



**Infezioni trasmissibili con la trasfusione:**  
*fattori di rischio, comunicazione e counselling  
con il donatore positivo*

## **Epidemiologia e fattori di rischio di HIV**

**Alessandra Bandera**

Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico Milano  
Università degli Studi Milano  
alessandra.bandera@unimi.it

La sottoscritta, in qualità di Relatore  
dichiara che

negli ultimi due anni ha avuto i seguenti rapporti anche di finanziamento con i  
soggetti portatori di interessi commerciali in campo sanitario:

Astra-Zeneca, BioMerieux, Janssen-Cilag, Nordic Pharma, Pfizer, Qiagen, SOBI, ViiV,  
Gilead, Takeda



# HIV infection: where are we today?

## Global HIV data

	2000	2005	2010	2021	2022
<b>People living with HIV</b>	26.6 million [22.6 million - 31.2 million]	28.9 million [24.5 million - 33.8 million]	31.5 million [26.7 million - 36.8 million]	38.7 million [32.8 million - 45.2 million]	39.0 million [33.1 million - 45.7 million]
<b>New HIV Infections</b>	2.8 million [2.2 million - 3.8 million]	2.5 million [1.9 million - 3.3 million]	2.1 million [1.6 million - 2.8 million]	1.4 million [1.1 million - 1.8 million]	1.3 million [1.0 million - 1.7 million]
<b>New HIV Infections (Adults, aged 15+)</b>	2.3 million [1.7 million - 3.1 million]	2.0 million [1.5 million - 2.6 million]	1.8 million [1.4 million - 2.4 million]	1.3 million [950 000 - 1.7 million]	1.2 million [900 000 - 1.6 million]
<b>New HIV Infections (Children, aged 0-14)</b>	530 000 [360 000 - 830 000]	480 000 [330 000 - 750 000]	310 000 [210 000 - 490 000]	140 000 [96 000 - 220 000]	130 000 [90 000 - 210 000]
<b>AIDS-related deaths</b>	1.7 million [1.3 million - 2.4 million]	2.0 million [1.5 million - 2.7 million]	1.3 million [970 000 - 1.8 million]	660 000 [500 000 - 920 000]	630 000 [480 000 - 880 000]

In 2022, there were 39 million people living with HIV:

- 37.5 million adults (15 years or older)
- 1.5 million children (0–14 years).

53% of all people living with HIV were women and girls

At the end of December 2022, 29.8 million people (76% of all people living with HIV) were accessing antiretroviral therapy, up from 7.7 million in 2010.

New HIV infections have been reduced by 59% since the peak in 1995.

AIDS-related deaths have been reduced by 69% since the peak in 2004 and by 51% since 2010.

Source: UNAIDS 2023 epidemiological estimates.

# HIV infection: where are we today?

## Regional data – 2022

	People living with HIV	New HIV Infections	New HIV Infections (Adults, aged 15+)	New HIV Infections (Children, aged 0-14)	AIDS-related deaths
<b>Global</b>	39.0 million [33.1 million - 45.7 million]	1.3 million [1.0 million - 1.7 million]	1.2 million [900 000 - 1.6 million]	130 000 [90 000 - 210 000]	630 000 [480 000 - 880 000]
<b>Asia and the Pacific</b>	6.5 million [5.3 million - 7.8 million]	300 000 [220 000 - 400 000]	290 000 [210 000 - 380 000]	12 000 [8600 - 18 000]	150 000 [110 000 - 220 000]
<b>Caribbean</b>	330 000 [290 000 - 380 000]	16 000 [11 000 - 21 000]	14 000 [10 000 - 19 000]	1 500 [1 100 - 2 100]	5 600 [4100 - 7500]
<b>Eastern and southern Africa</b>	20.8 million [17.4 million - 24.5 million]	500 000 [370 000 - 670 000]	440 000 [330 000 - 590 000]	58 000 [38 000 - 100 000]	260 000 [200 000 - 370 000]
<b>Eastern Europe and central Asia</b>	2.0 million [1.8 million - 2.1 million]	160 000 [140 000 - 180 000]	160 000 [130 000 - 180 000]	... [... - ...]	48 000 [38 000 - 58 000]
<b>Latin America</b>	2.2 million [2.0 million - 2.5 million]	110 000 [94 000 - 130 000]	110 000 [90 000 - 130 000]	3800 [2900 - 4700]	27 000 [21 000 - 35 000]
<b>Middle East and North Africa</b>	190 000 [160 000 - 220 000]	17 000 [13 000 - 23 000]	16 000 [12 000 - 21 000]	1700 [1300 - 2100]	5300 [4000 - 7100]
<b>Western and central Africa</b>	4.8 million [4.2 million - 5.5 million]	160 000 [110 000 - 250 000]	110 000 [66 000 - 190 000]	51 000 [34 000 - 69 000]	120 000 [96 000 - 160 000]
<b>Western and central Europe and North America</b>	2.3 million [1.9 million - 2.6 million]	58 000 [46 000 - 69 000]	57 000 [46 000 - 69 000]	... [... - ...]	13 000 [9300 - 17 000]

Source: UNAIDS 2023 epidemiological estimates.

