# ENDING the HIV EPIDEMIC (EtHE)
# Getting to ZERO Through Prevention

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# Financial Disclosures

- None

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# OUTLINE

- Overview
- Ending the HIV Epidemic
  - Undetectable=Untransmittable
  - Pre-exposure Prophylaxis

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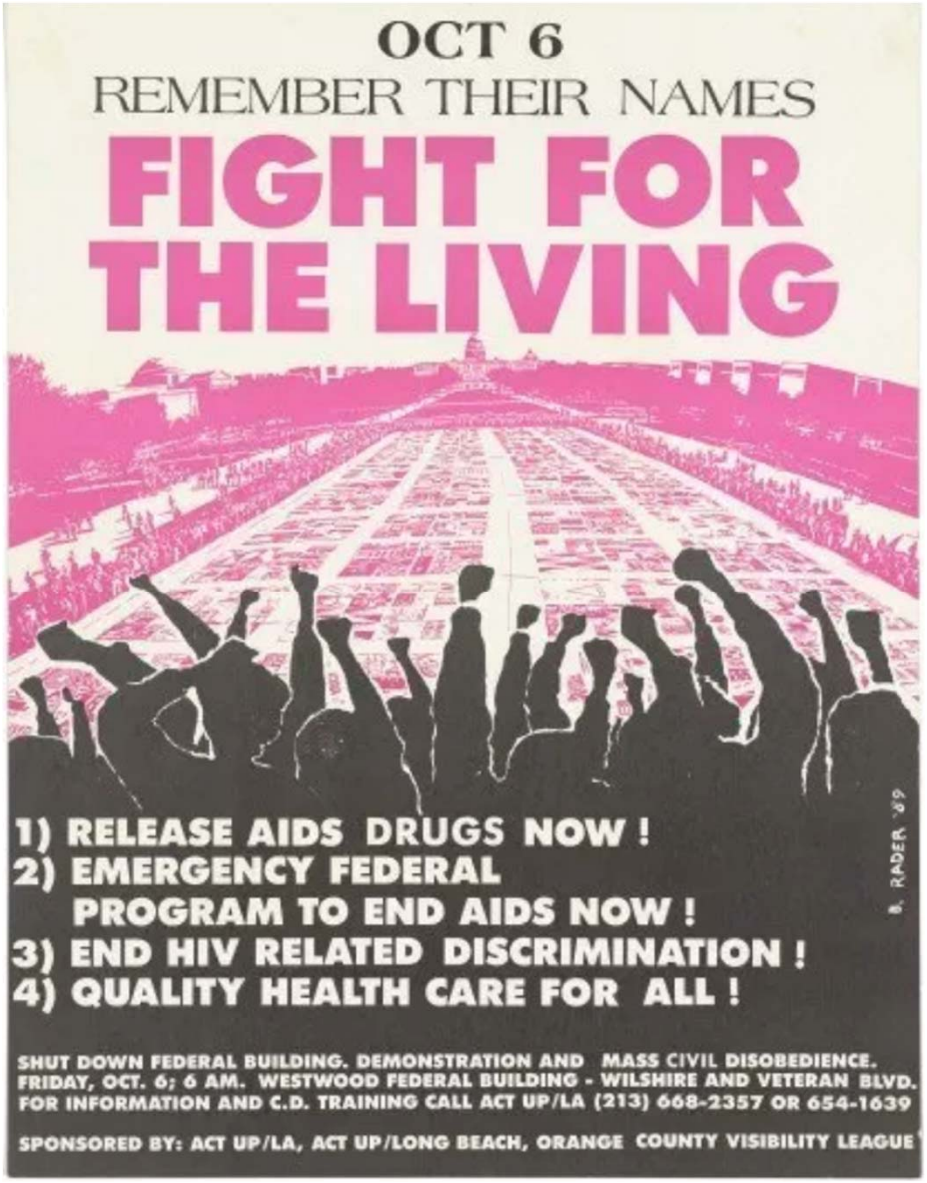


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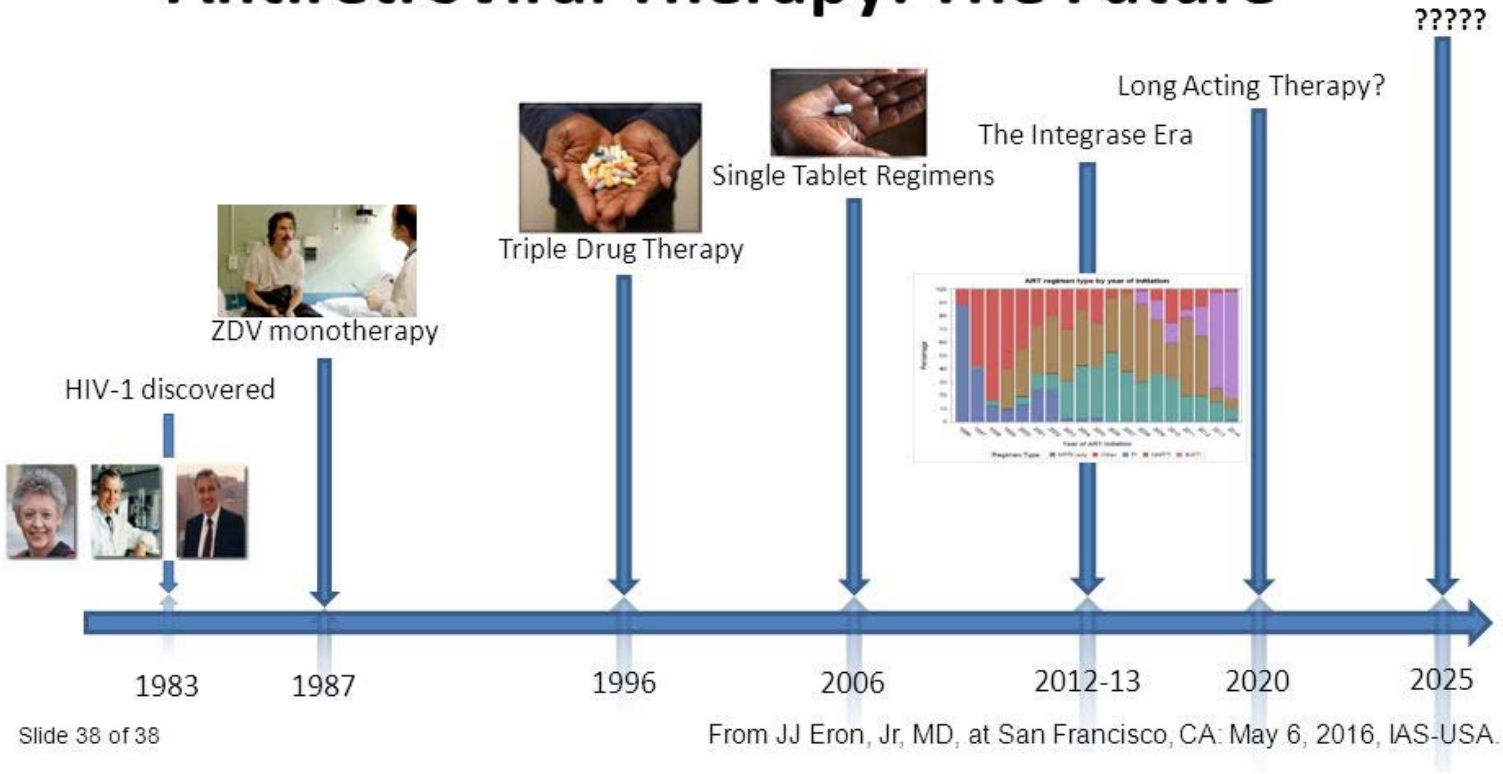
# Antiretroviral Therapy: The Future






From JJ Eron, Jr, MD, at San Francisco, CA: May 6, 2016, IAS-USA.

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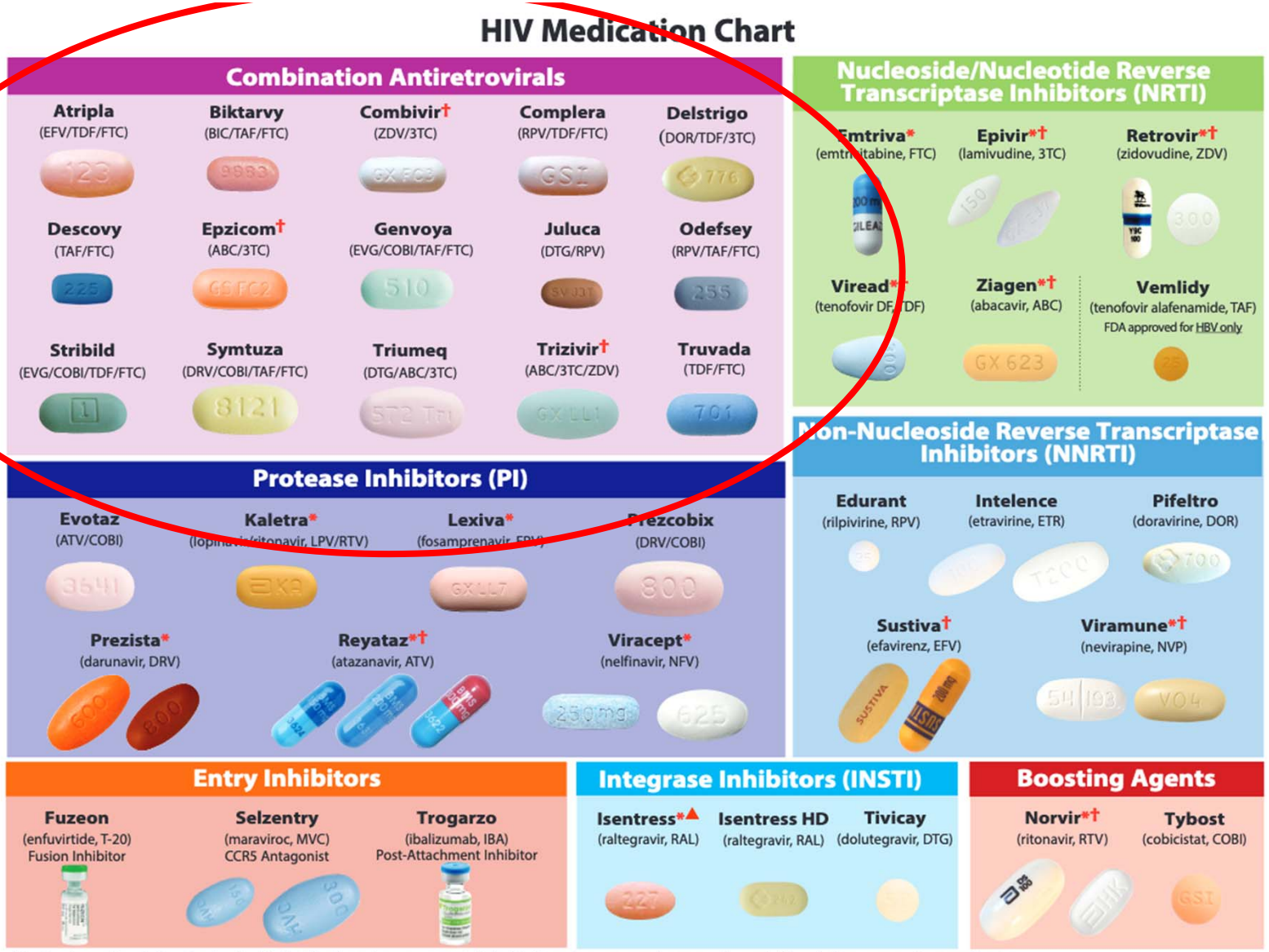
# HIV Medication Chart




All pills shown in relative size/scale. *Medication brand names appear in bold. Generic names and commonly used abbreviations appear in parentheses.*

*Also available in liquid or powder form. †Generic formulation available. ▲Chewable form available.

