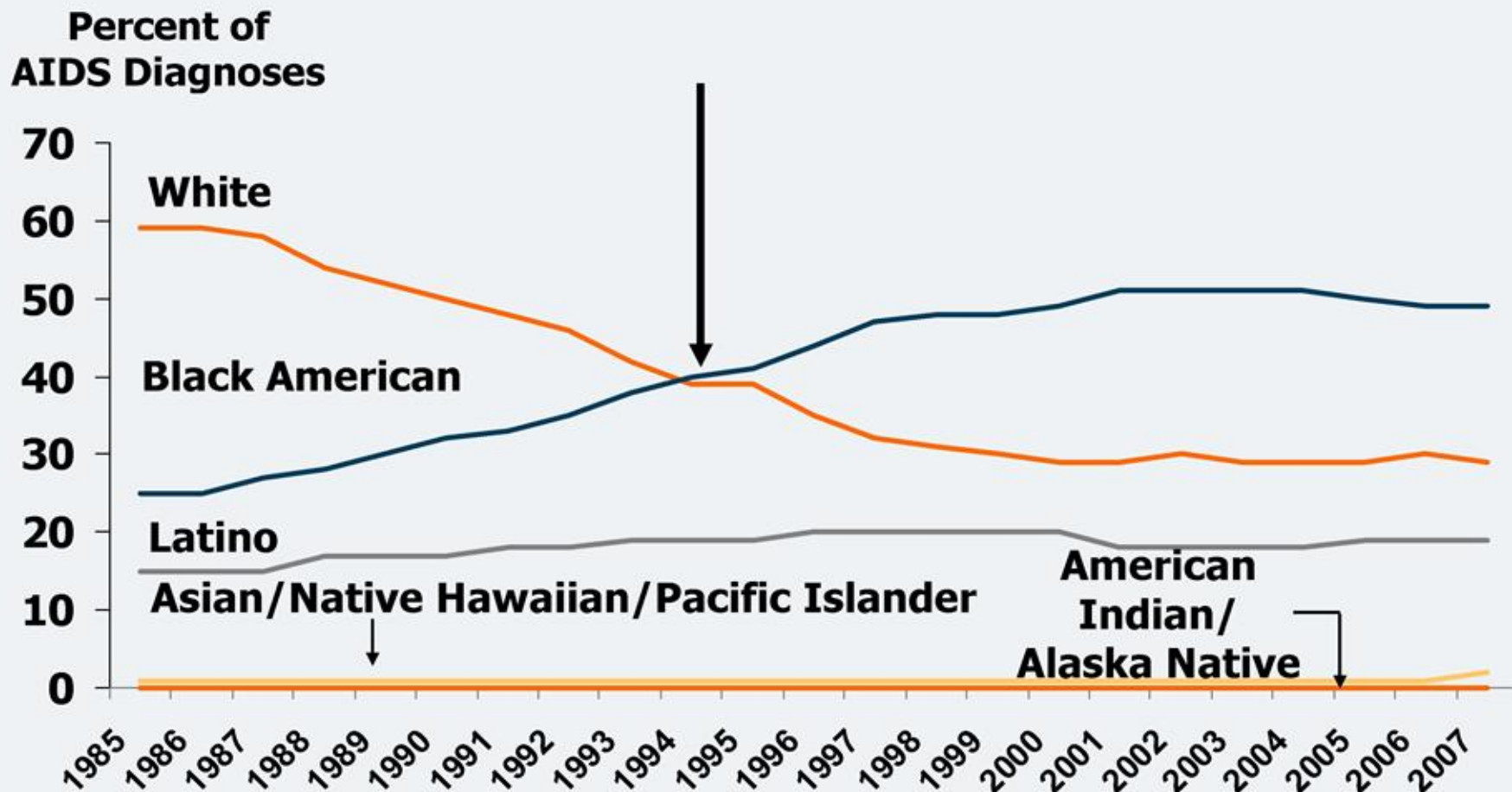
Figure1: Estimated New HIV Infections in the United States, 2010, for the 10 Subpopulations



Diagnosis of HIV Infection by Race/Ethnicity, 2010 -- 46 States



Proportion of AIDS Cases, by Race/Ethnicity, United States, 1985-2007



NOTE: Data are estimates and represent AIDS diagnoses by year.

SOURCE: Kaiser Family Foundation, based on CDC, Data Request, 2006; CDC, *HIV/AIDS Surveillance Report*, Vol. 19, 2009.

Factors Influencing HIV/AIDS Epidemic: Poverty

HIV and Hepatitis.com Coverage of the

XVIII International AIDS Conference (AIDS 2010)