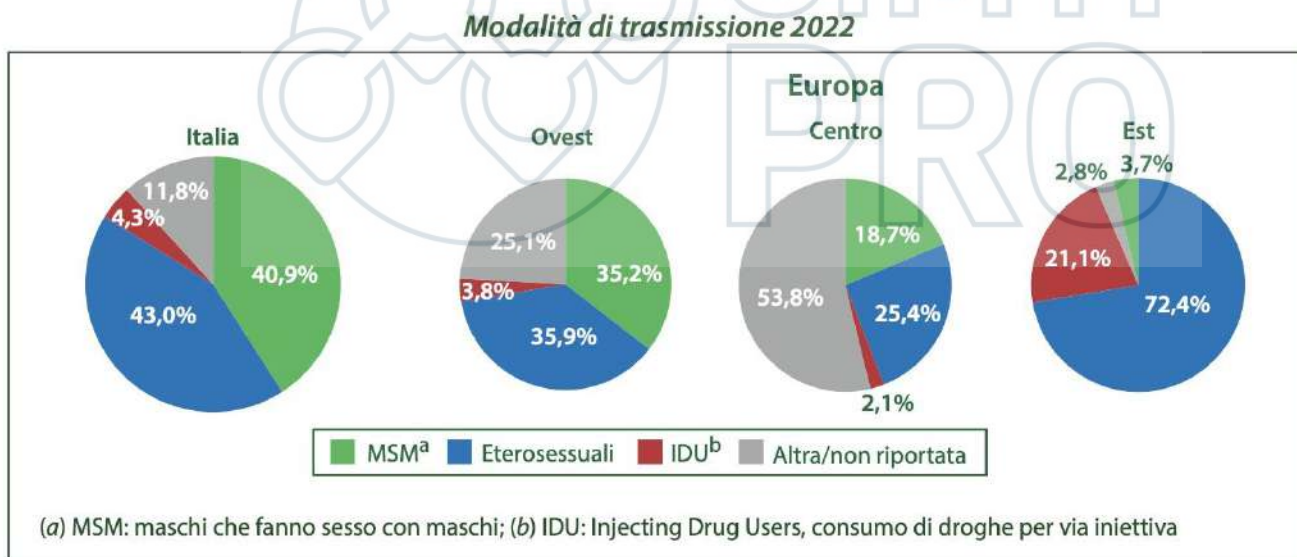
# HIV infection: where are we today?

## Key populations

Globally, median HIV prevalence among the adult population (ages 15-49) was 0.7%.

However median prevalence was higher among key populations:

- 2.5% among sexworkers
- 7.5% among gay men and other men who have sex with men
- 5.0% among people who injectdrug
- 10.3% among transgenderpersons
- 1.4%amongpeopleinprisons.



Distribuzione percentuale delle nuove diagnosi di infezione da HIV per modalità di trasmissione 2022.

Fonti: Sistema di Sorveglianza HIV nazionale, ECDC/WHO. HIV/AIDS Surveillance in Europe 2023-2022 data (1)

# HIV infection: where are we today in Italy?

## HIV

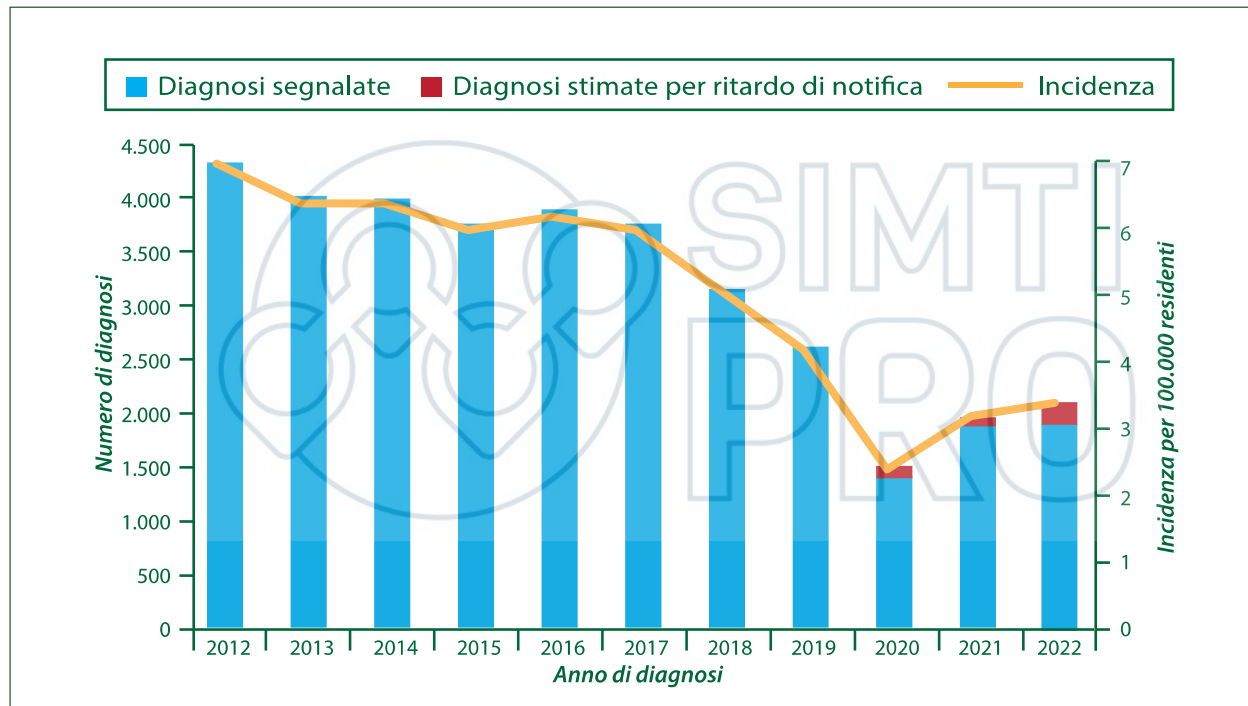
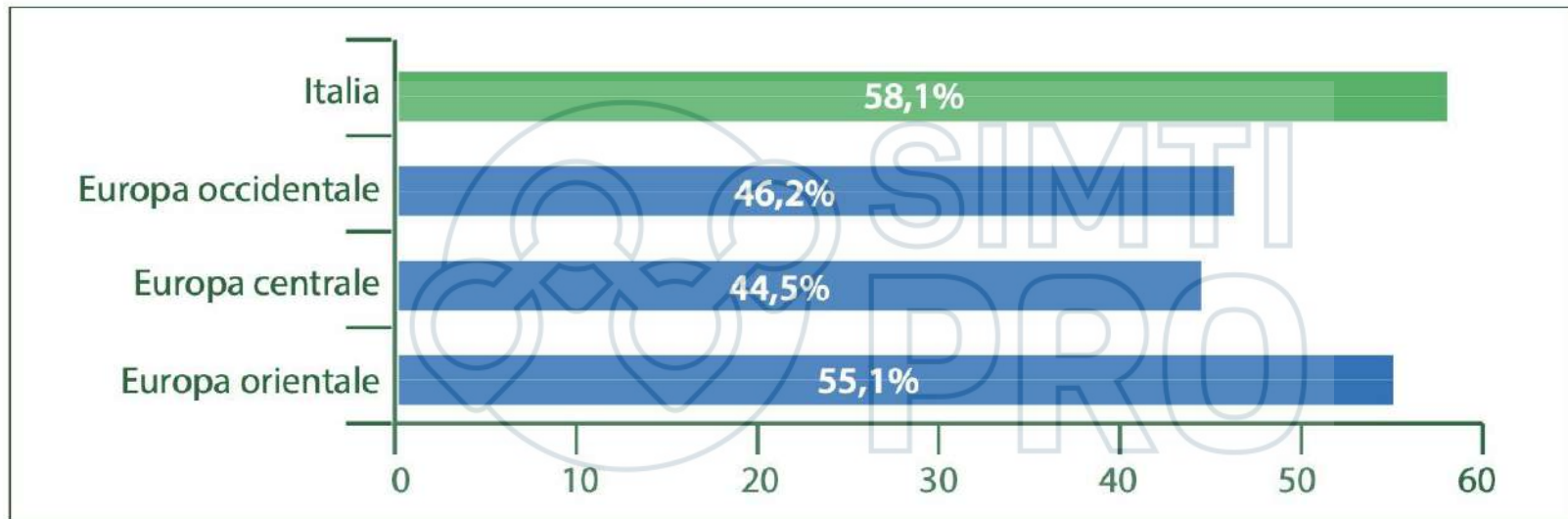