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# Summary of the global HIV epidemic (2017)

| | People living with HIV in 2017 | People newly infected with HIV in 2017 | HIV-related deaths 2017 |
|---|---|---|---|
| Total | 36.9 million [31.1 million – 43.9 million] | 1.8 million [1.4 million – 2.4 million] | 940 000 [670 000 – 1.3 million] |
| Adults | 35.1 million [29.6 million – 41.7 million] | 1.6 million [1.3 million – 2.1 million] | 830 000 [590 000 – 1.2 million] |
| Women | 18.2 million [15.6 million – 21.4 million] | – | – |
| Men | 16.8 million [13.9 million – 20.4 million] | – | – |
| Children (<15 years) | 1.8 million [1.3 million – 2.4 million] | 180 000 [110 000 – 260 000] | 110 000 [63 000 – 160 000] |

**Source: UNAIDS/WHO estimates**

World Health Organization

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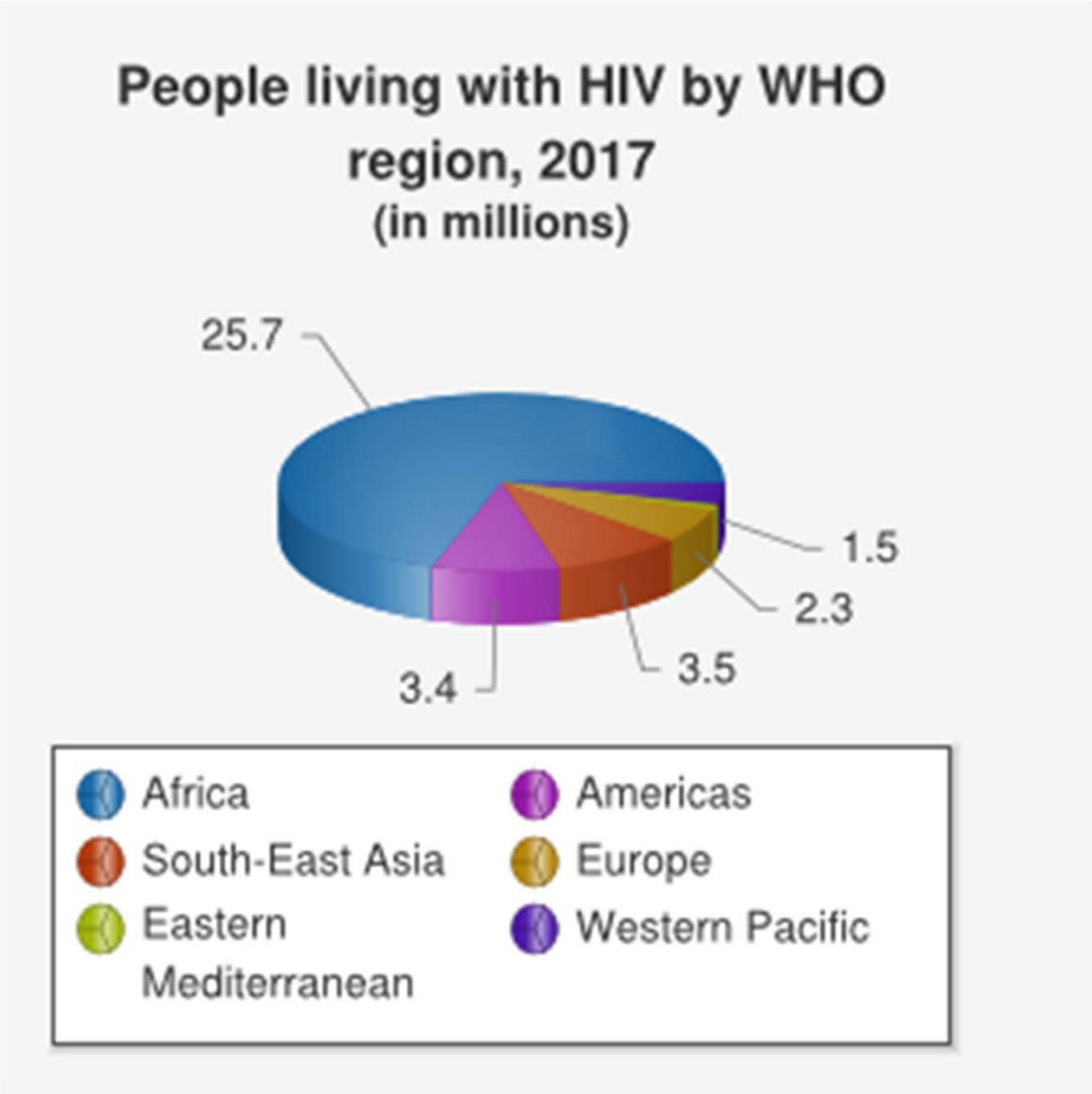


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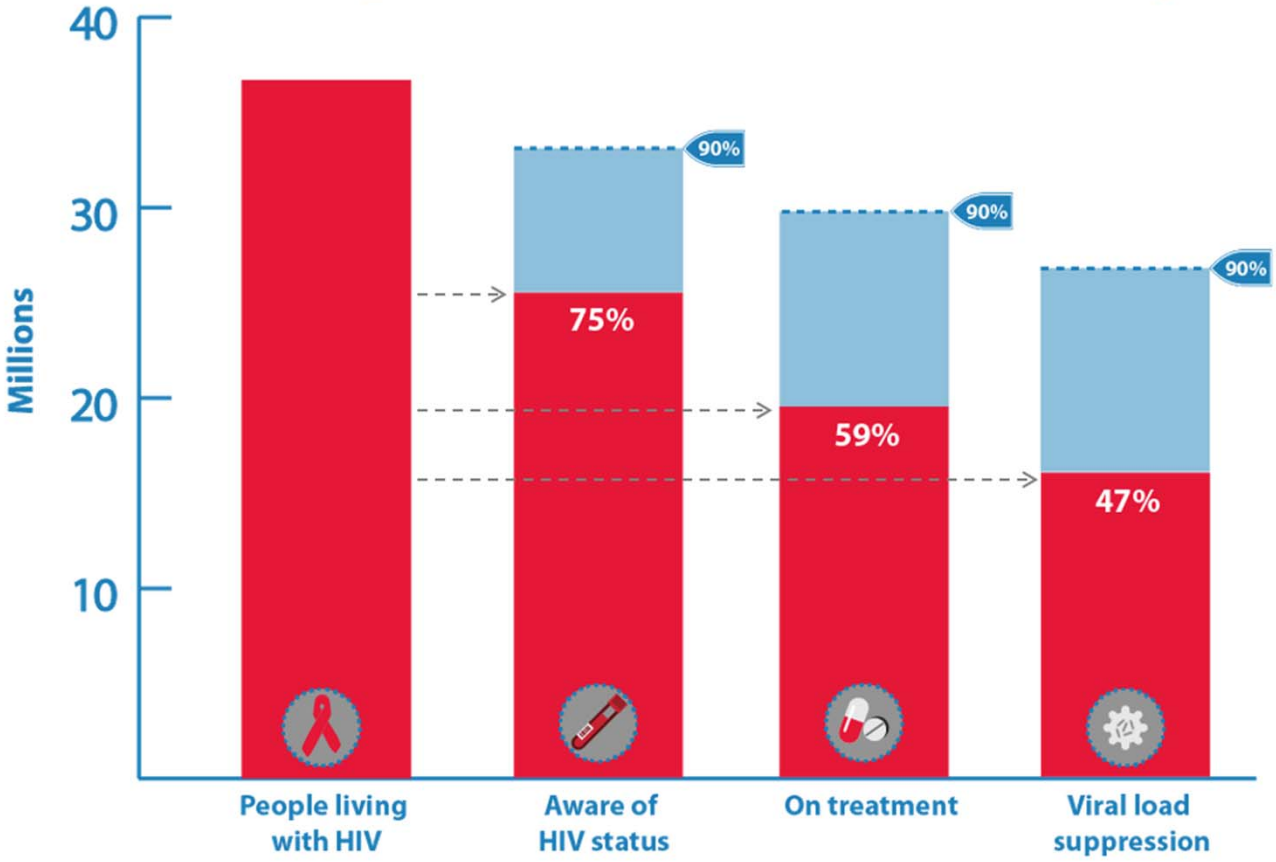
# HIV testing and care continuum (2017)




Source: UNAIDS/WHO estimates

World Health Organization

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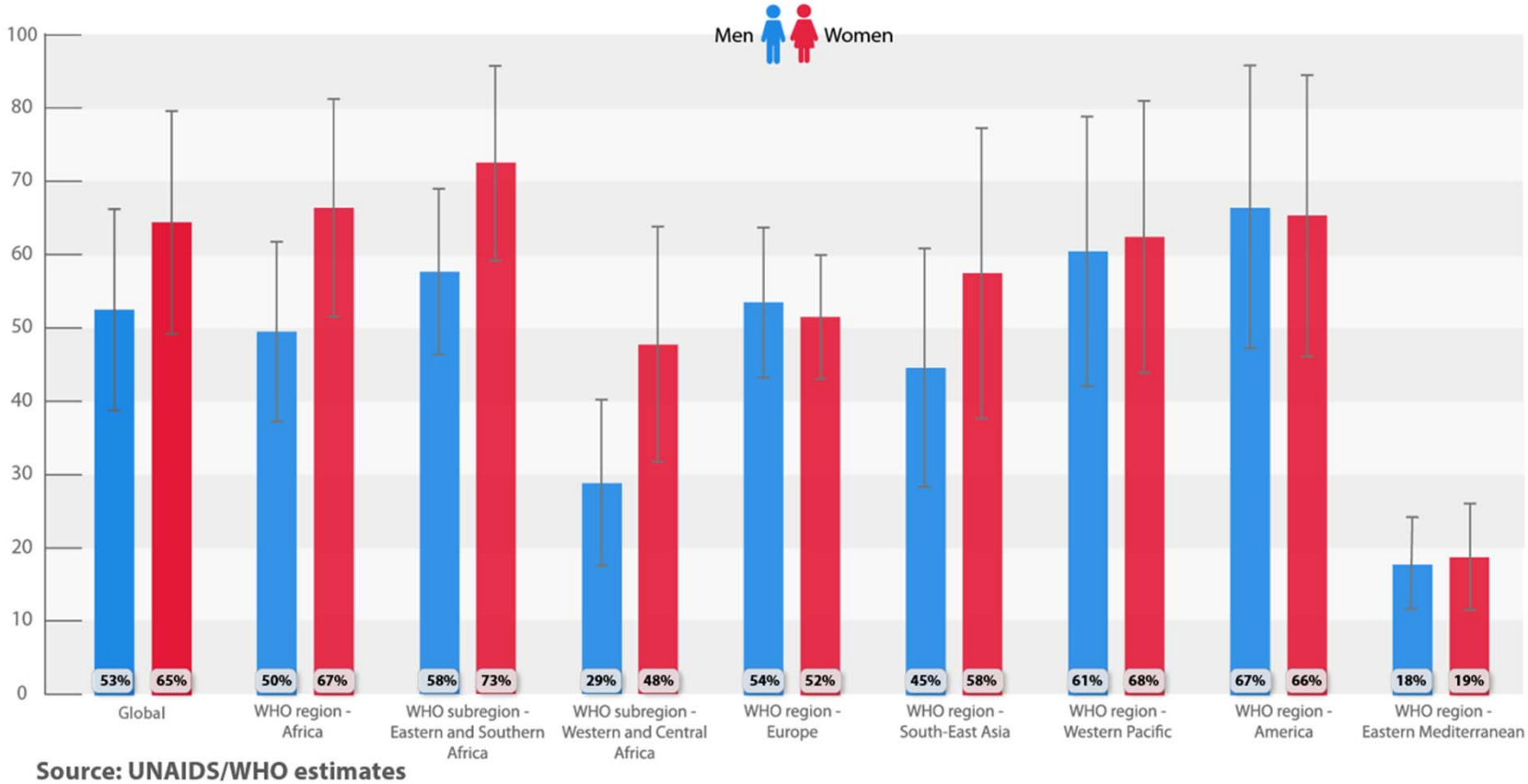
# ART coverage by sex among adults (2017




Source: UNAIDS/WHO estimates

World Health Organization

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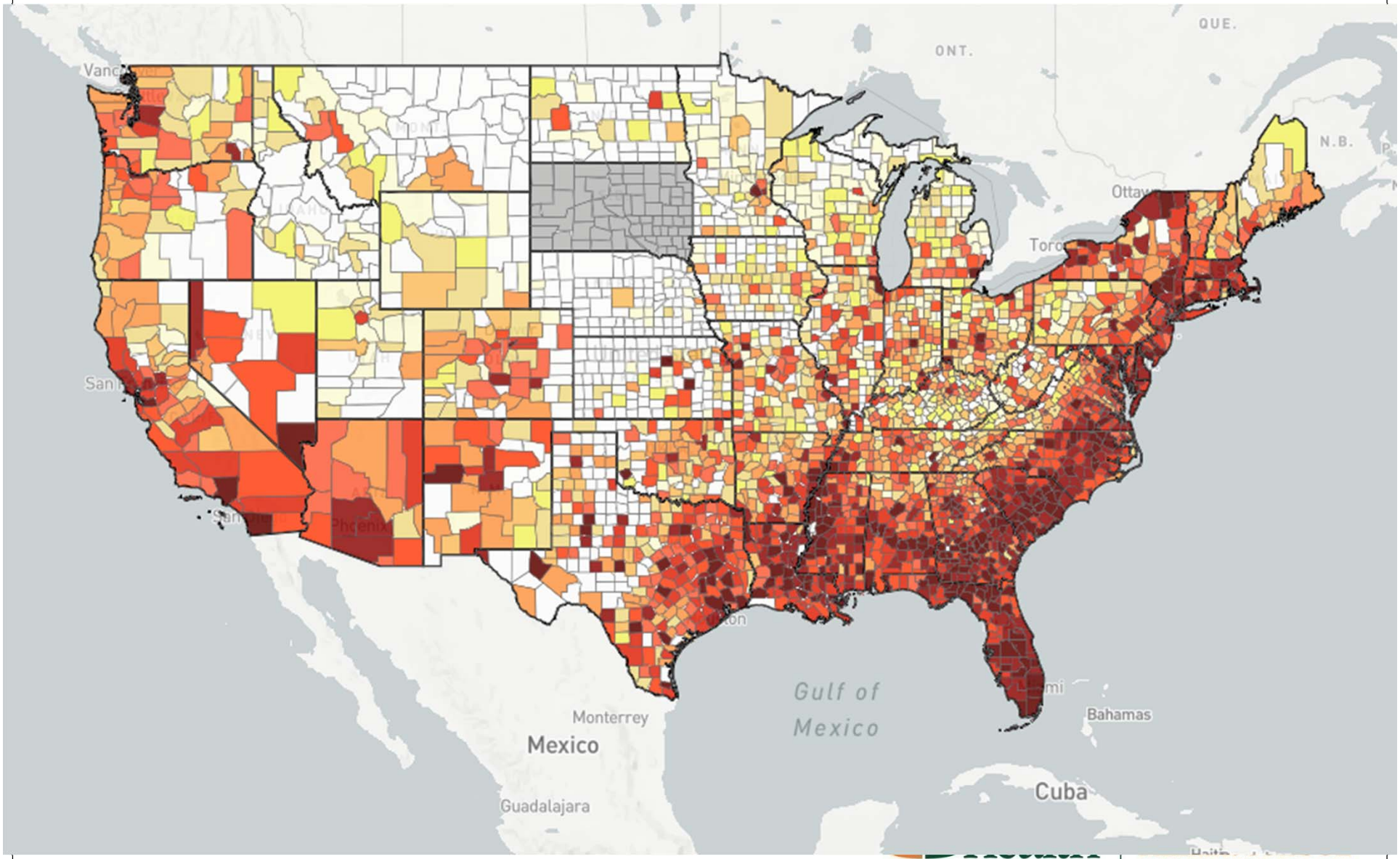
# PEOPLE LIVING WITH HIV IN 2015




https://map.aidsvu.org/map

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# HIV/AIDS in the United States