July 18 - 23, 2010, Vienna, Austria

CDC Study Reveals High HIV Infection Rates Linked to Poverty More Than Race

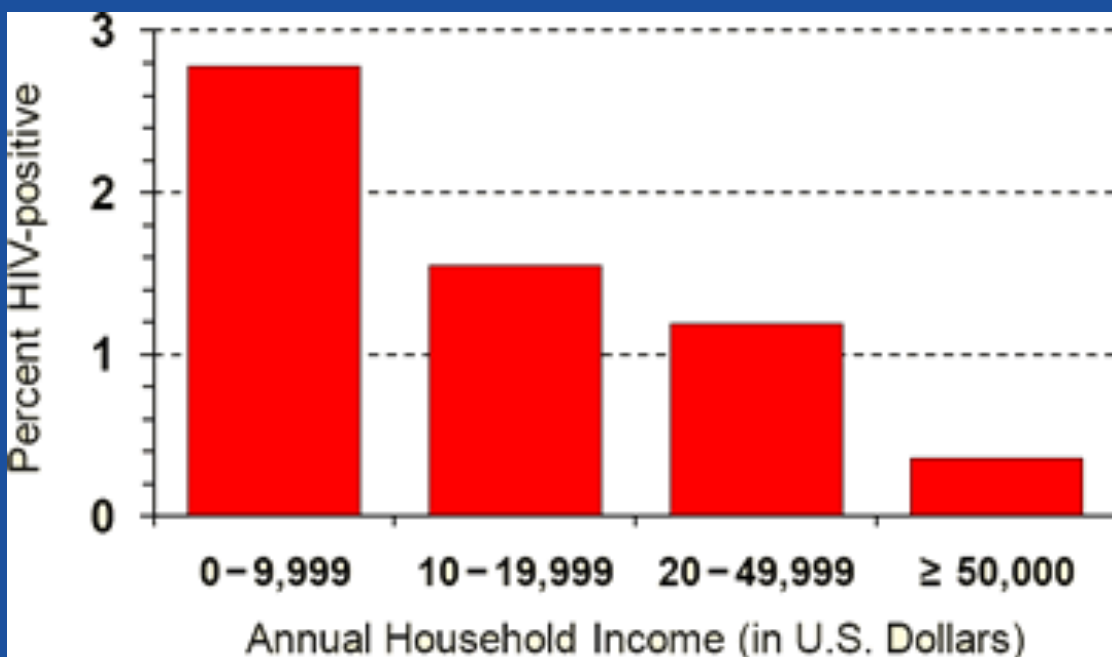
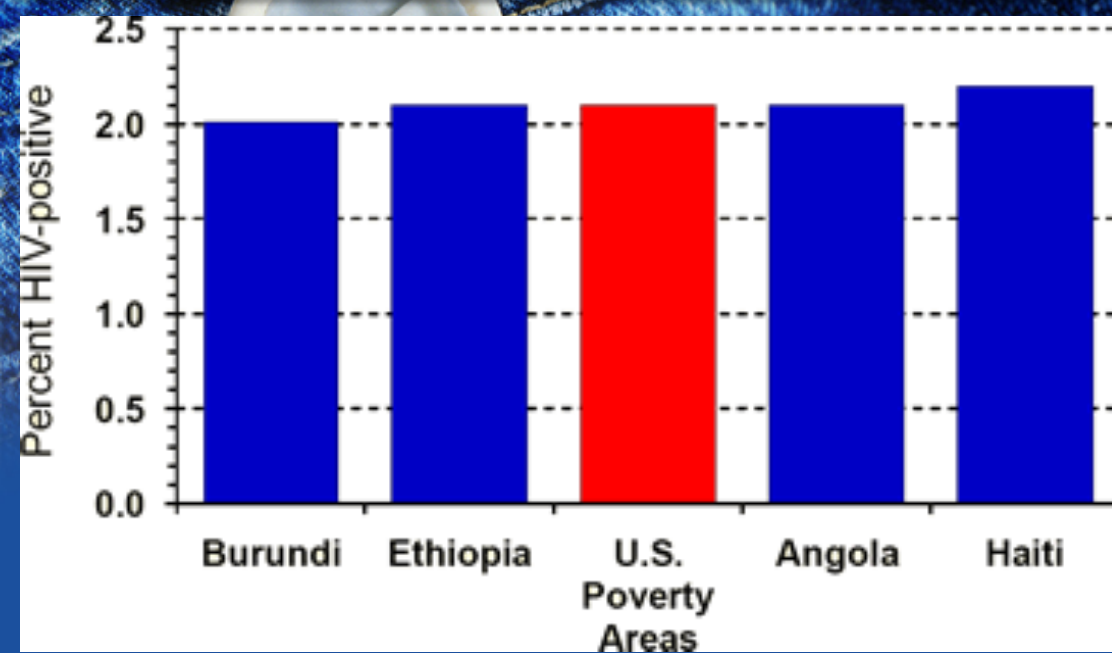
SUMMARY: Local HIV/AIDS epidemics in some large U.S. cities have reached the status of "generalized epidemic," meaning there is significant HIV transmission outside defined risk groups such as gay/bisexual men and injection drug users, researchers

New CDC Analysis Reveals Strong Link Between Poverty and HIV Infection

New Study in Low-Income Heterosexuals in America's Inner Cities Reveals High HIV Rates

Vienna, Austria -- July 19, 2010 -- The Centers for Disease Control and Prevention today released a first-of-its-kind analysis showing that 2.1 percent of heterosexuals living in high-poverty urban areas in the United States are infected with HIV. This analysis suggests that many low-income cities across the United States now have generalized HIV epidemics as defined by the United Nations Joint Program on HIV/AIDS (UNAIDS).