Figura 1 - Nuove diagnosi di infezione da HIV e incidenze corrette per ritardo di notifica (2012-2022)

Not Ist Super Sanità 2023;36(11)

# HIV infection: where are we today in Italy?

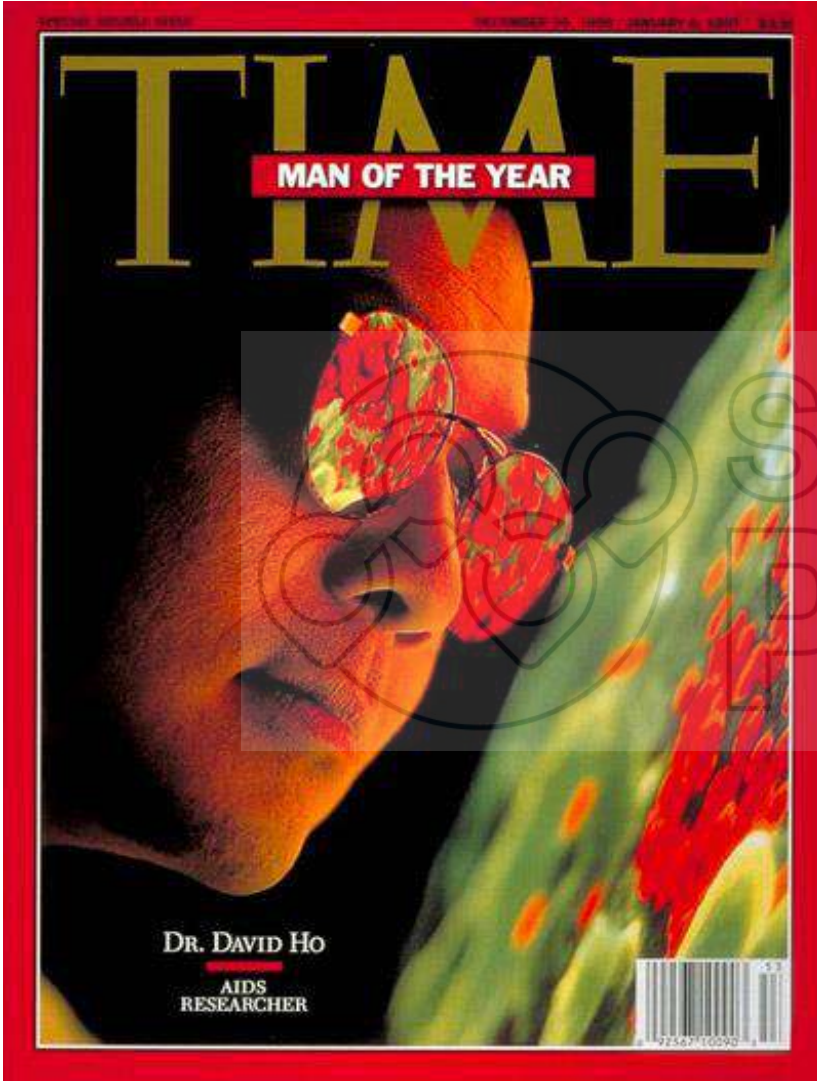
*Late presenters\* 2022*



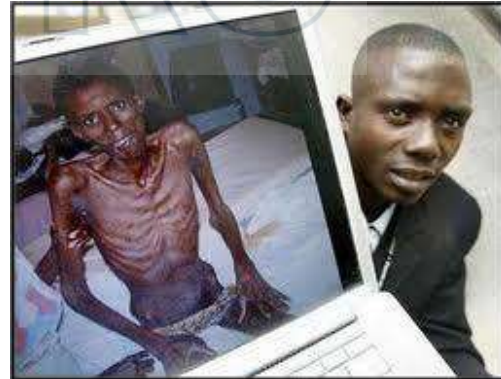
(\*) *Late presenters*: nuove diagnosi di infezione da HIV con numero di linfociti CD4 <350 cell/ $\mu$ l.