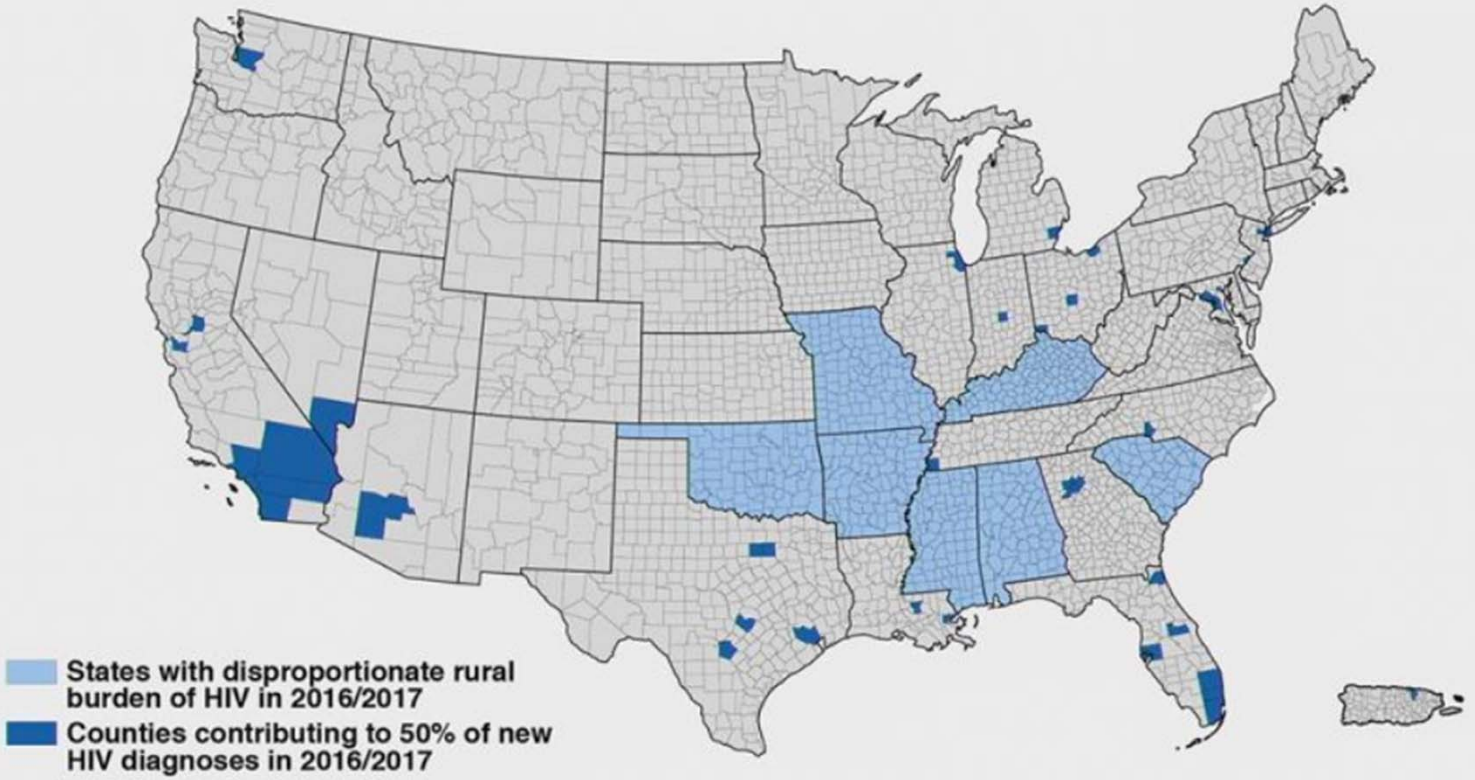
- 1.1 M people living with HIV, of whom 14% are unaware of their infection
- 703,413 people with AIDS have died
- 38,281 newly diagnosed HIV infections in 2017
  - 21% among youths 13-24 years old
- MSM, Blacks/African Americans bear the greatest burden of HIV

Source: CDC, 2/2019

# Major Geographic and Demographic Disparities for HIV Incidence in the U.S.

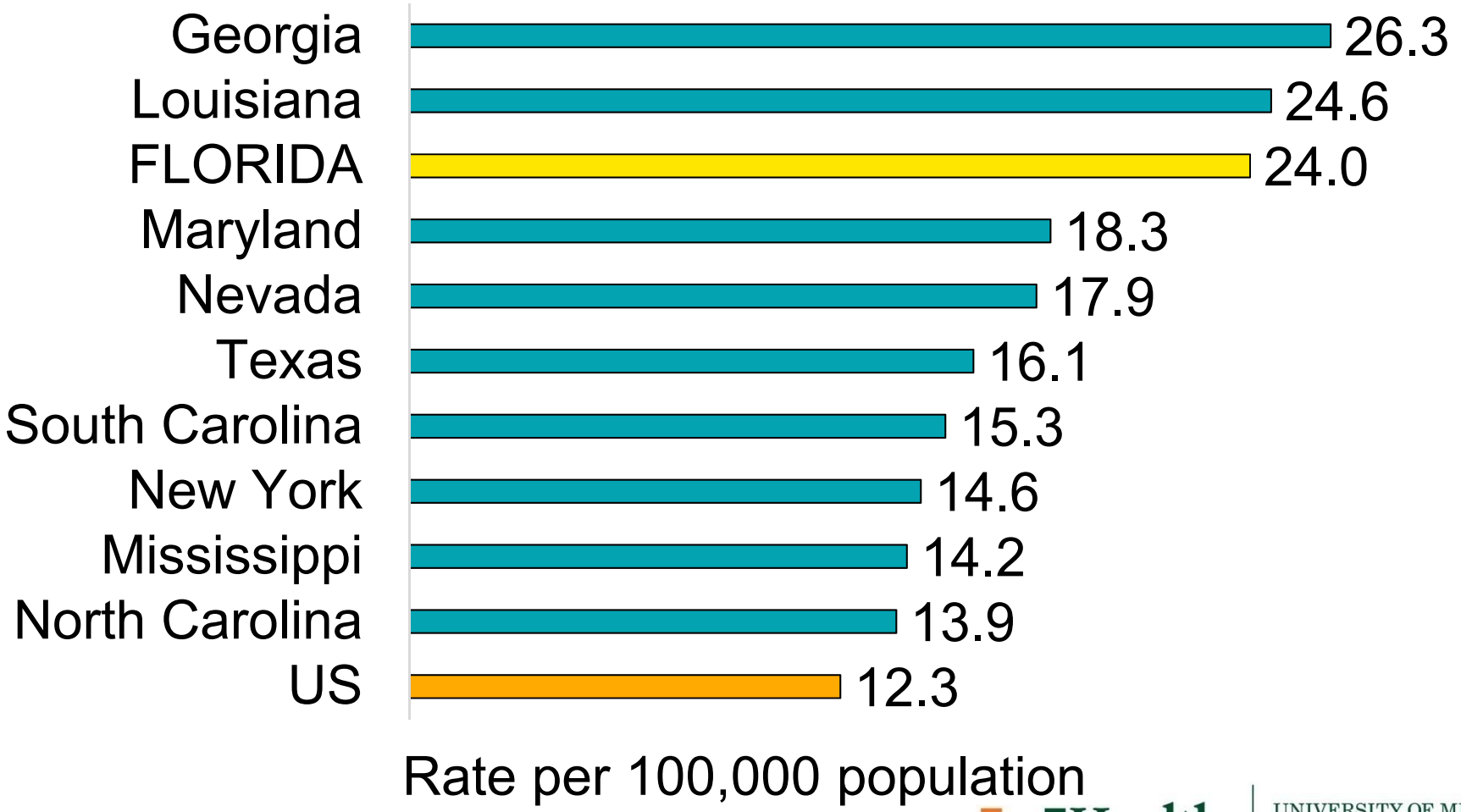
- 3007 counties in the United States
- During 2016-2017, > 50% of new HIV infections occurred in 48 counties, Washington, DC and Puerto Rico
- Majority of new HIV infections among Black/African American and Hispanic/Latino MSM; high incidence among transgender individuals and IDUs
- 7 mostly southern states have a disproportionate occurrence of HIV in rural areas

# U.S. Areas with the Highest Burden of HIV Diagnosis




Source: CDC, June 2018

# Rankings of HIV Case Rates (all ages) by State[1] Diagnosed in 2016, United States

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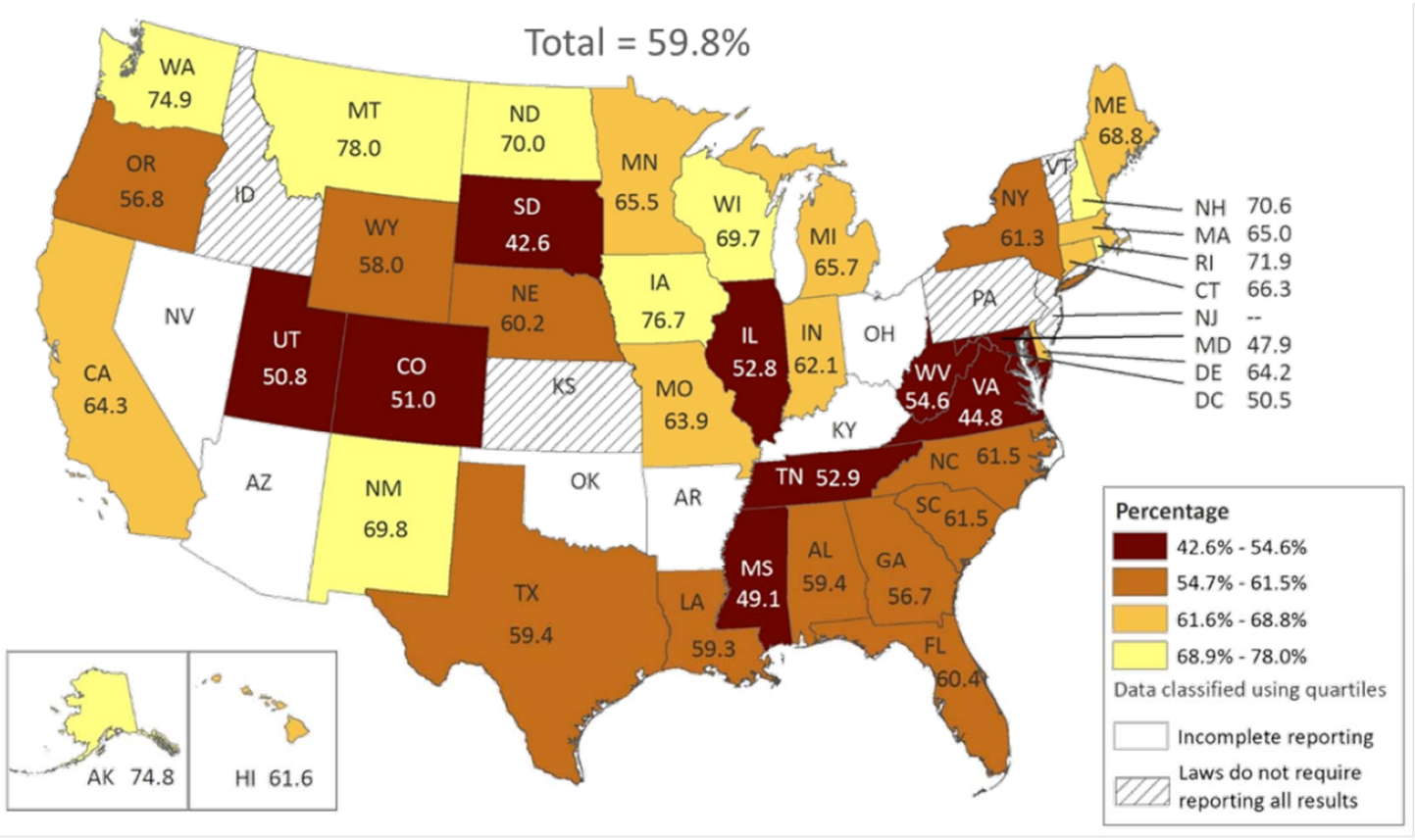
[1] Source: US data: HIV Surveillance Report, 2016 (most recent available) Vol. 28, Table 24 (HIV data for all 50 states) http://www.cdc.gov/hiv/topics/surveillance/resources/reports/index.htm

# Viral Suppression among Persons Aged ≥13 Years Living with Diagnosed HIV Infection, 2015—39 States and the District of Columbia




Note. Viral suppression was defined as <200 copies/mL on the most recent VL test in 2015. Residence was based on most recent known address as of year-end 2015.