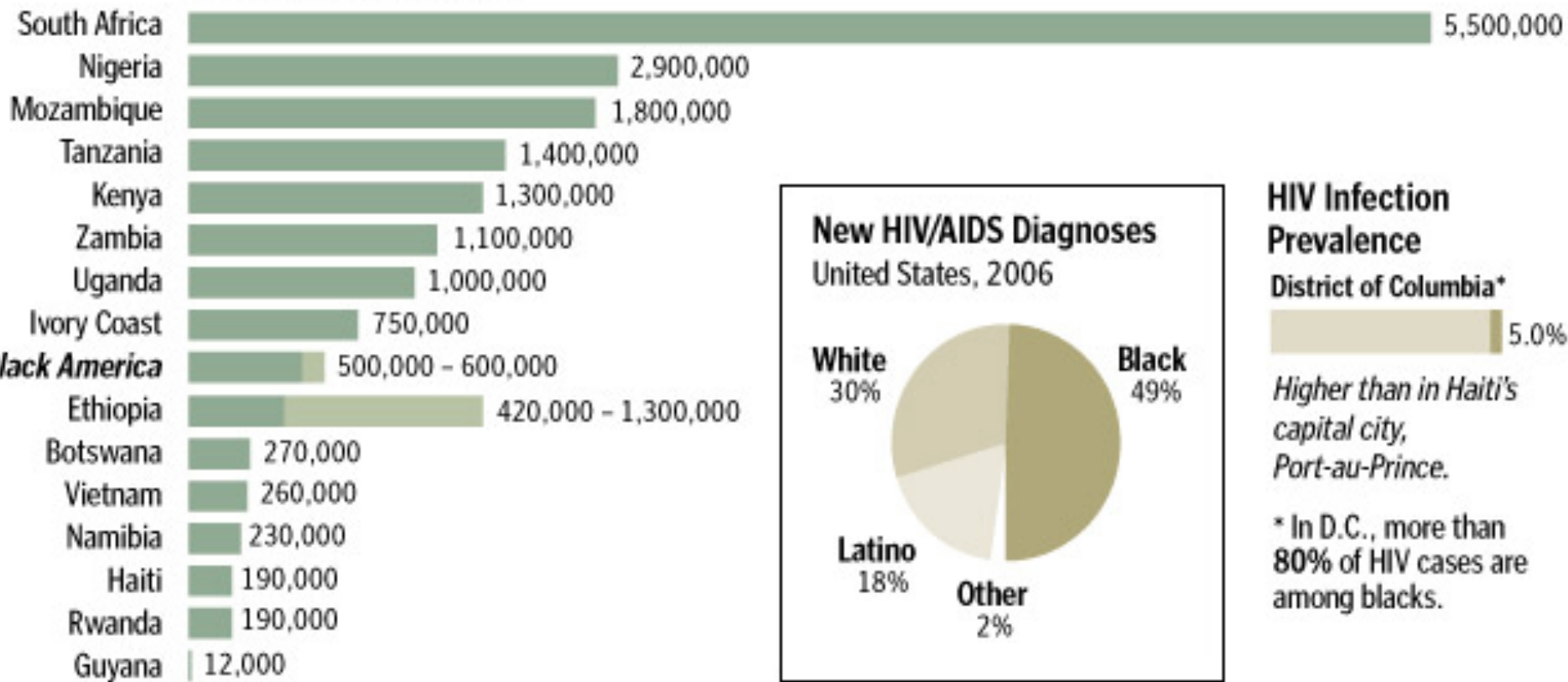
HIV Prevalence Rate by Country & US Poverty Areas



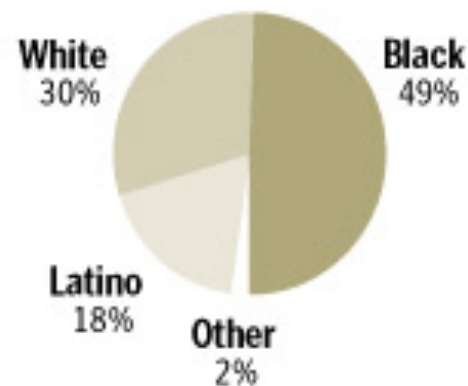
- **Northeastern Region:** Boston, Nassau/Suffolk Counties, New Haven, New York City, Newark, and Philadelphia.
- **Southern Region:** Atlanta, Baltimore, Dallas, Fort Lauderdale, Houston, Miami, New Orleans, and Washington, DC.
- **Midwestern Region:** Chicago, Detroit, and St. Louis.
- **Western Region:** Denver, Las Vegas, Los Angeles, San Diego, San Francisco, and Seattle.

HIV/AIDS in Black America

HIV-infected population



New HIV/AIDS Diagnoses United States, 2006



HIV Infection Prevalence

District of Columbia*



*Higher than in Haiti's
capital city,
Port-au-Prince.*

* In D.C., more than
80% of HIV cases are
among blacks.

HIV/AIDS in Black America

New HIV Infections



U.S. Population



2% American Indian/
1% Alaska Native 1%

AIDS in African Americans

- ❑ 1999-2006 data from a national household survey found that 2% of Blacks in the U.S. (aged 18–49) were HIV positive (whites 0.23%).
- ❑ **AIDS is the leading cause of death among Black women ages 25-34**
- ❑ The number of Black Americans living with AIDS increased by 27% between 2002 and 2006 (19% increase among whites)
- ❑ Black women accounted for 61% of new HIV infections among women in 2006 nearly 15 times the rate among white women
- ❑ Although Black teens (aged 13–19) represent only 16% of U.S. teenagers, they account for 69% of new AIDS cases reported among teens in 2006

Why is the AIDS Problem so Grave in Black America?

- ☐ Ignorance
- ☐ Government Failure – incarceration and homosexual activity; No condoms in prison; opposition of Federal funds on needle exchange programs
- ☐ Patterns of sexual behavior – multiple sexual relations are 2 X more common among blacks as whites
- ☐ Men on the down-low
- ☐ Failure of leadership in African American communities