Fonti: Sistema di Sorveglianza HIV nazionale, ECDC/WHO. HIV/AIDS Surveillance in Europe 2023-2022 data (1)

Not Ist Super Sanità 2023;36(11)



# 1996





# The New England Journal of Medicine

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VOLUME 338

MARCH 26, 1998

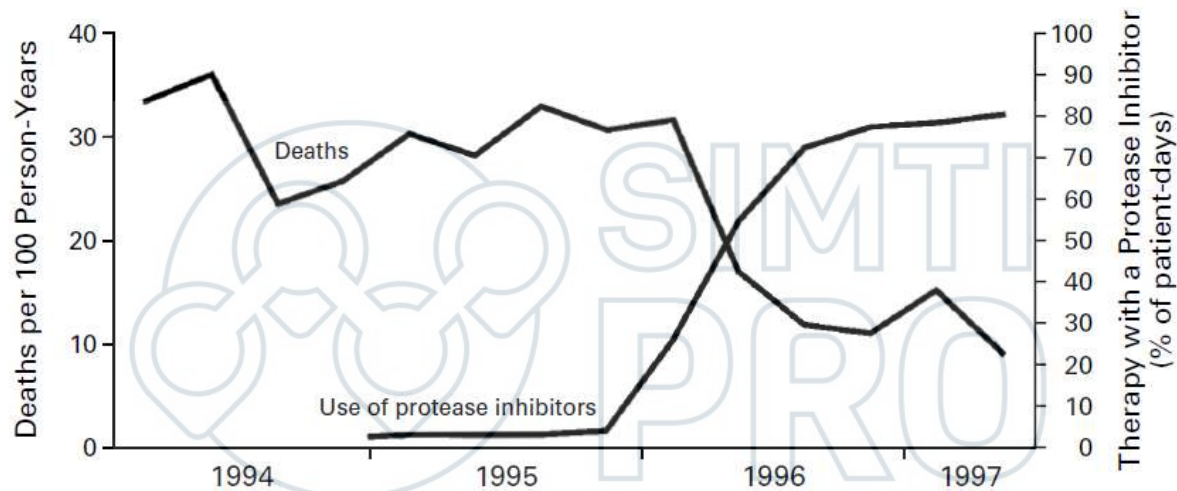
NUMBER 13



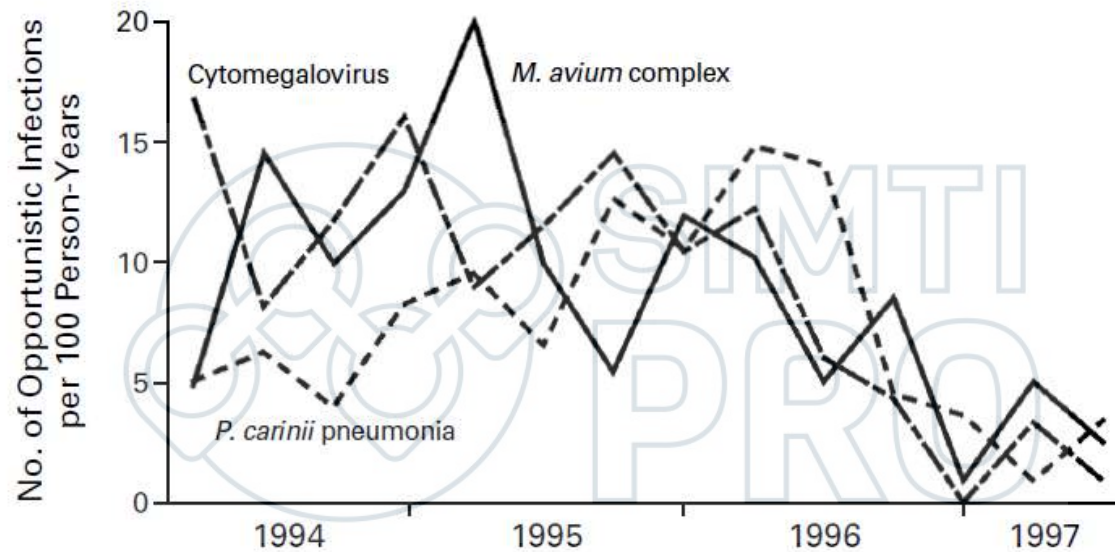
## DECLINING MORBIDITY AND MORTALITY AMONG PATIENTS WITH ADVANCED HUMAN IMMUNODEFICIENCY VIRUS INFECTION

FRANK J. PALELLA, JR., M.D., KATHLEEN M. DELANEY, M.S., ANNE C. MOORMAN, B.S.N., M.P.H.,  
MARK O. LOVELESS, M.D., JACK FUHRER, M.D., GLEN A. SATTEN, PH.D., DIANE J. ASCHMAN, R.Ph., M.S.,  
SCOTT D. HOLMBERG, M.D., M.P.H., AND THE HIV OUTPATIENT STUDY INVESTIGATORS\*



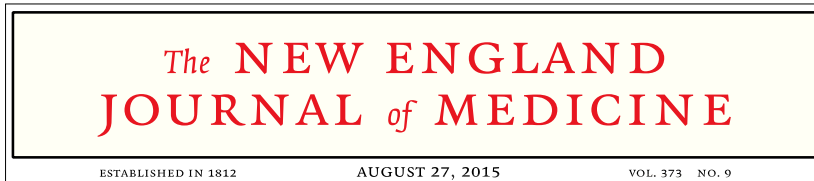


**Figure 1.** Mortality and Frequency of Use of Combination Antiretroviral Therapy Including a Protease Inhibitor among HIV-Infected Patients with Fewer Than 100 CD4+ Cells per Cubic Millimeter, According to Calendar Quarter, from January 1994 through June 1997.