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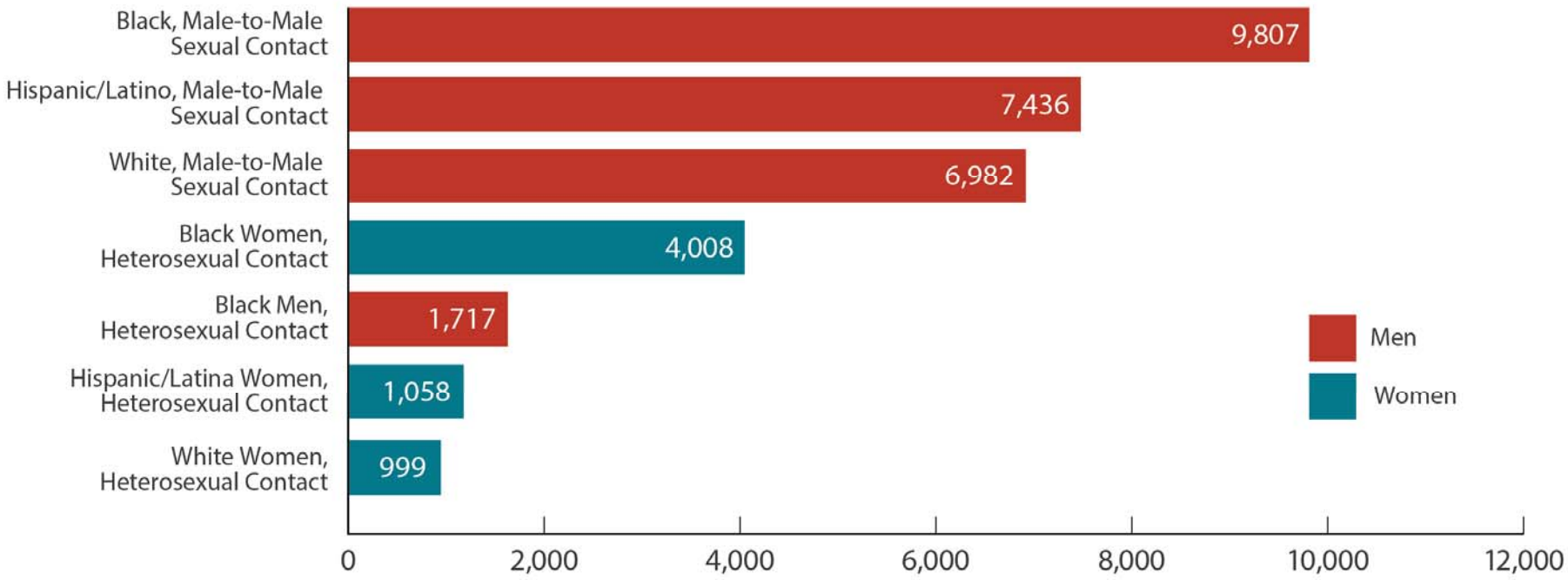
New HIV Diagnoses in the US for the Most-Affected Subpopulations, 2017




https://www.cdc.gov/hiv/statistics/overview/ataglance.html

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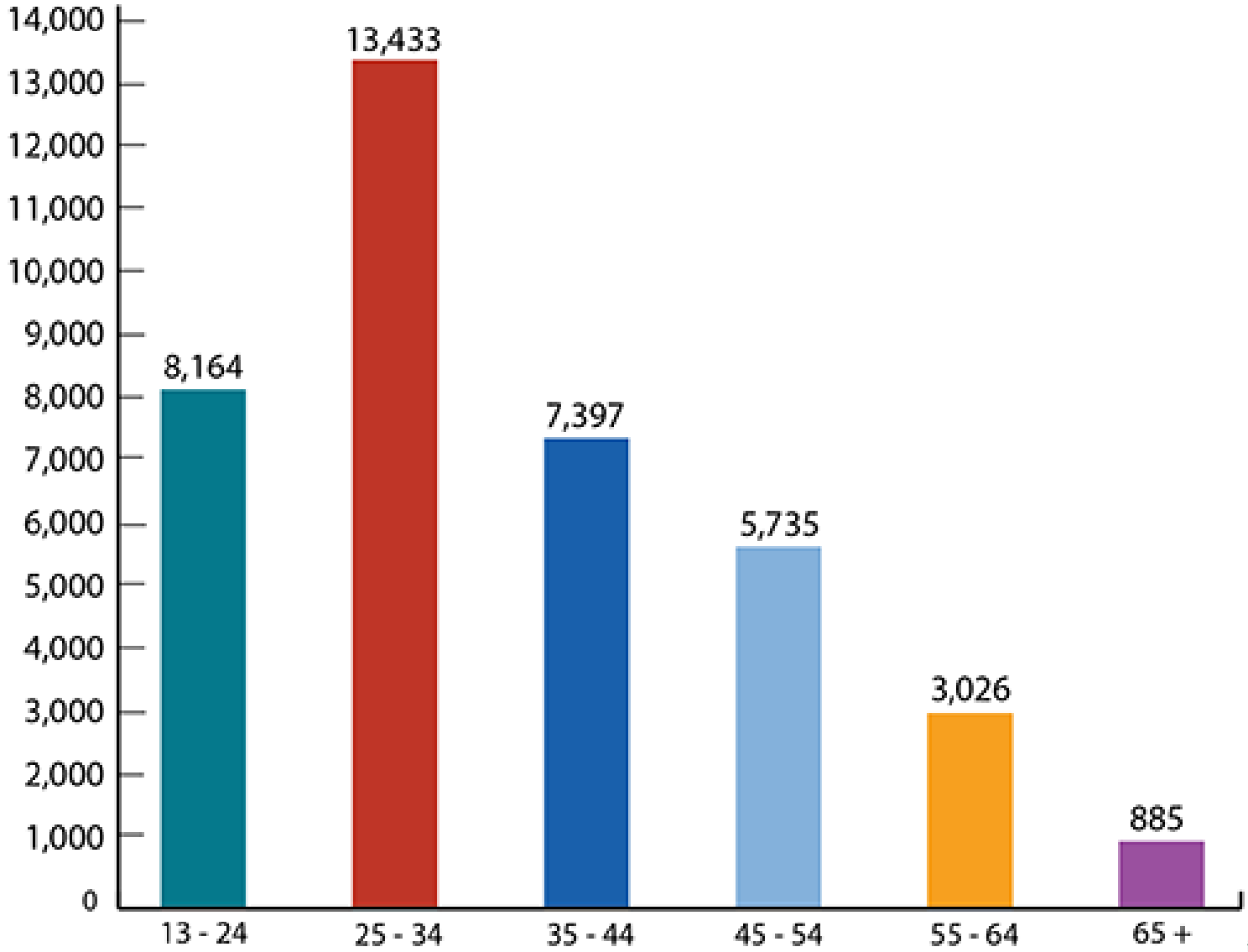
New HIV Diagnoses in the US by Age, 2017

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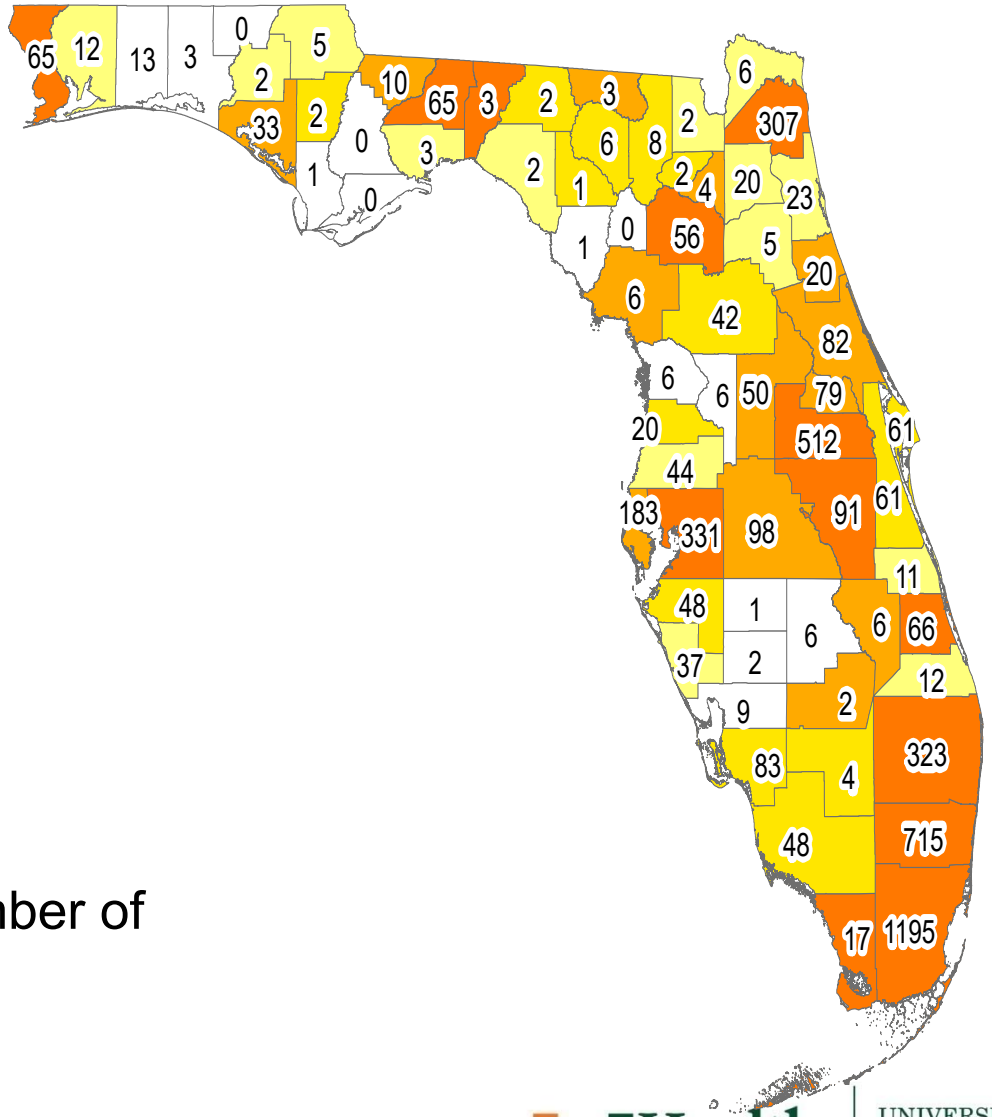
https://www.cdc.gov/hiv/statistics/overview/ataglance.html