Risky Sexual Behavior & HIV

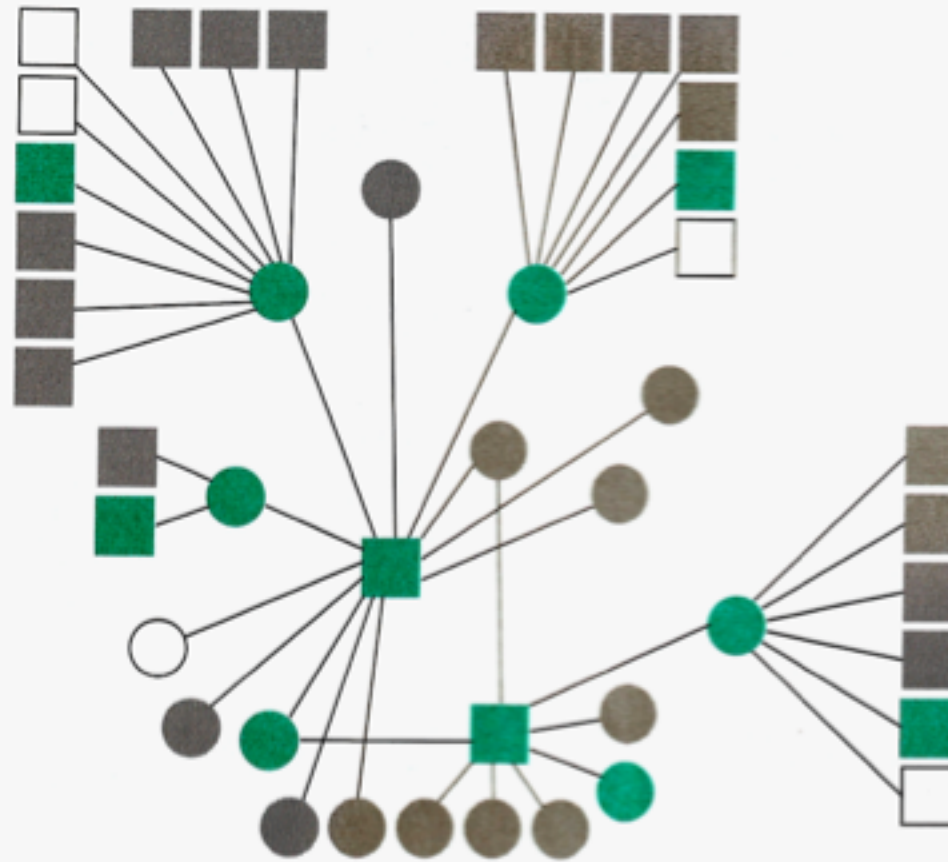
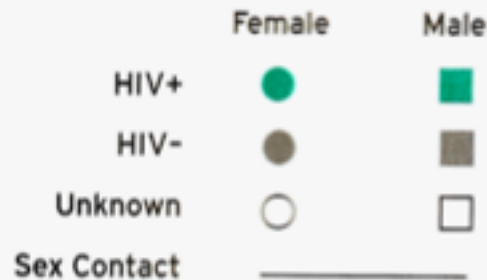


FIGURE 5.8

A diagram of a network of young people in a rural Mississippi town who shared sex partners and spread HIV among the network.

Source: Centers for Disease Control, HIV/AIDS Surveillance Report, 12(1), June 2000.





HIV and African American Gay and Bisexual Men

OF THE 40,324 HIV DIAGNOSES IN THE US AND 6 DEPENDENT AREAS IN 2016:*
10,226 (25%) WERE AMONG AFRICAN AMERICAN GAY AND BISEXUAL MEN

**AFRICAN AMERICAN GAY AND
BISEXUAL MEN MADE UP 38% OF
HIV DIAGNOSES AMONG ALL GAY
AND BISEXUAL MEN**

**3 OUT OF 4 AFRICAN
AMERICAN GAY AND BISEXUAL
MEN WHO RECEIVED AN HIV
DIAGNOSIS WERE AGED 13 - 34**



What places some African American gay and bisexual men at higher risk?

- Many African American gay and bisexual men do not know their HIV status. People who do not know they have HIV cannot get the treatment they need and may pass the infection to others without knowing it.
- African American gay and bisexual men have lower rates of viral suppression compared to gay and bisexual men of other races/ethnicities. Because of the low rates of viral suppression and greater number of people living with HIV in that population, African American gay and bisexual men have a greater chance of coming in contact with HIV.
- Limited access to quality health care, lower income and educational levels, and higher rates of unemployment and incarceration may place some African American gay and bisexual men at higher risk for HIV.
- Stigma, homophobia, and discrimination put gay and bisexual men of all races/ethnicities at risk for many health issues and may affect whether they are able to get quality health care.

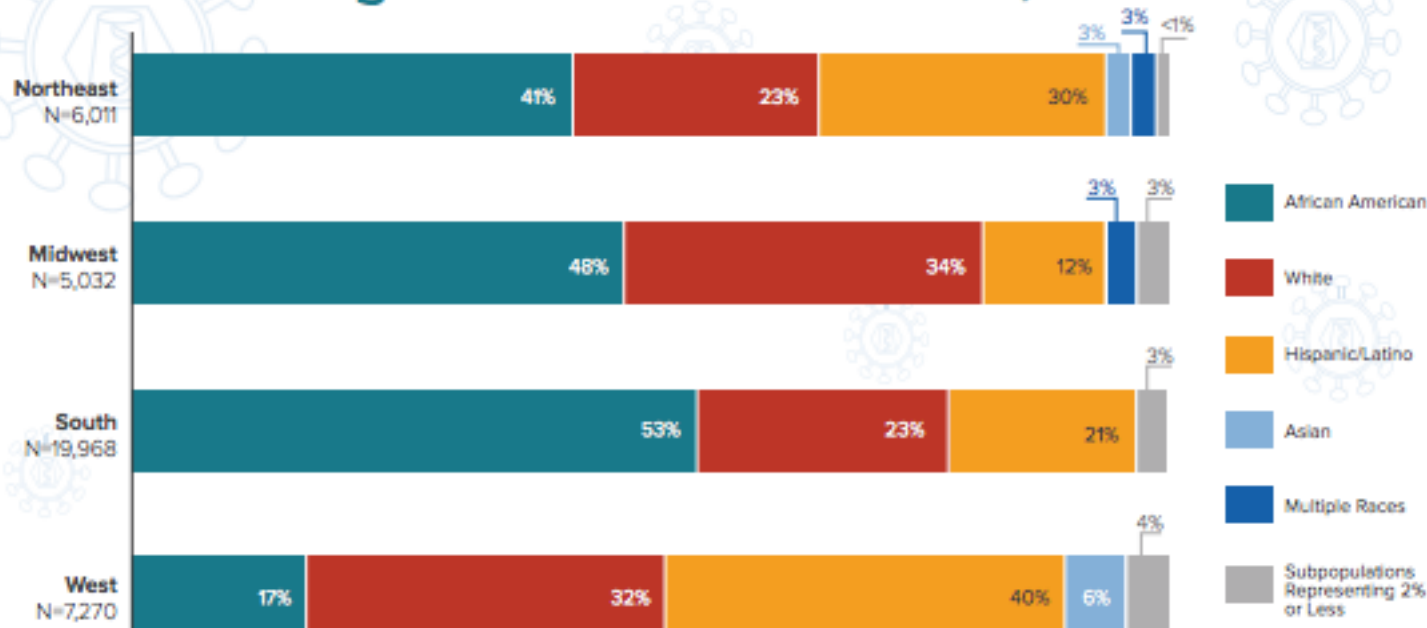
Of the 38,739 new HIV diagnoses in the US* in 2017,
19,968 (52%) were in the South.