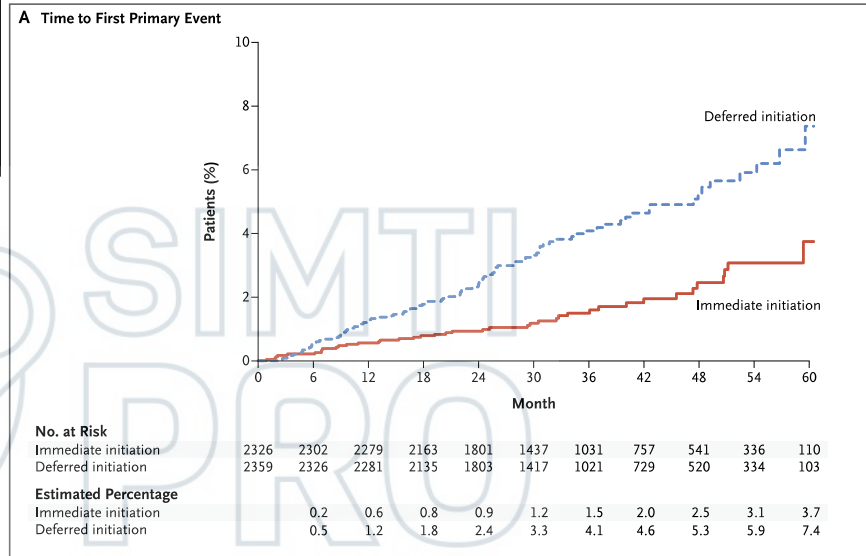
**Figure 2.** Rates of Cytomegalovirus Infection, *Pneumocystis carinii* Pneumonia, and *Mycobacterium avium* Complex Disease among HIV-Infected Patients with Fewer Than 100 CD4+ Cells per Cubic Millimeter, According to Calendar Quarter, from January 1994 through June 1997.

# Management of HIV infection in 2024



## Initiation of Antiretroviral Therapy in Early Asymptomatic HIV Infection

The INSIGHT START Study Group\*



ART is the cornerstone of HIV care and should be initiated at or close to diagnosis.

There are 4 initial combination regimens for antiretroviral-naïve patients and several others that can be used in certain clinical scenarios, which allows individualization of treatment.

Short- and long-term adverse effects and drug–drug interactions can be managed proactively.

# HIV Today

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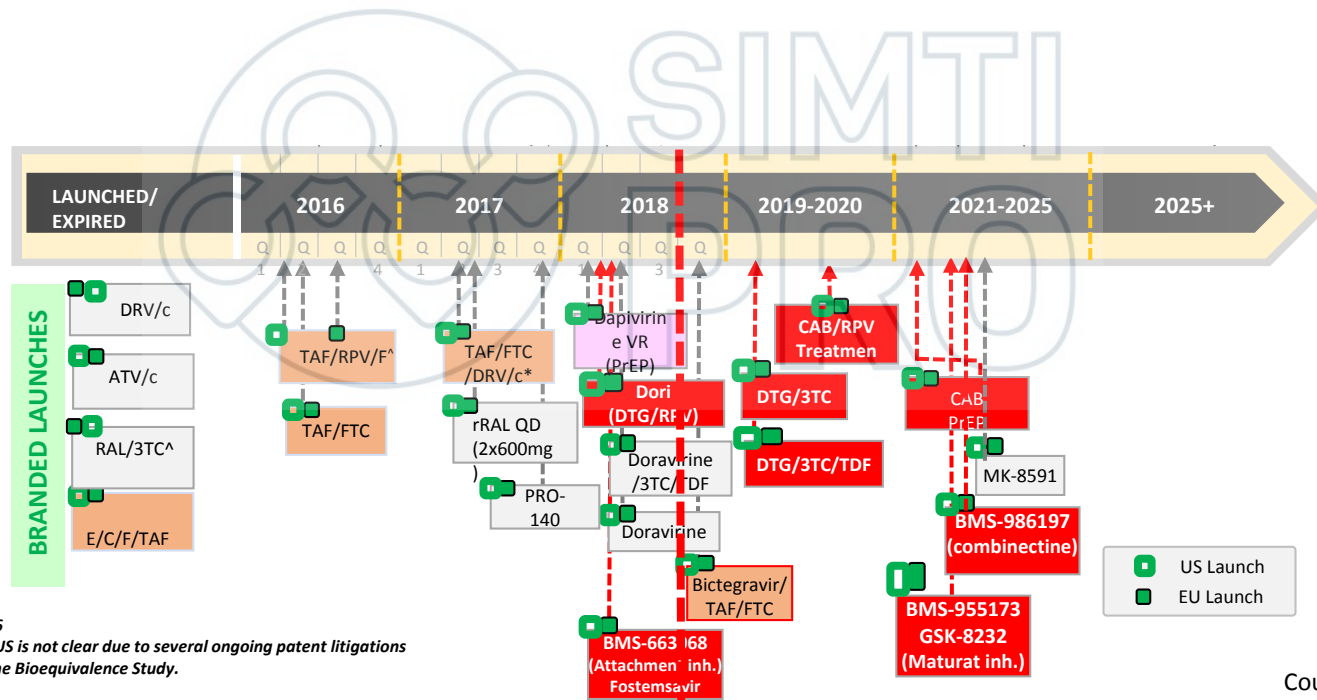
- **The Opportunity:**

- More than 20 Antiretroviral Drugs and Combinations
- Diagnostics : CD4, Viral Load, Resistance Testing

- **The Challenges:**

- Life Long Therapy (30-50 years)
- Highly mutable virus leading to resistance
- Supply Chain
- Logistics
- Funding

# Estimated Expected Launches & Earliest Generic Entries



^ Approved in the US on 1<sup>st</sup> March 2016

\*Launch of gx darunavir in the EU and US is not clear due to several ongoing patent litigations