# HIV Diagnosis Rates[1] by County of Residence[2] Diagnosed in 2017, Florida

HIV Diagnosis Rate
per 100,000 population
State Rate=24.1

- 0.0 - 6.7
- 6.8 - 10.0
- 10.1 - 13.6
- 13.7 - 20.5
- 20.6 - 43.4

Numbers on map are number of
HIV diagnoses
State Total N=4,949

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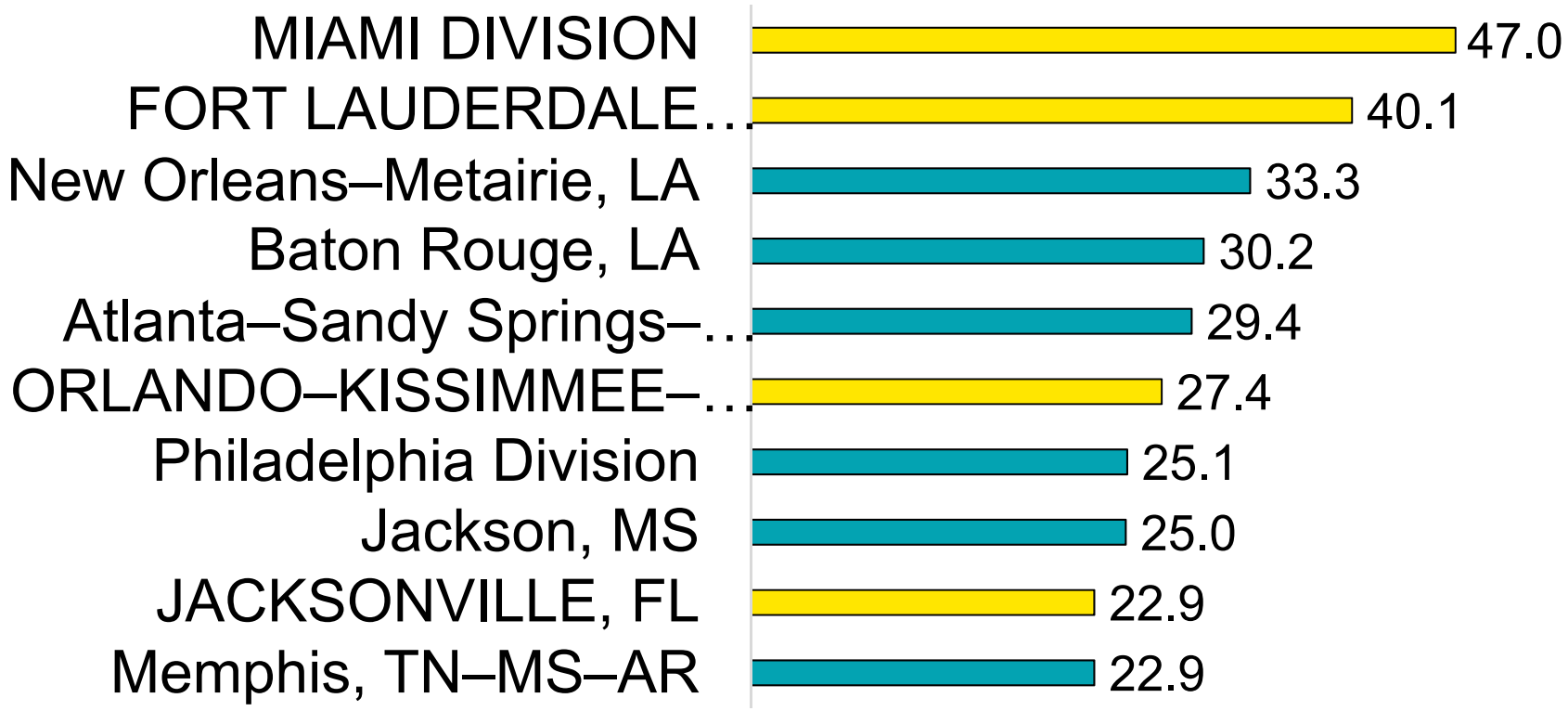
[1]Source: Population data were provided by Florida CHARTS as of 6/30/2018.
[2]County totals exclude diagnoses from Department of Corrections and Federal Correctional Institutions

# Rankings of HIV Case Rates (all ages) by MSA[1] Diagnosed in 2016, United States




Rate per 100,000 population

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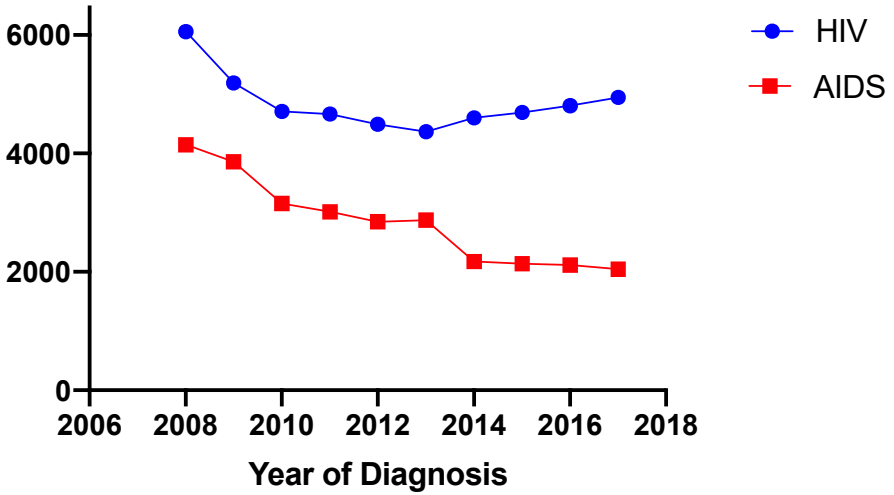
[1] Source: US data: HIV Surveillance Report, 2016 (most recent available) Vol. 28, Table 24 (HIV data for all 50 states) http://www.cdc.gov/hiv/topics/surveillance/resources/reports/index.htm

HIV/AIDS Diagnoses by Year of Diagnosis, 2008–2017, Florida
10 year % change (2008–2017) = 18% decrease

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Saint Roch curing the Plague


J. Tintoretto

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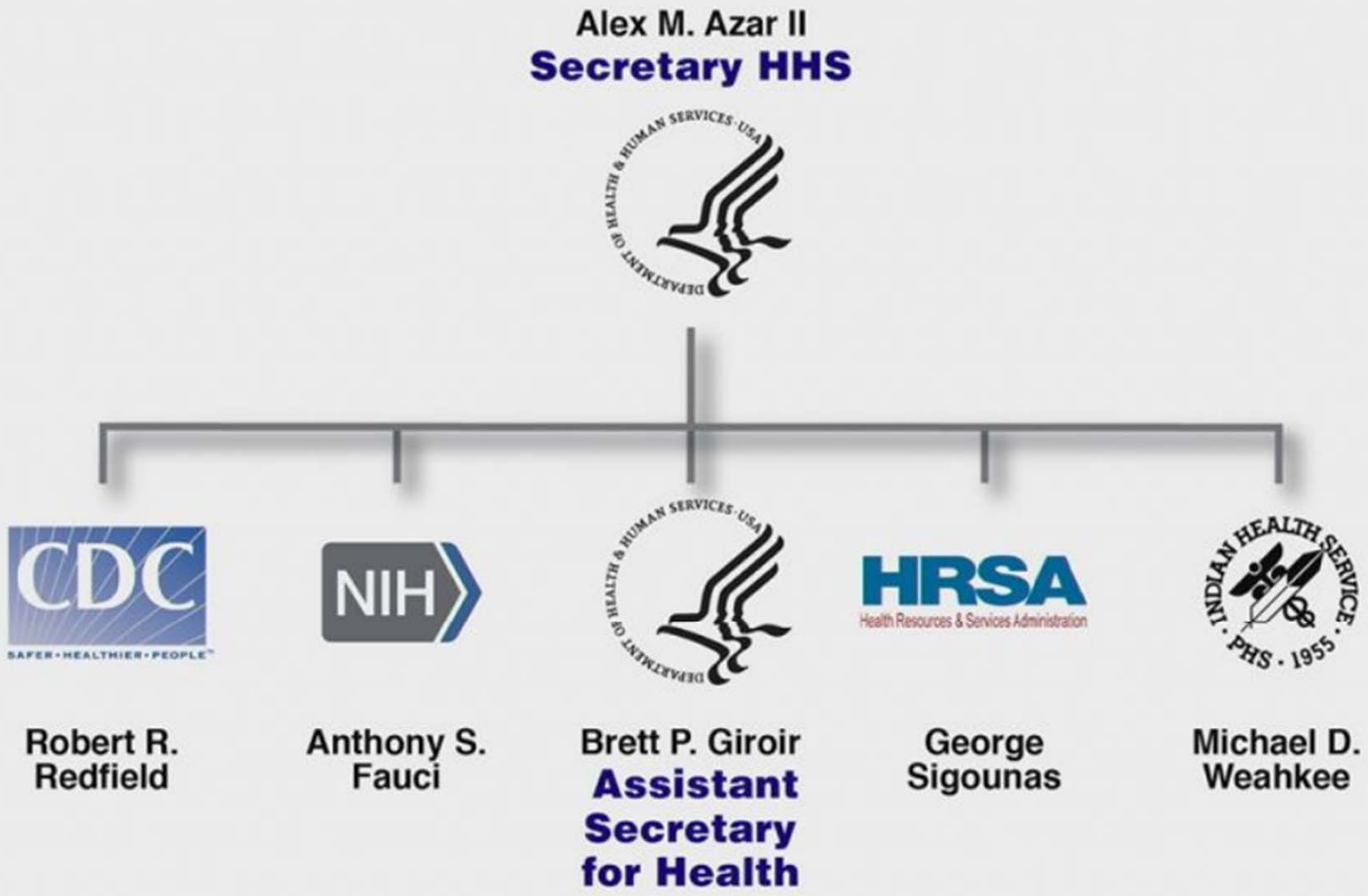
February 7, 2019

Editorial

# Ending the HIV Epidemic
# A Plan for the United States

AS Fauci, RR Redfield, G Sigounas, MD Weahkee,
and BP Giroir




*Fauci CROI 2019*

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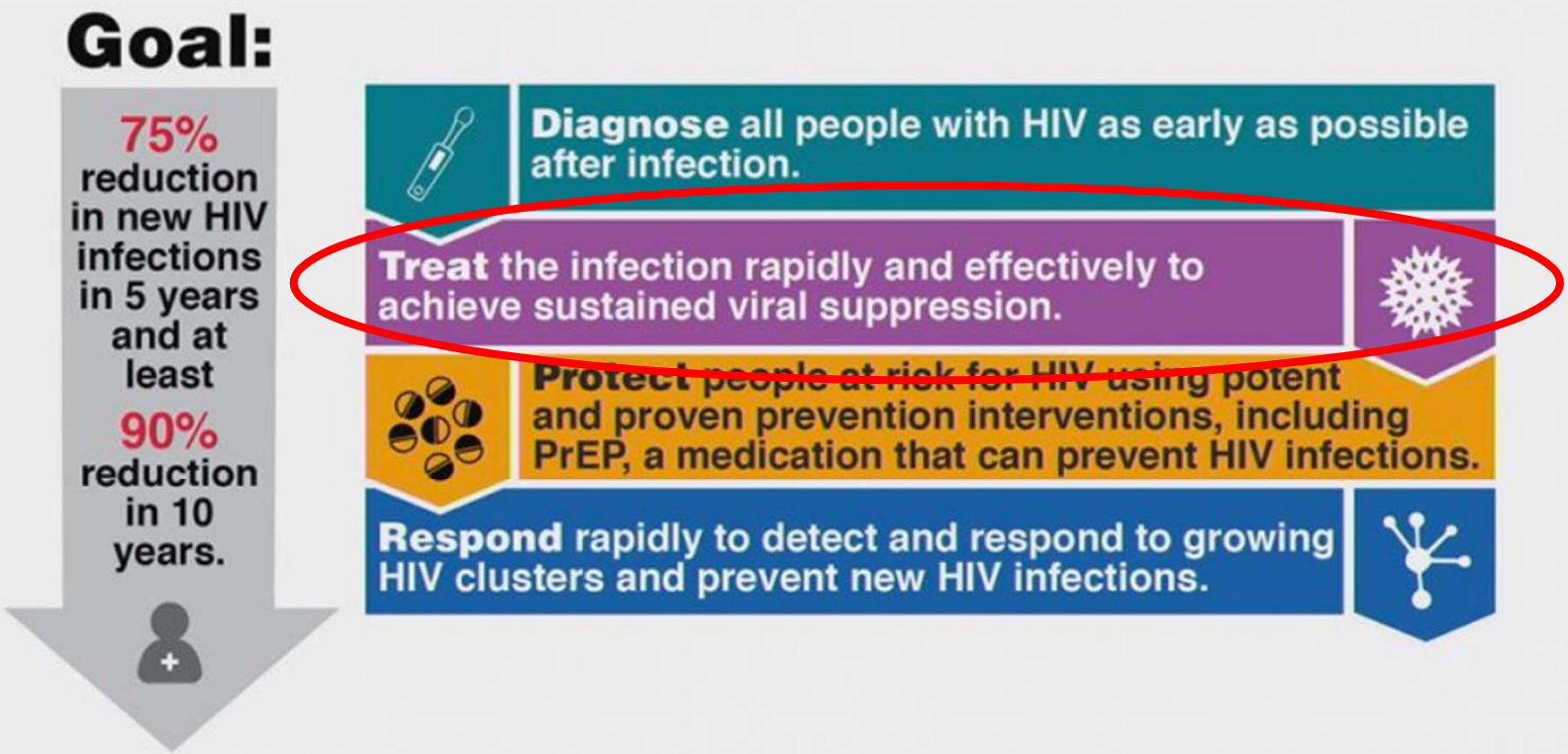
# Ending the HIV Epidemic: A Plan for America

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ART INITIATION

## Changing Criteria for Initiating ART

| CD4 Count (cells/mL) | 1998 | 2001 | 2006 | 2008 | 2009 | 2012 |
|---|---|---|---|---|---|---|
| >500 | Offer if VL >20,000 | Offer if VL >55,000 | Consider if VL >100,000 | Consider in certain groups | Consider in certain patients | Treat |
| >350–500 | Offer if VL >20,000 | Consider if VL >55,000 | Consider if VL >100,000 | Consider in certain groups | Consider in certain groups | Treat |
| 200–350 | Offer if VL >20,000 | Offer, but controversy existed | Offer after discussion with patient | Treat | Treat | Treat |
| <200 or symptomatic | Treat | Treat | Treat | Treat | Treat | Treat |

VL = viral load

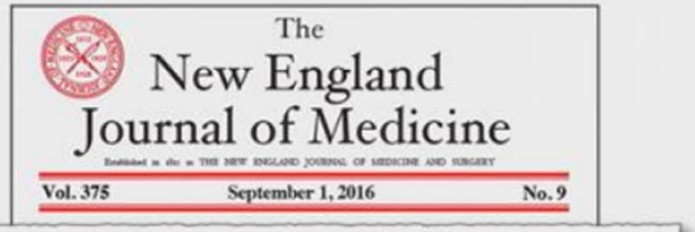
DHHS. Guidelines for Use of Antiretroviral Agents in HIV-1–Infected Adults and Adolescents. 2017. Last updated May 30, 2018. https://aidsinfo.nih.gov/contentfiles/lvguidelines/AdultandAdolescentGL.pdf. Accessed Dec 20, 2018.