From 2012 to 2016, HIV diagnoses remained stable in the US.**

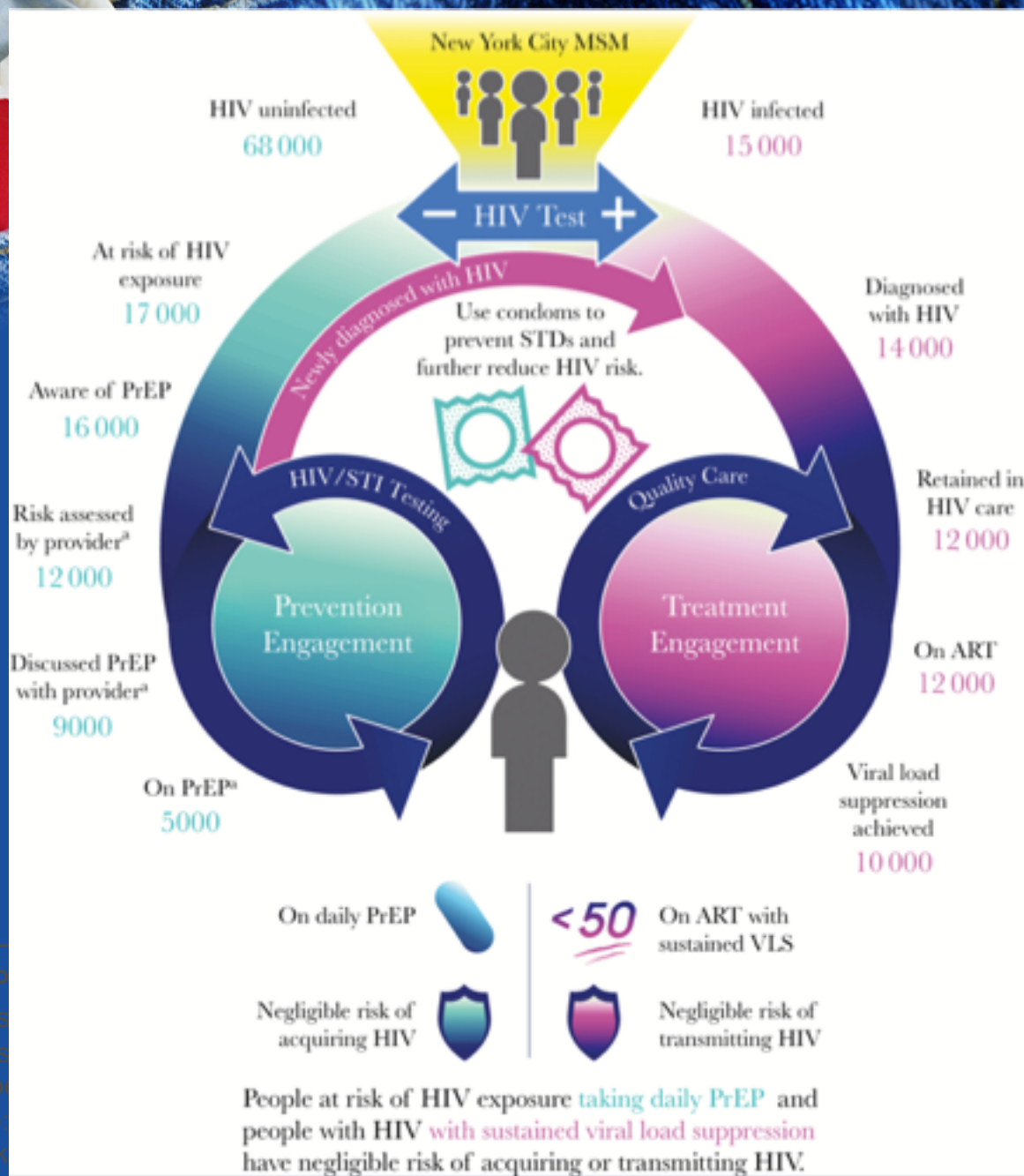


- HIV diagnoses fell 27% in the US dependent areas.
- HIV diagnoses fell 17% in the Northeast.
- HIV diagnoses fell 6% in the Midwest.
- HIV diagnoses remained stable in the South.
- HIV diagnoses remained stable in the West.

New HIV Diagnoses by Race/Ethnicity and Region of Residence in the US, 2017



NYC TREATMENT SUCCESS



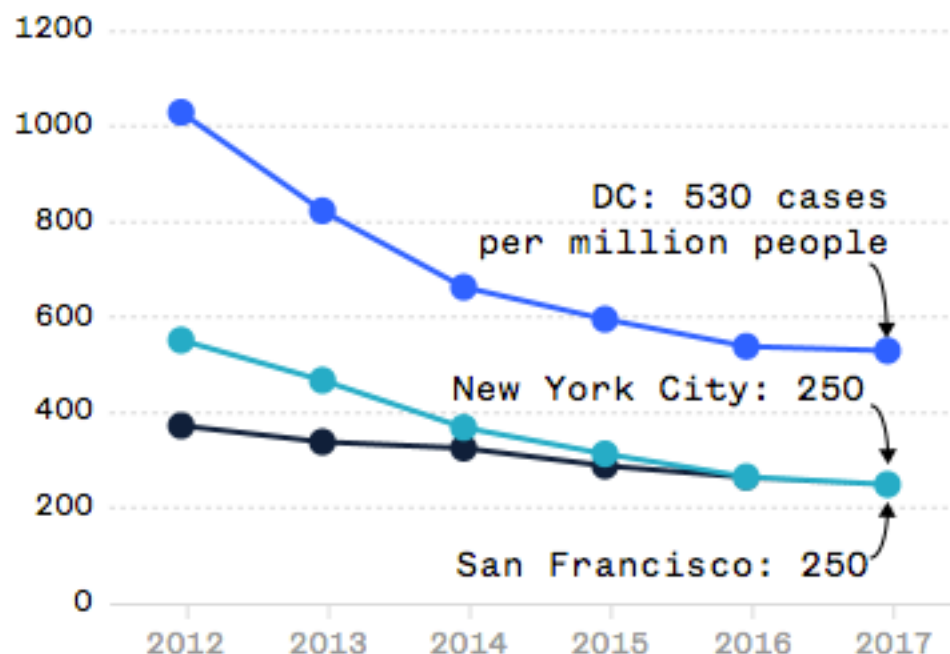
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New HIV diagnoses since the introduction of PrEP (2012)