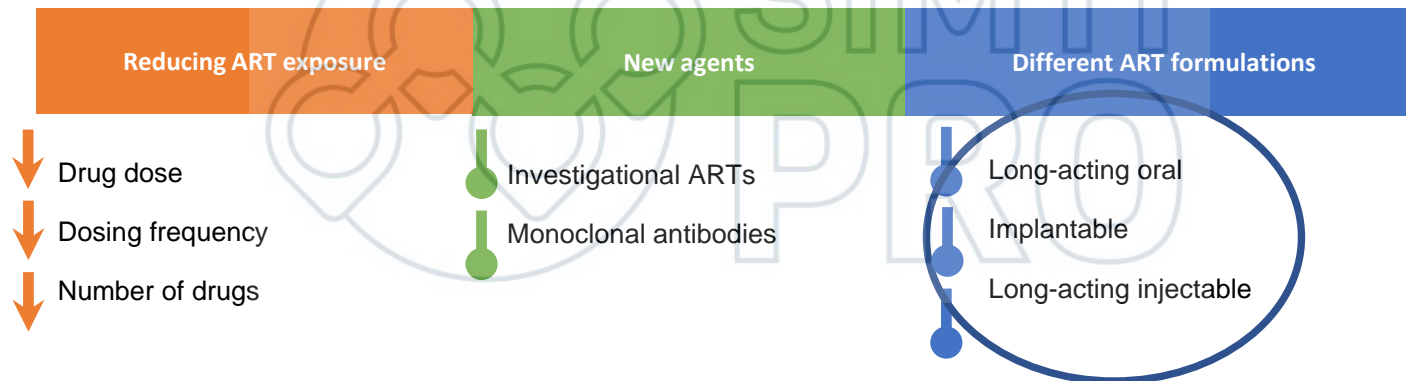
\*Assuming the filing will be based on the Bioequivalence Study.

Note: Estimates for generic entry do not reflect a determination regarding the validity of underlying IP

Courtesy of A. Antinori

# HIV Today

## HIV Treatment and management strategies for next 10 yrs



# Lifelong daily HIV therapy can be challenging for some PLHIV



## Fear of disclosure<sup>1-3</sup>

**Stigma** surrounding HIV is a major concern for PLHIV, and disclosure of HIV status is perhaps the area an individual retains the greatest control



*"Whenever I go out with [my friends] or they come over to visit, I don't take my medications. I could never let them know I'm positive"<sup>3</sup>*



## Daily reminder of HIV<sup>2</sup>

**Psychological** challenges can match physical manifestations



*"I'm telling you it's very depressing, you got to take it every day, every day, every day, and that's not every day living. And sometimes you want to say Lord, I want to take a break. I'm tired of taking pills"<sup>4</sup>*



## Adherence anxiety<sup>2</sup>

Daily medication can be restrictive and may lead to **adherence anxiety**



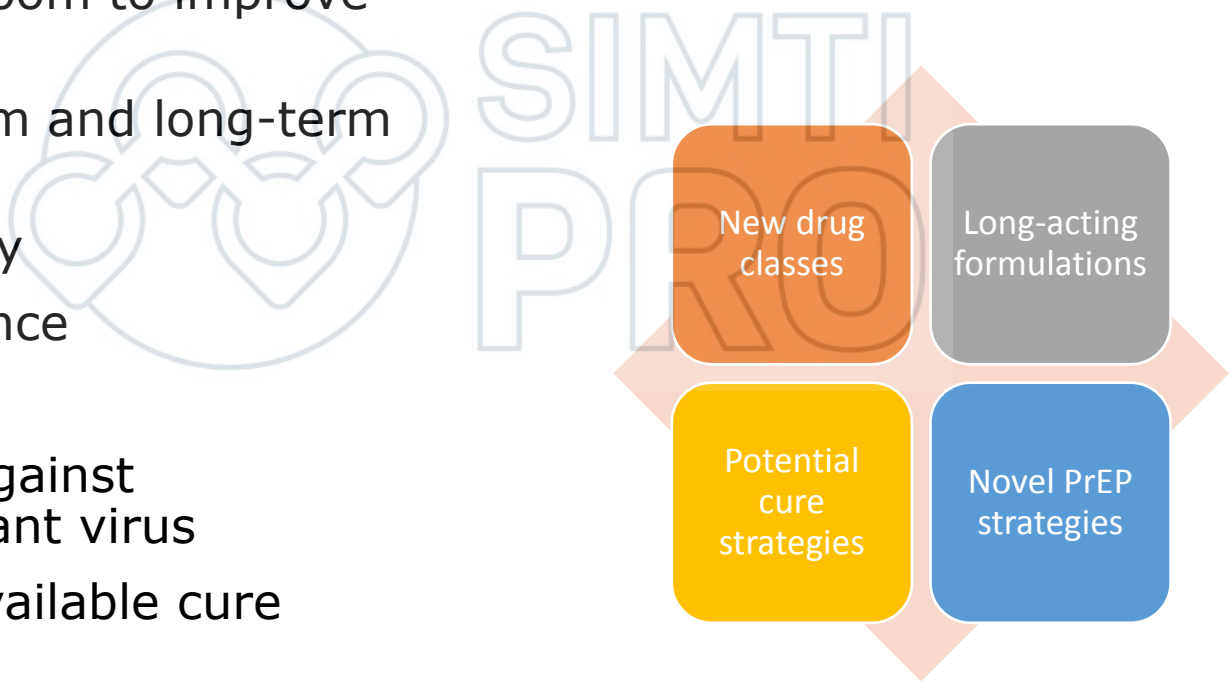
*"...I'd still get anxiety over whether I'd taken it or not, and once or twice I double-dosed, just because I couldn't remember, but then I'd go count and – it's just a lot of anxiety..."<sup>5</sup>*

1. Changing Perceptions: Talking About HIV and Attitude: Positive Voices Survey, Nov 2018. Available from: [https://www.nat.org.uk/sites/default/files/publications/web\\_PV\\_Changing%20Perceptions-Stigma-report.pdf](https://www.nat.org.uk/sites/default/files/publications/web_PV_Changing%20Perceptions-Stigma-report.pdf) (accessed July 2020)  
2. Young B, et al. IDWeek 2019. Poster 1329; 3. Katz IT, et al. J Int AIDS Soc 2013;16(Suppl 2):18640  
4. Muessig KE, et al. AIDS Patient Care STDs 2015;29:606–16; 5. Mantzios A, et al. IDWeek 2019. Poster 2497