# The Pivotal HPTN 052 Study


**Prevention of HIV-1 Infection with Early Antiretroviral Therapy**

**HPTN 052** Study Team

- 1,763 HIV-serodiscordant couples in 9 countries
- 96% reduction in HIV transmission when ART started in HIV-infected partner at CD4 count of 350-550 compared to <250




**Antiretroviral Therapy for the Prevention of HIV-1 Transmission**

**HPTN 052** Study Team

- After 5+ years of follow-up, protective effect of early ART was sustained (93% lower risk)
- No linked infections when HIV was stably suppressed by ART (i.e. undetectable viral load) in HIV+ partner

Bottom line from HPTN 052

Early Treatment and Viral Load Suppression Reduces Transmission:

**Undetectable=Untransmittable**

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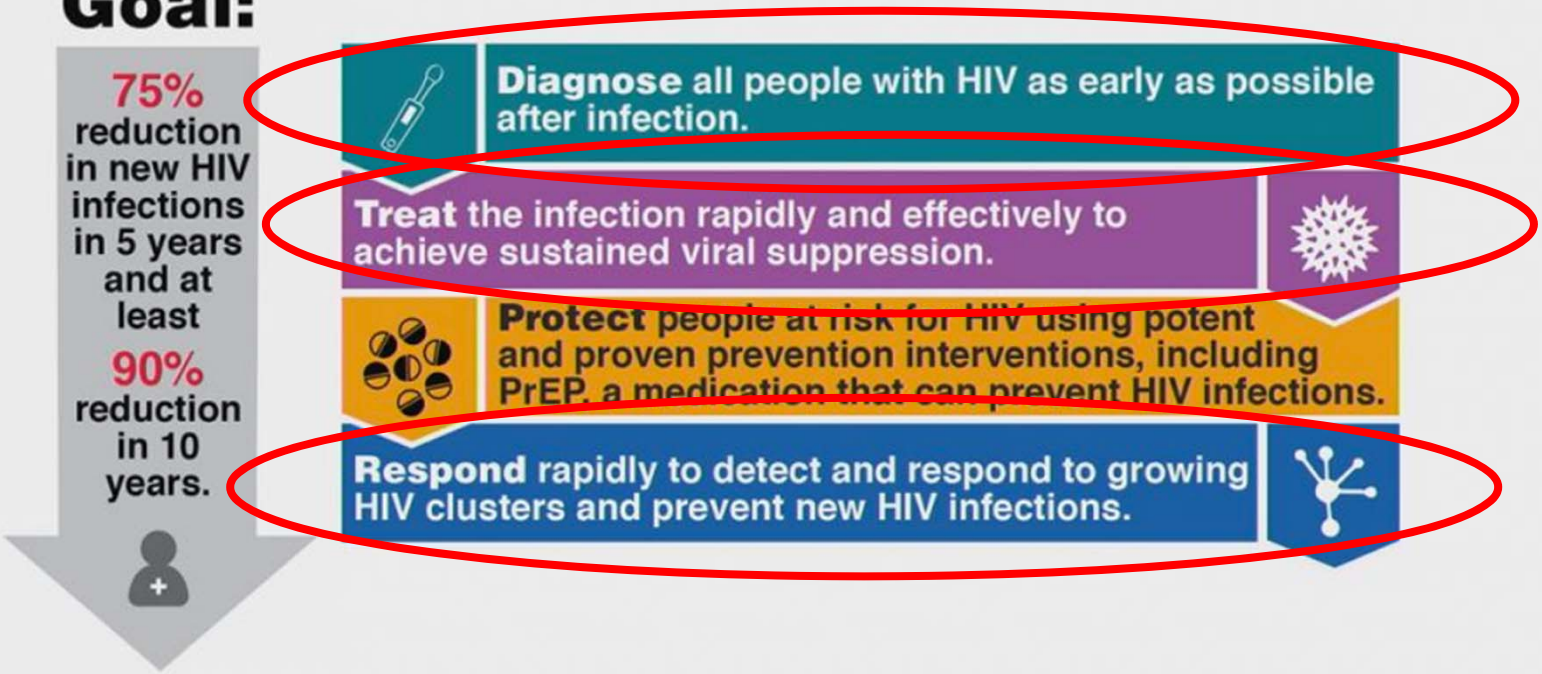
# Ending the HIV Epidemic: A Plan for America

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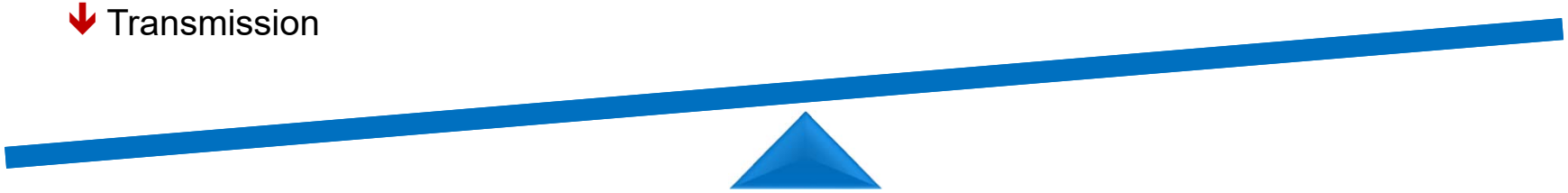
# Benefits to Early ART Initiation Outweigh the Costs

## Early ART

- ↑ Potency, durability, simplicity, and safety of current regimens
- ↓ Emergence of resistance
- ↓ Toxicity with earlier therapy
- ↑ Subsequent treatment options
- ↓ Risk of uncontrolled viremia at all CD4 levels
- ↓ Transmission

## Delayed ART

- Drug toxicity
- Preservation of limited Rx options
- Risk of resistance
- Risk of transmission of resistant virus
- Increased cost



DHHS. Guidelines for Use of Antiretroviral Agents in HIV-1−Infected Adults and Adolescents. 2017. Last updated May 30, 2018. https://aidsinfo.nih.gov/contentfiles/lvguidelines/AdultandAdolescentGL.pdf. Accessed Dec 20, 2018.

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ORIGINAL ARTICLE

# Initiation of Antiretroviral Therapy in Early Asymptomatic HIV Infection

The INSIGHT START Study Group

## Conclusions

The initiation of antiretroviral therapy in HIV-positive adults with a CD4+ count of more than 500 cells per cubic millimeter provided net benefits over starting such therapy in patients after the CD4+ count had declined to 350 cells per cubic millimeter.

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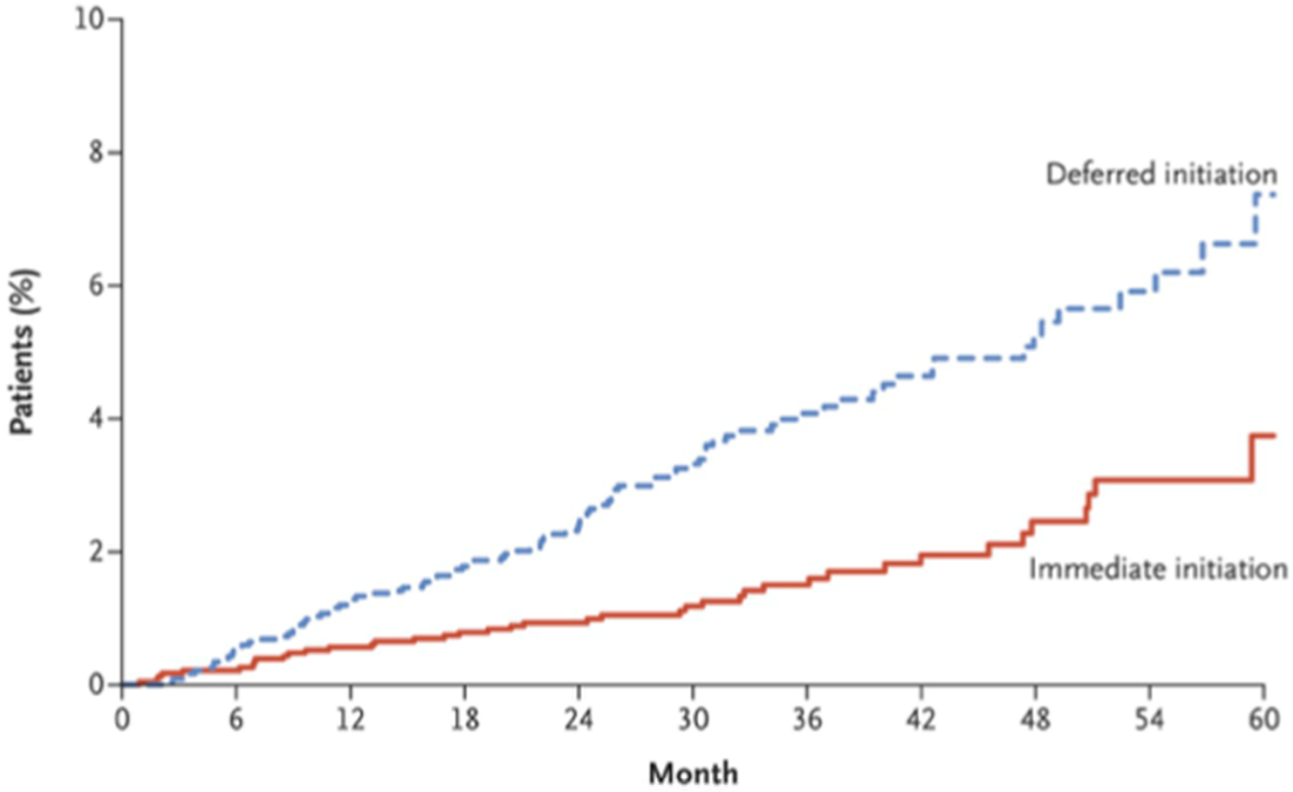
# Initiation of Antiretroviral Therapy in Early Asymptomatic HIV Infection