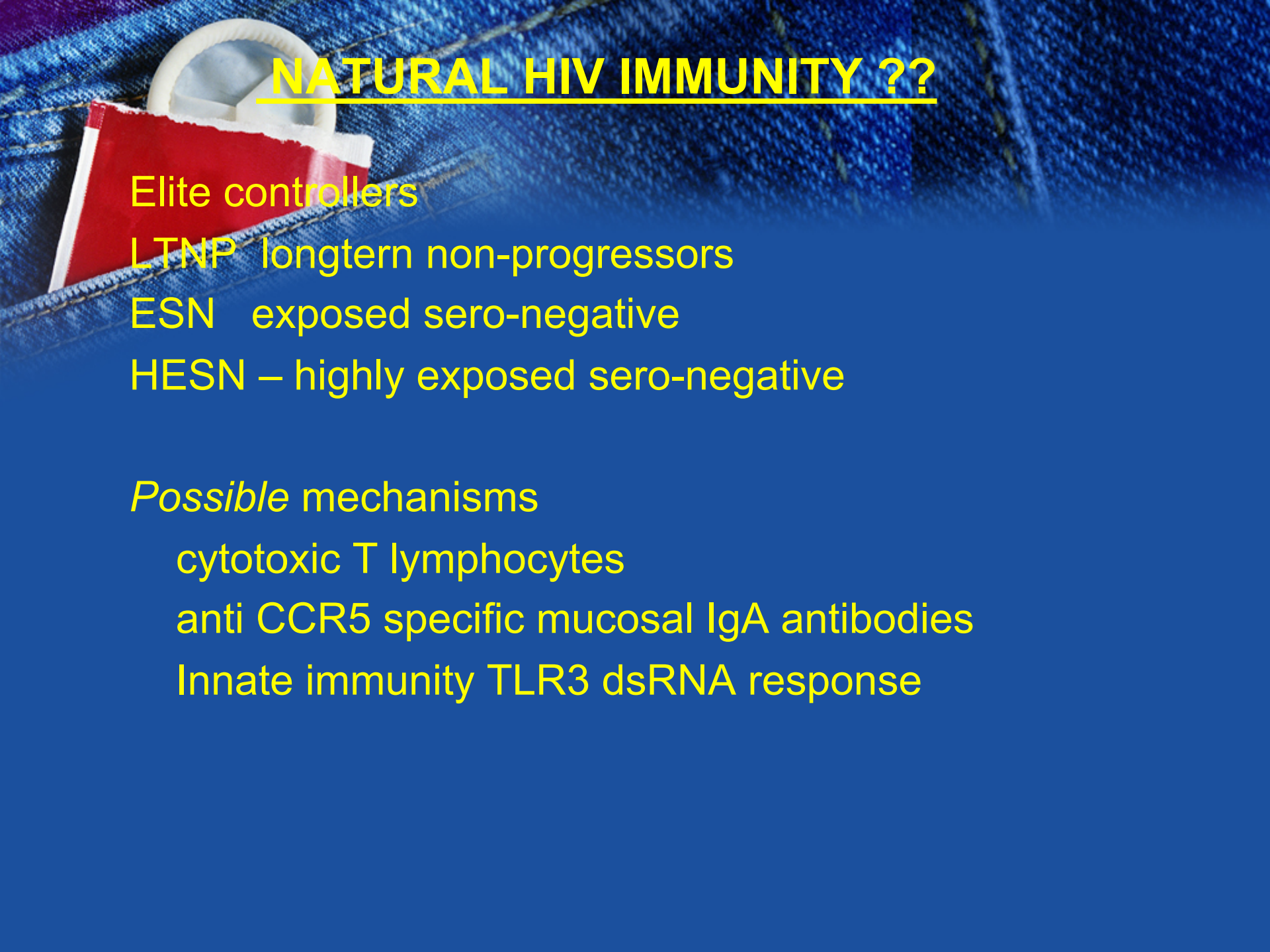
Number of cases per 1,000,000 people

- Washington D.C.
- San Francisco, CA
- New York City, NY



Sources: District of Columbia Department of Health,
New York City Department of Health and Mental
Hygiene, San Francisco Department of Public Health
and Census Bureau

Graphic: Jiachuan Wu / NBC News



NATURAL HIV IMMUNITY ??

Elite controllers

LTNP longterm non-progressors

ESN exposed sero-negative

HESN – highly exposed sero-negative

Possible mechanisms

cytotoxic T lymphocytes

anti CCR5 specific mucosal IgA antibodies

Innate immunity TLR3 dsRNA response

Post treatment Controllers



- **Post treatment controller**
- Reason for ending treatment unknown
- Estimates are 10 - 15 % of those in treatment
- I.E. majority would experience progression increased viral load and CD4 decline if they stopped meds

Bone marrow transplant eliminates HIV traces from two patients' DNA: Call it a cure?



Another study was presented today at AIDS 2012 by Daniel Kuritzkes. They studied the persistence of HIV in two HIV-infected men who underwent allogeneic (foreign) stem cell transplantation for treatment of lymphoma. Both patients had been infected for many years, and had been on antiretroviral therapy that completely suppressed HIV replication, but continued to have detectable latent virus in their circulating lymphocytes prior to transplantation.