# Despite Extraordinary Efficacy, HIV Therapy Can Be Improved

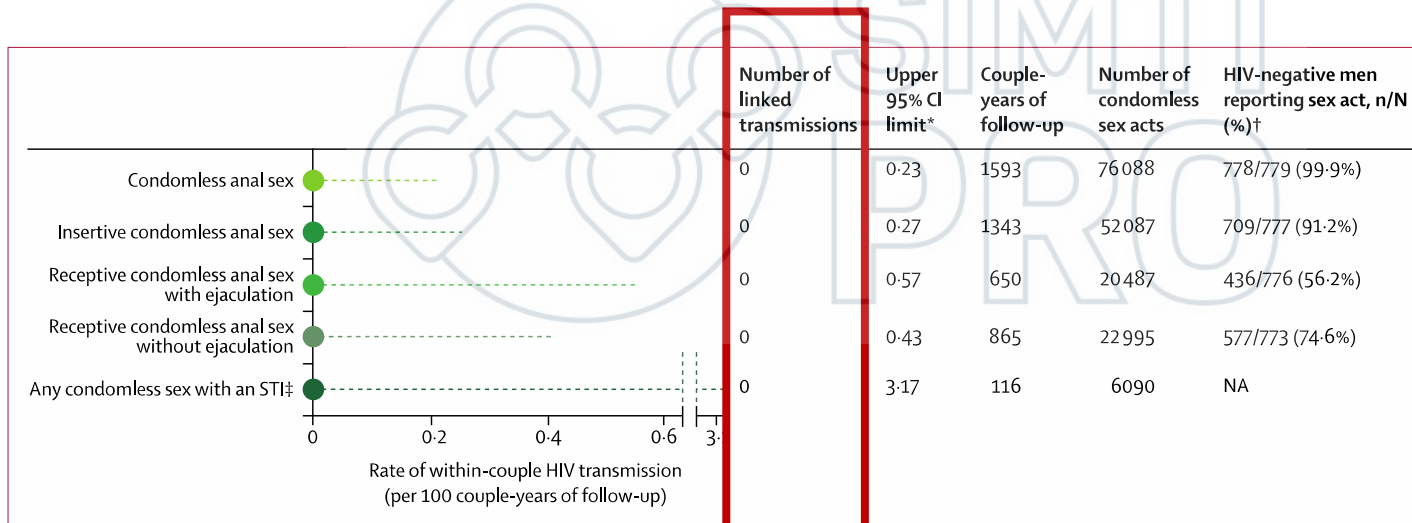
- Virologic suppression rates can barely be improved in adherent patients
- But there is room to improve ART:
  - Short-term and long-term safety
  - Tolerability
  - Convenience
  - Cost
  - Activity against panresistant virus
  - Still no available cure
- ART approaches under current investigation include:



Courtesy of A. Antinori and A. Calcagno

# Risk of HIV transmission through condomless sex in serodifferent gay couples with the HIV-positive partner taking suppressive antiretroviral therapy (PARTNER): final results of a multicentre, prospective, observational study

Alison J Rodger, Valentina Cambiano, Tina Bruun, Pietro Vernazza, Simon Collins, Olaf Degen, Giulio Maria Corbelli, Vicente Estrada, Anna Maria Geretti, Apostolos Beloukas, Dorthe Raben, Pep Coll, Andrea Antinori, Nneka Nwokolo, Armin Rieger, Jan M Prins, Anders Blaxhult, Rainer Weber, Arne Van Eeden, Norbert H Brockmeyer, Amanda Clarke, Jorge del Romero Guerrero, Francois Raffi, Johannes R Bogner, Gilles Wandeler, Jan Gerstoft, Felix Gutiérrez, Kees Brinkman, Maria Kitchen, Lars Ostergaard, Agathe Leon, Matti Ristola, Heiko Jessen, Hans-Jürgen Stellbrink, Andrew N Phillips, Jens Lundgren, for the PARTNER Study Group\*



Lancet 2019; 393: 2428-38

**JAMA**  
THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

February 5, 2019

Volume 321  
Number 5

**Viewpoint**

# **HIV Viral Load and Transmissibility of HIV Infection**

## **Undetectable Equals Untransmittable**

RW Eisinger, CW Dieffenbach, and AS Fauci

# HIV TREATMENT as PREVENTION

A HIGHLY EFFECTIVE STRATEGY TO PREVENT THE SEXUAL TRANSMISSION OF HIV



People living with HIV who take  
**HIV medication  
as prescribed**



and get and keep an  
**undetectable viral load**



**have effectively no risk of  
sexually transmitting HIV**  
to their HIV-negative partners

APRIL 2022

LEARN MORE AT [HIV.GOV/TASP](https://www.hiv.gov/tasp)



# The Washington Post

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January 10, 2016

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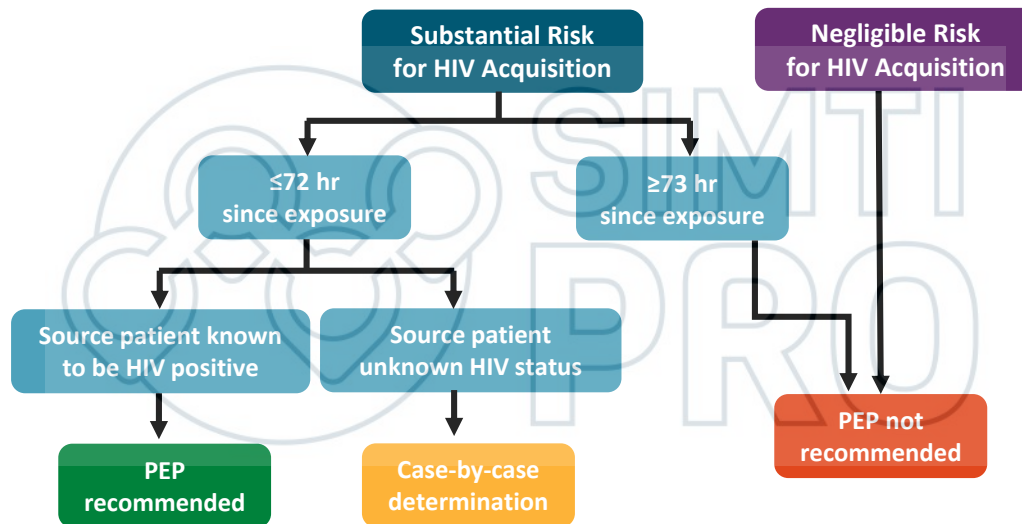
OPINIONS