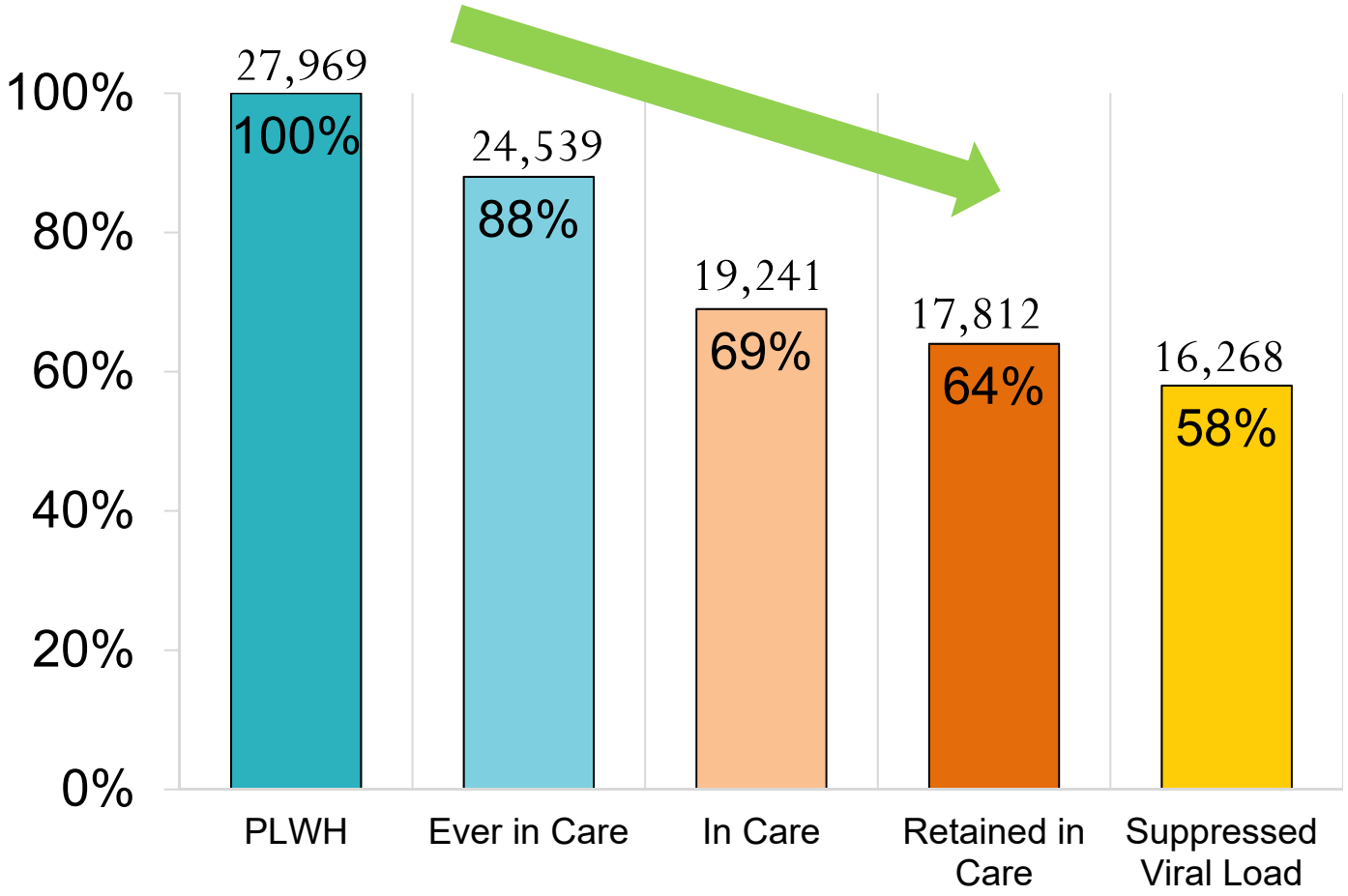
The INSIGHT START Study Group

## A Time to First Primary Event




| No. at Risk | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Immediate initiation | 2326 | 2302 | 2279 | 2163 | 1801 | 1437 | 1031 | 757 | 541 | 336 | 110 |
| Deferred initiation | 2359 | 2326 | 2281 | 2135 | 1803 | 1417 | 1021 | 729 | 520 | 334 | 103 |
| **Estimated Percentage** | | | | | | | | | | | |
| Immediate initiation | | 0.2 | 0.6 | 0.8 | 0.9 | 1.2 | 1.5 | 2.0 | 2.5 | 3.1 | 3.7 |
| Deferred initiation | | 0.5 | 1.2 | 1.8 | 2.4 | 3.3 | 4.1 | 4.6 | 5.3 | 5.9 | 7.4 |

## Persons Living with HIV (PLWH) in Miami-Dade County Along the HIV Care Continuum, 2017

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Division of Disease Control and Health Protection

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# Evidence-Based Recommendations

Shorten Wait Time for Initial Appointment

- May increase the likelihood of appointment completion

Follow-Up After Missed Initial Appointment

- Improve the initial clinic orientation process, implement reminder phone calls, use peer navigators, and accompany patients to medical appointments

Retain Patients in Care

- Significantly associated with virologic suppression and longer survival
- Address barriers to care such as transportation problems, unstable housing, substance abuse, and mental illness
- Consider longitudinal programs that can continuously engage patients who fall in and out of care


Mugavero MJ, et al. Clin Infect Dis. 2007;45:127-130.
Mugavero MJ. Top HIV Med. 2008;16:156-161.
Liau A, et al. AIDS Behav. 2013;17:1941-1962.
CDC. 2017. https://www.cdc.gov/hiv/research/interventionresearch/compendium/lrc/index.html.
Dombrowski JC, et al. AIDS. 2012;26:77-86.
Mugavero MJ, et al. Clin Infect Dis. 2009;48:248-56.
Navarra AD, et al. AIDS Behav. 2017;21:3154-3171.

# San Francisco Experience: Same-Day Observed ART Initiation vs. Standard of Care

Significantly shorter time to viral suppression (*P*<0.0001)

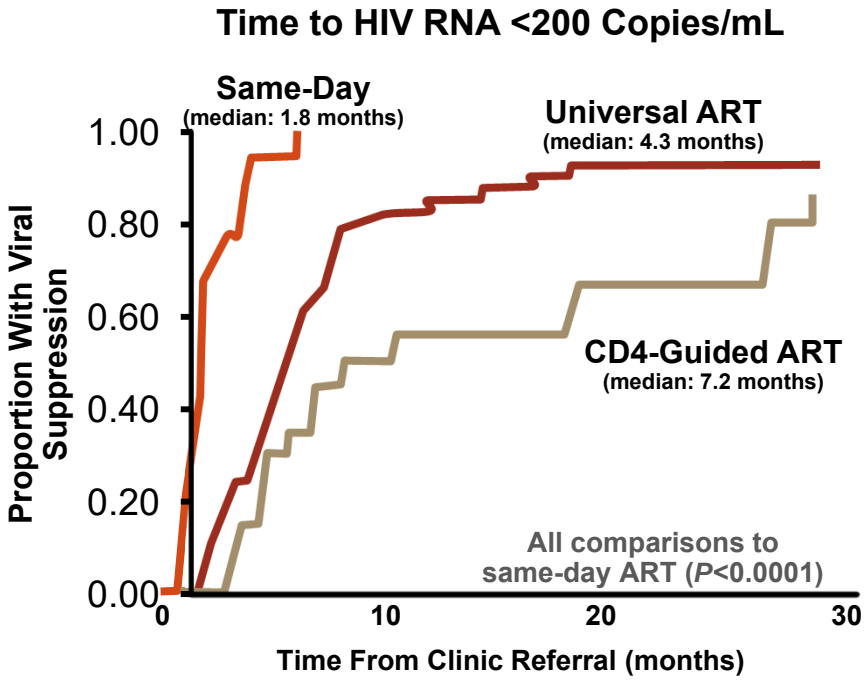
- Same-day ART versus universal ART (2010-2013) and CD4-guided ART (2006-2009)

Similar rates of loss to follow-up

- Same-day (10%) versus non-same-day ART (15%)

Most same-day patients received INSTI-based regimens

- Similar safety and tolerability with non-same day ART
- No regimen modifications due to virologic failure
- No cases of treatment-emergent resistance (35% had transmitted mutations, 24% with major NNRTI mutations)




Dolutegravir (69%), elvitegravir/cobicistat (18%), darunavir/r (10%), raltegravir (2%).
Pilcher CD, et al. JAIDS. 2017;74:44-51.

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# Ending the HIV Epidemic: A Plan for America

## Goal:

**75%** reduction in new HIV infections in 5 years and at least **90%** reduction in 10 years.

**Diagnose** all people with HIV as early as possible after infection.

**Treat** the infection rapidly and effectively to achieve sustained viral suppression.

**Protect** people at risk for HIV using potent and proven prevention interventions, including PrEP, a medication that can prevent HIV infections.

**Respond** rapidly to detect and respond to growing HIV clusters and prevent new HIV infections.

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# Ending the HIV Epidemic: A Plan for America


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# Preexposure Chemoprophylaxis for HIV Prevention in Men Who Have Sex with Men

(N Engl J Med 2010; 363:2587-2599)

Oral FTC–TDF provided protection against the acquisition of HIV infection among the subjects. Detectable blood levels strongly correlated with the prophylactic effect.

Pre-exposure Prophylaxis= No HIV Acquisition

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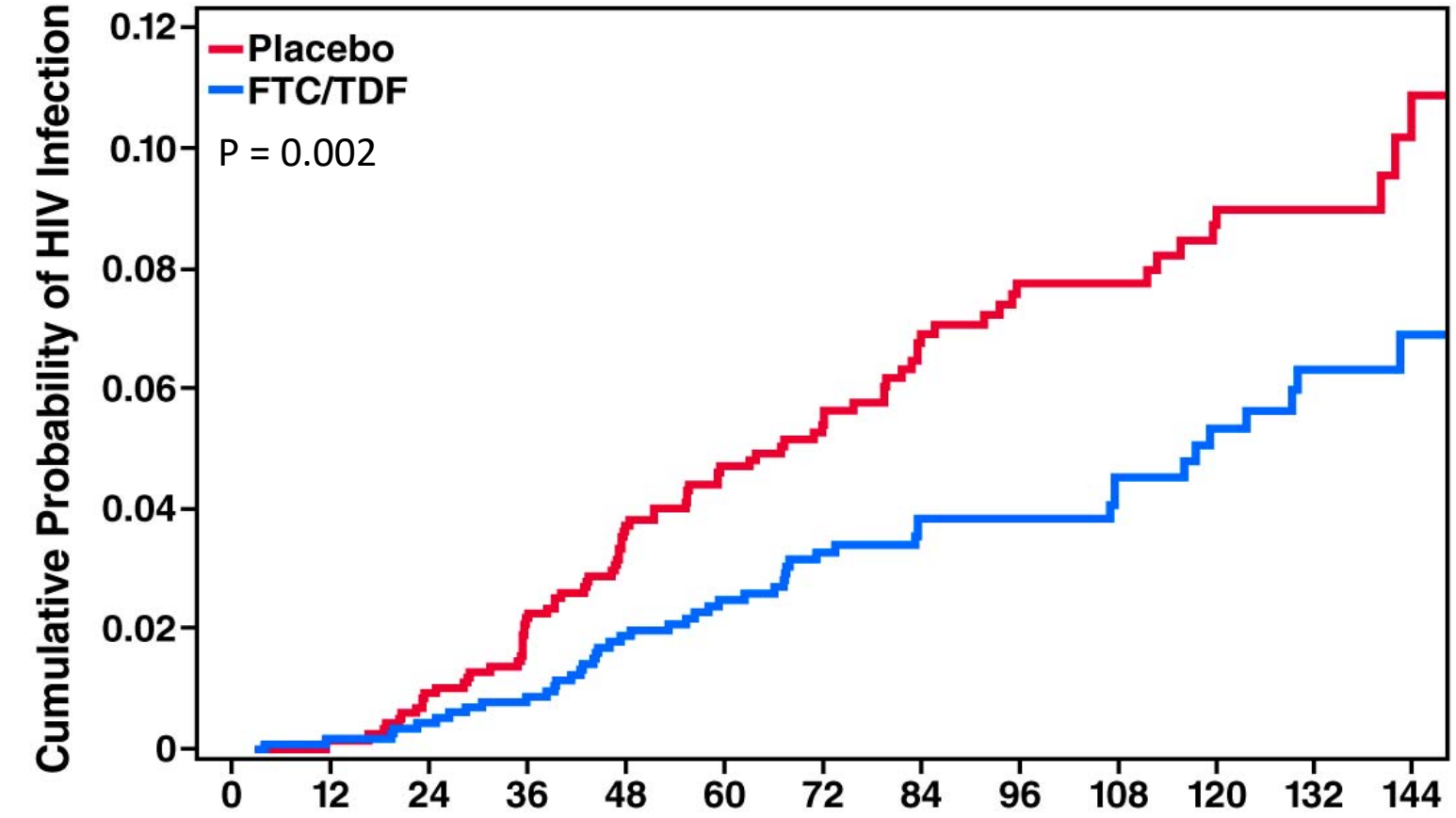
# Efficacy (MITT) 42% (18-60%) Through End of Study
# Infection Numbers: 83 – 48 = 35 averted




| N = | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Placebo: | 1248 | 1198 | 1157 | 1119 | 1030 | 932 | 786 | 638 | 528 | 433 | 344 | 239 | 106 |
| FTC/TDF: | 1251 | 1190 | 1149 | 1109 | 1034 | 939 | 808 | 651 | 523 | 419 | 345 | 253 | 116 |