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Original Research | 2 September 2014

Antiretroviral-Free HIV-1 Remission and Viral Rebound After Allogeneic Stem Cell Transplantation: Report of 2 Cases

Timothy J. Henrich, MD; Emily Hanhauser, BS; Francisco M. Marty, MD; Michael N. Sirignano, BS; Sheila Keating, PhD; Tzong-Hae Lee, MD, PhD; Yvonne P. Robles, BA; Benjamin T. Davis, MD; Jonathan Z. Li, MD; Andrea Heisey, BS; Alison L. Hill, PhD; Michael P. Busch, MD, PhD; Philippe Armand, MD, PhD; Robert J. Soiffer, MD; Marcus Altfeld, MD, PhD; and Daniel R. Kuritzkes, MD

Post treatment Controllers

PLoS Pathog. 2013 Mar;9(3):e1003211. doi: 10.1371/journal.ppat.1003211. Epub 2013 Mar 14.

Post-treatment HIV-1 controllers with a long-term virological remission after the interruption of early initiated antiretroviral therapy ANRS VISCONTI Study.

Sáez-Cirión A¹, Bacchus C, Hocqueloux L, Avettand-Fenoel V, Girault I, Lecuroux C, Potard V, Versmisse P, Melard A, Prazuck T, Descours B, Guergnon J, Viard JP, Boufassa F, Lambotte O, Goujard C, Meyer L, Costagliola D, Venet A, Pancino G, Autran B, Rouzioux C; ANRS VISCONTI Study Group.

⊕ Author information

Abstract

Combination antiretroviral therapy (cART) reduces HIV-associated morbidities and mortalities but cannot cure the infection. Given the difficulty of eradicating HIV-1, a functional cure for HIV-infected patients appears to be a more reachable short-term goal. We identified 14 HIV patients (post-treatment controllers [PTCs]) whose viremia remained controlled for several years after the interruption of prolonged cART initiated during the primary infection. Most PTCs lacked the protective HLA B alleles that are overrepresented in

Visconti cohort

“Morning after” A.R.T.

then stopped

virus free after several

years

Evolving resistance to retroviral infection

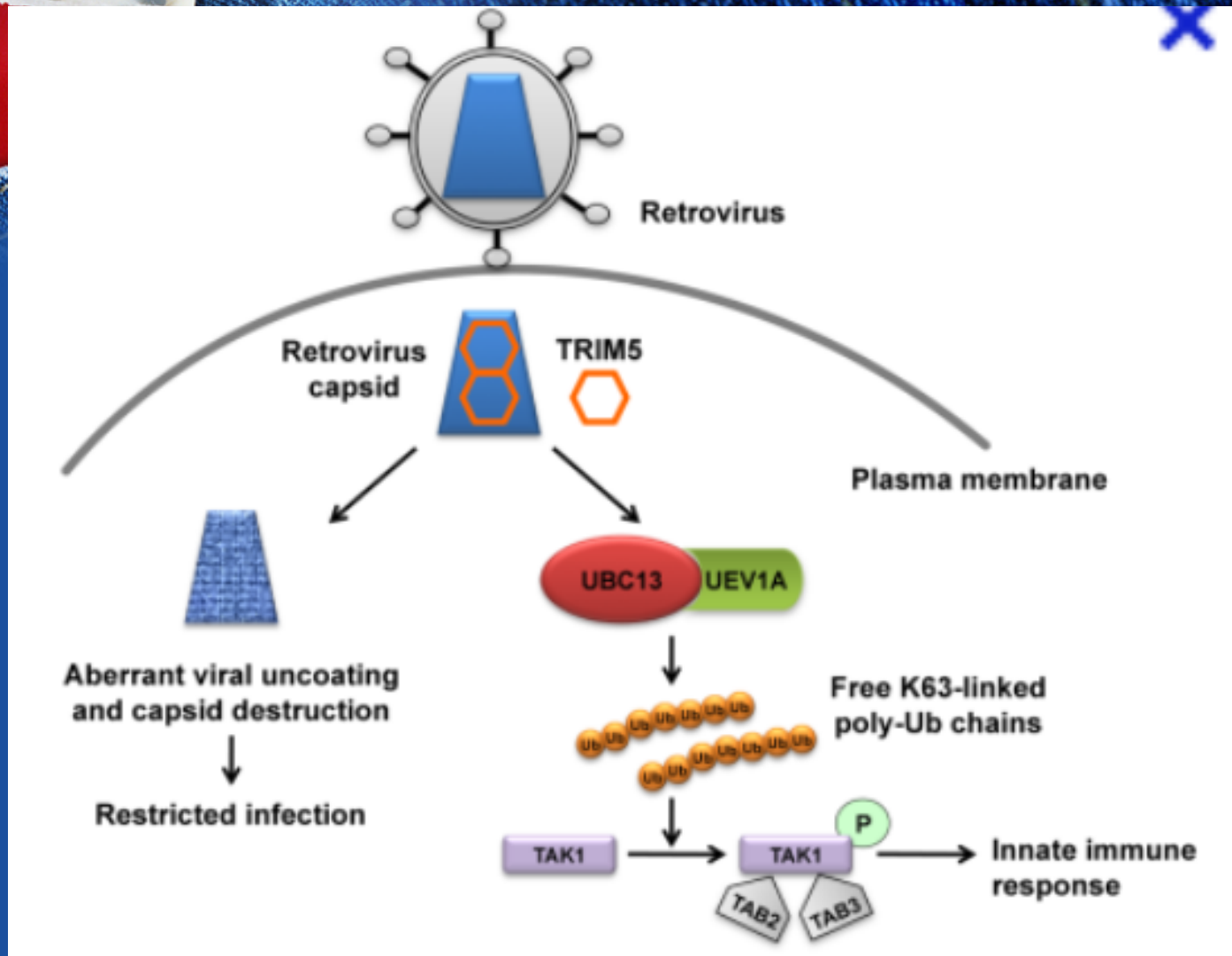
Independent genesis of chimeric TRIM5-cyclophilin proteins in two primate species

Cesar A. Virgen,^{*} Zerina Kratovac,^{*} Paul D. Bieniasz,^{*†‡} and Theodora Hatziioannou^{*‡}

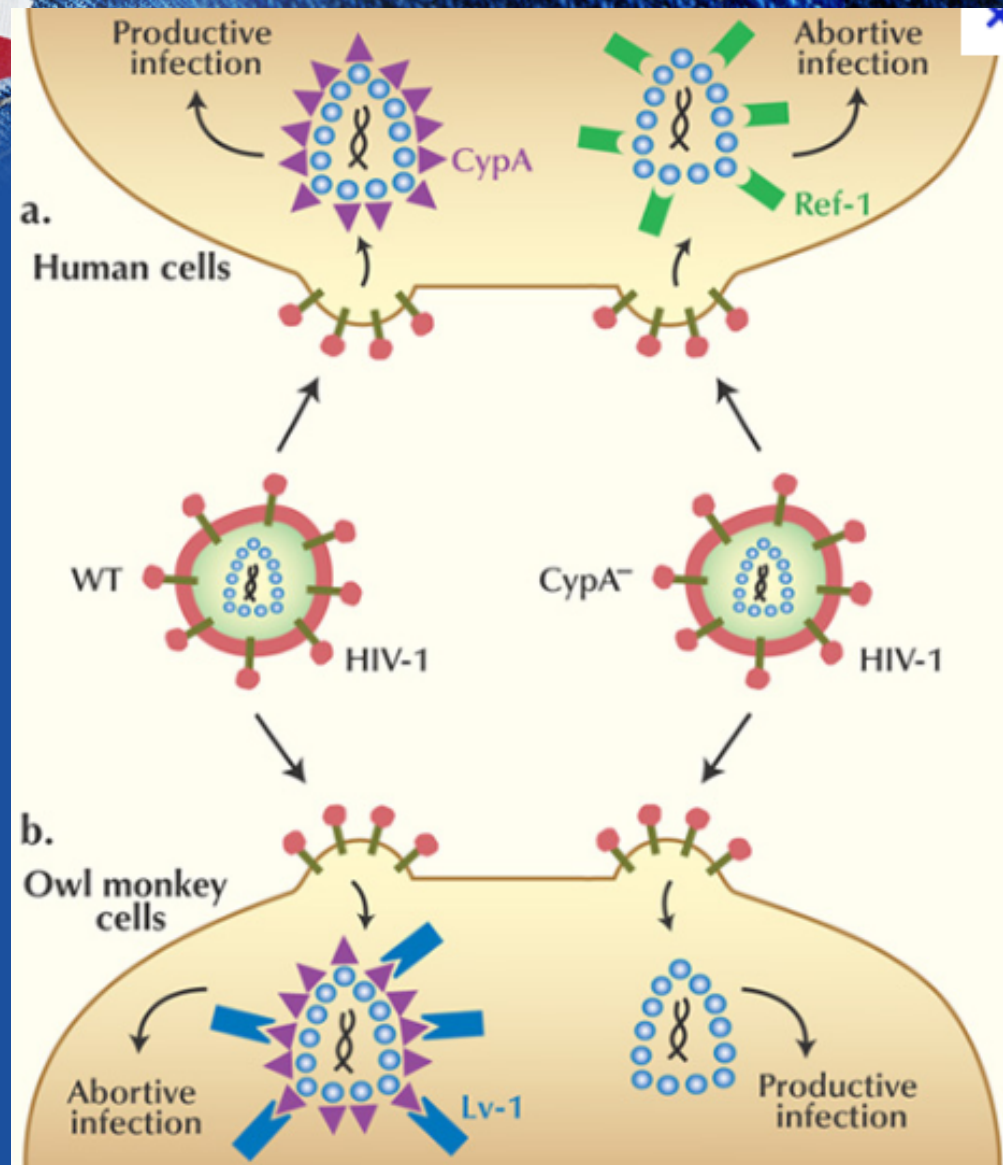
The host range of retroviruses is influenced by antiviral proteins such as TRIM5, a restriction factor that recognizes and inactivates incoming retroviral capsids. Remarkably, in Owl monkeys (omk), a cyclophilin A (CypA) cDNA has been transposed into the TRIM5 locus, resulting in the expression of a TRIM5-CypA fusion protein (TRIMCyp) that restricts retroviral infection based on the retroviral capsid-binding specificity of CypA. Here, we report that the seemingly improbable genesis of TRIMCyp has, in fact, occurred twice, and pigtailed macaques (pgt) express an independently generated TRIMCyp protein. The omkTRIMCyp and pgtTRIMCyp proteins restrict infection by several lentiviruses, but their specificities are distinguishable. Surprisingly, pgtTRIMCyp cannot bind to or restrict HIV-1 capsids as a consequence of a point mutation close to the Cyp:capsid-binding interface that was acquired during or after transposition of pgtCypA. However, the same mutation confers on pgtTRIMCyp the ability to restrict FIV in the presence of cyclosporin A, a drug that normally abolishes the interaction between pgtTRIMCyp or omkTRIMCyp and lentiviral capsids. Overall, an intuitively unlikely evolutionary event has, in fact, occurred at least twice in primates and represents a striking example of convergent evolution in divergent species.

- Independent **new/novel** rearrangement events in different kinds of monkeys lead to retroviral (SIV) restriction

INNATE IMMUNITY: VIRAL RESTRICTION BY TRIM 5



Viral restriction by Cyclophilin A





Stem Cell Therapies

- Berlin Patient - Delta 32 CCR5
- Ex vivo expansion and Stem Cell treatment for CCR5 (somatic therapy)
- Clinical trials on going (production scale ready)2018
- Practicality
- Potential Problems
- Loss of CCR5 associated with brain pathology in West Nile Virus
(need for leukocyte trafficking in the brain)
- CCR5 inhibitors (maraviroc) microglial activation
inflammation, dementia