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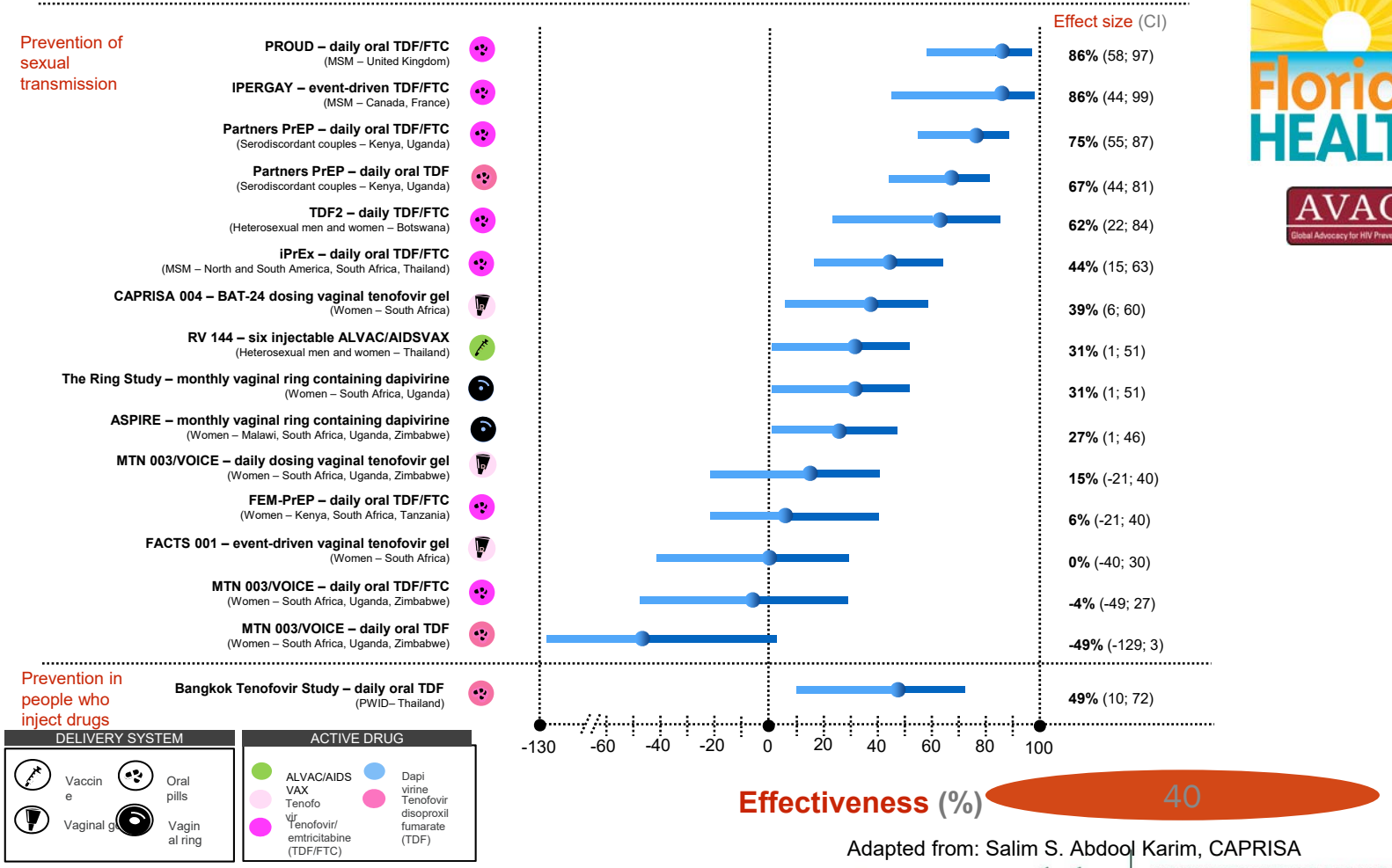
# Clinical Trial Evidence for HIV Prevention Options (February 2016)

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Adapted from: Salim S. Abdool Karim, CAPRISA

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AVAC Global Advocacy for HIV Prevention

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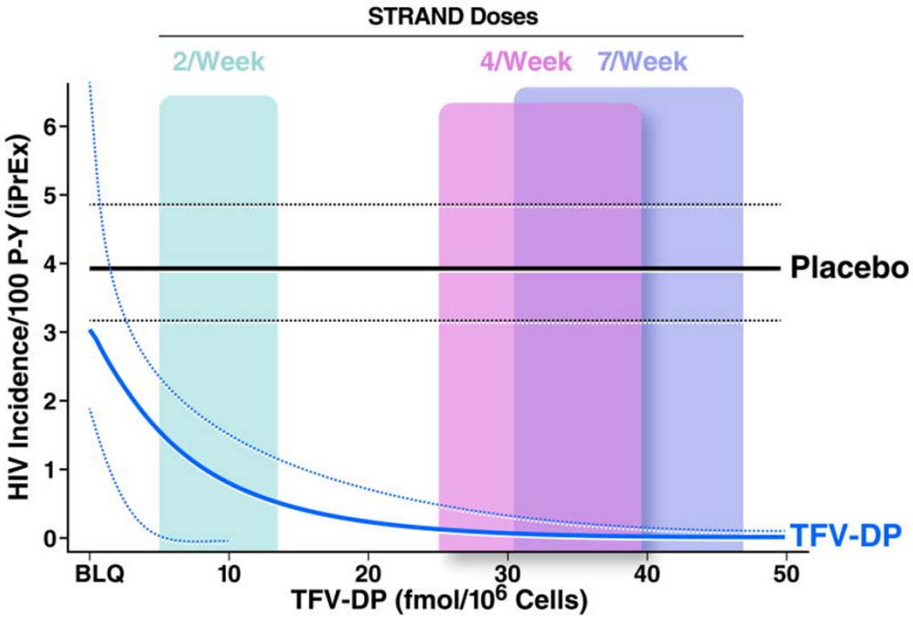
# Adherence, Drug levels and Efficacy




| Dosing | Estimated PrEP Efficacy |
|---|---|
| 2x/week | 76% |
| 4x/week | 90% |
| Daily | 99% |

Anderson PL. Sci Transl Med 2012;4:1-8.

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# Who Should Be Offered PrEP?
# CDC Guidelines

"Substantial risk of HIV Infection"

| MSM | Heterosexual Women and Men | IDU |
|---|---|---|
| HIV-positive sexual partner | HIV-positive sexual partner | HIV-positive injecting partner |
| Recent bacterial STI | Recent bacterial STI | Sharing injection equipment |
| High number of sex partners | High number of sex partners | |
| History of inconsistent or no condom use | History of inconsistent or no condom use | |
| Commercial sex work | Commercial sex work | |

Center for Disease Control and Prevention Guidelines – 2017 update
https://www.cdc.gov/hiv/pdf/risk/prep/cdc-hiv-prep-guidelines-2017.pdf

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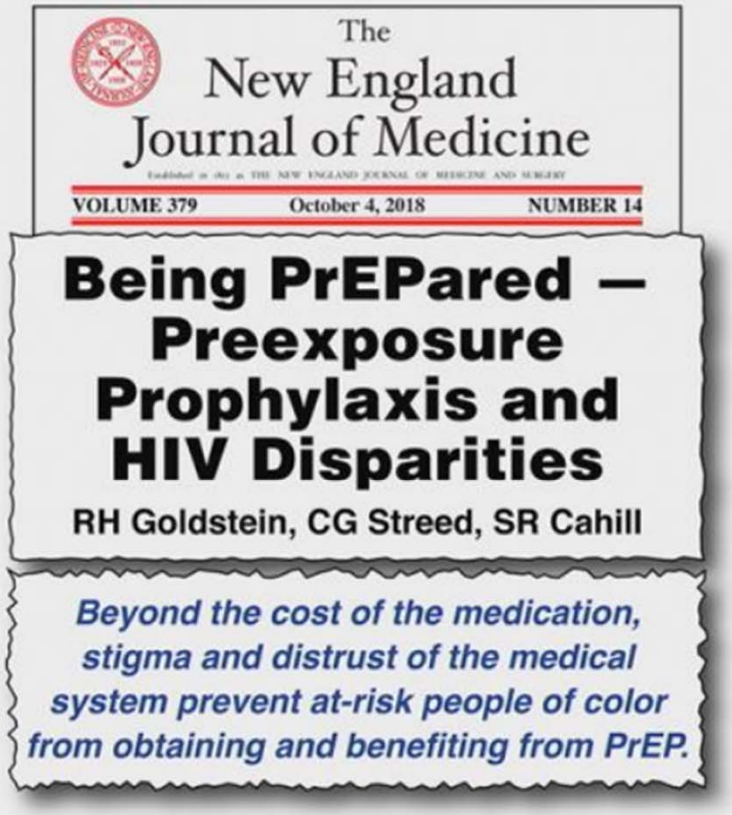
# HIV Pre-Exposure Prophylaxis (PrEP) is Underutilized

- 1.1 million individuals in United States are at substantial risk for HIV and should be offered PrEP (CDC)
- Estimated number of U.S. PrEP users, end-2018: 269,000 (AVAC PrEPWatch, 2/2019)




*Fauci CROI 2019*

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# ESTIMATED NUMBER OF ADULTS WHO COULD POTENTIALLY BENEFIT FROM PREP, UNITED STATES, 2015

| | Gay, bisexual, or other men who have sex with men | Heterosexually active adults | Persons who inject drugs | Total by race/ethnicity |
|---|---|---|---|---|
| Black/African American, non-Hispanic | 309,190 | 164,660 | 26,490 | 500,340 |
| Hispanic/Latino | 220,760 | 46,580 | 14,920 | 282,260 |
| White, non-Hispanic | 238,670 | 36,540 | 28,020 | 303,230 |
| Total who could potentially benefit from PrEP | **813,970** | **258,080** | **72,510** | **1,144,550** |

Notes: PrEP=pre-exposure prophylaxis; data for "other race/ethnicity" are not shown


U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

Smith, DK., et al. CROI 2018; March 4-7, Boston, MA, USA.

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# HIV prevention pill is not reaching most who could potentially benefit – especially African Americans and Latinos


of people who could potentially benefit from PrEP are **African American – approximately 500,000 people…**

…but only **1%** of those – **7,000 African Americans** – were prescribed PrEP*



of people who could potentially benefit from PrEP are **Latino – nearly 300,000 people…**

…but only **3%** of those – **7,600 Latinos** – were prescribed PrEP*


*Prescription data in this analysis limited to those filled at retail pharmacies or mail order services from September 2015 – August 2016; racial and ethnic information not available for one-third of the prescription data

Smith, DK., et al. CROI 2018; March 4-7, Boston, MA, USA.

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# Ending the HIV Epidemic: A Plan for America

## Goal:

**75%** reduction in new HIV infections in 5 years and at least **90%** reduction in 10 years.

**Diagnose** all people with HIV as early as possible after infection.

**Treat** the infection rapidly and effectively to achieve sustained viral suppression.

**Protect** people at risk for HIV using potent and proven prevention interventions, including PrEP, a medication that can prevent HIV infections.

**Respond** rapidly to detect and respond to growing HIV clusters and prevent new HIV infections.

*Fauci CROI 2019*

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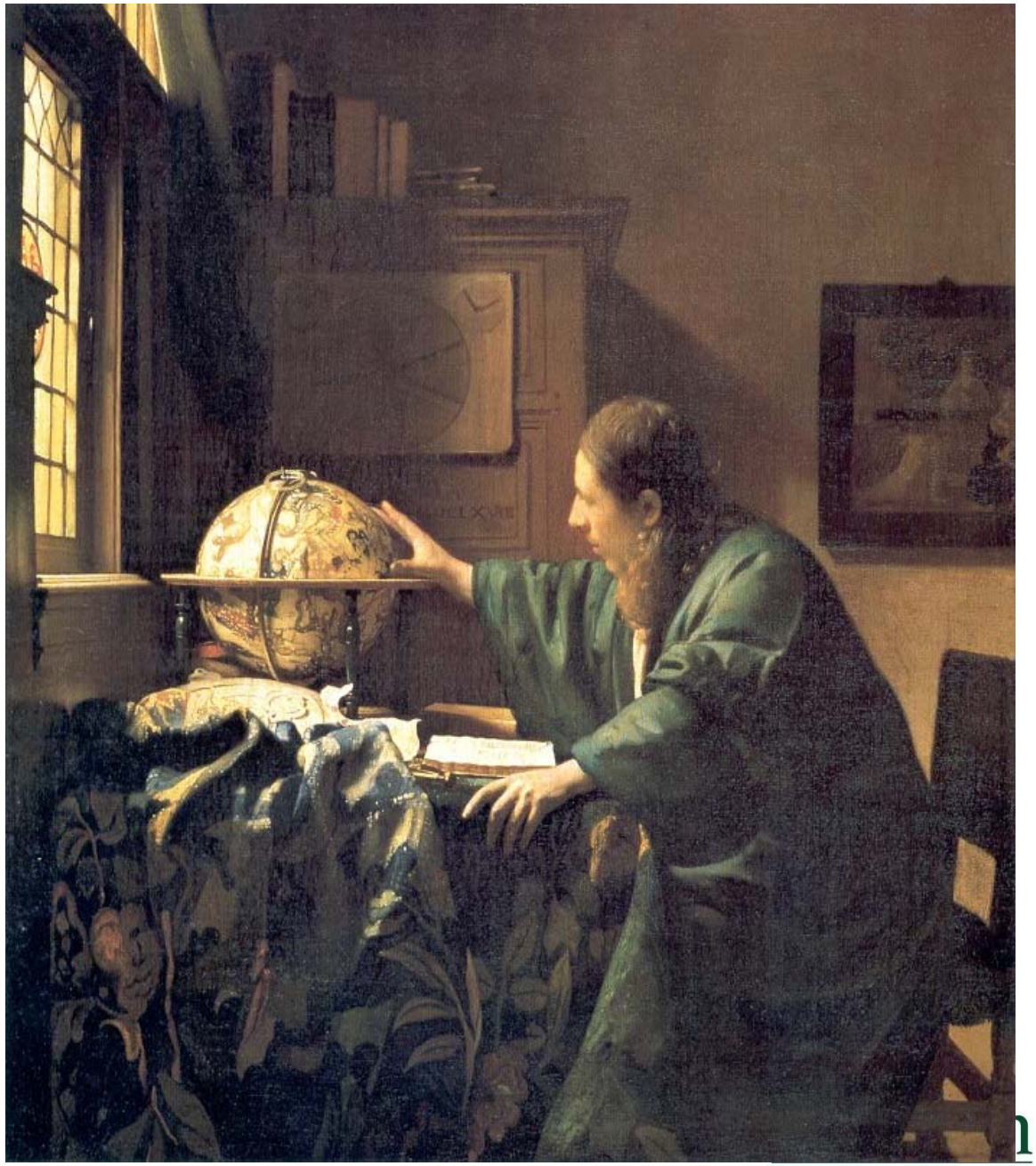

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