## **No More Excuses. We Have the Tools to End the HIV/AIDS Pandemic.**

**Anthony S. Fauci**

# HIV post-exposure prophylaxis

Substantial Risk for HIV Acquisition  
Exposure of  
vagina, rectum, eye, mouth, or other mucous membrane, nonintact skin, or percutaneous contact  
With  
blood, semen, vaginal secretions, rectal secretions, breast milk, or any body fluid that is visibly contaminated with blood  
When the source is known



Negligible Risk for HIV Acquisition  
Exposure of  
vagina, rectum, eye, mouth, or other mucous membrane, intact or nonintact skin, or percutaneous contact  
With  
urine, nasal secretions, saliva, sweat, or tears if not visibly contaminated with blood  
Regardless of the known or suspected HIV status of the source

# HIV post-exposure prophylaxis

## Results from the post-exposure prophylaxis pilot program (P-QUAD) demonstration project in Los Angeles County

Matthew R Beymer<sup>1,2</sup>, Ryan M Kofron<sup>3</sup>, Chi-Hong Tseng<sup>4</sup>, Robert K Bolan<sup>1</sup>, Risa P Flynn<sup>1</sup>, Jennifer M Sayles<sup>3</sup>, Mario J Perez<sup>5</sup>, Wilbert C Jordan<sup>6</sup> and Raphael J Landovitz<sup>2,3</sup>

Between March 2010 and June 2011, two community-based clinics in Los Angeles County provided PEP in a pilot program to 267 unique individuals. Courses were primarily dispensed to men who have sex with men (84%) and consisted overwhelmingly of a three-drug antiretroviral therapy regimen containing two nucleoside reverse transcriptase inhibitors and either an integrase inhibitor (raltegravir) or a boosted protease inhibitor (lopinavir/ritonavir). Approximately 64% of all PEP courses were followed for at least 12 weeks, and seven individuals seroconverted. Of the seven seroconversions, six had subsequent re-exposure.

**Table 3.** Follow-up data for P-QUAD participants, March 2010 – June 2011 ( $n = 282$  courses).

	<i>n</i>	%
Self-reported medication adherence		
Incomplete medication adherence	74	26.2
Complete medication adherence	149	52.8
Unknown <sup>a</sup>	59	20.9
Course completion		
Completed	139	49.3
Refused	1	0.4
Other	11	3.9
Unknown	131	46.5
Last visit <sup>b</sup>		
No follow-up visits attended	24	8.5
Retained at 2 weeks	30	10.6
Retained at 4 weeks	47	16.7
Retained at 12 weeks	49	17.4
Retained at 24 weeks	132	46.8
Seroconversion at follow-up <sup>c</sup>		
Remained HIV-negative through follow-up	275	97.5
Tested HIV-positive at follow-up	7	2.5
Total	282	100.0

International Journal of STD & AIDS  
2018, Vol. 29(6) 557–562

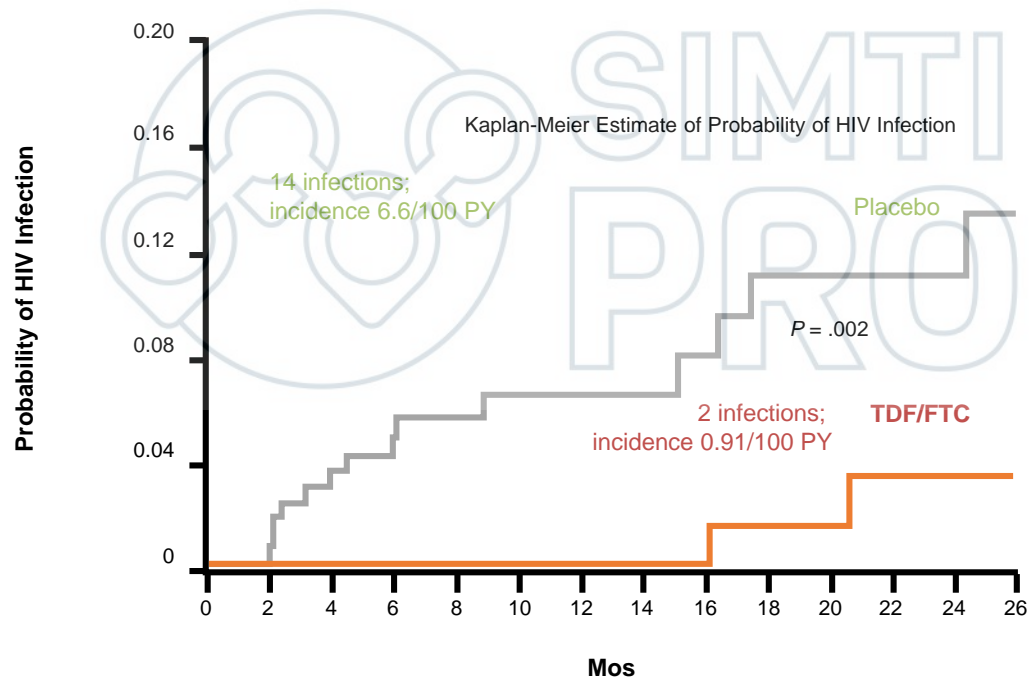
# HIV pre-exposure prophylaxis





# On-Demand Oral TDF/FTC PrEP in High-Risk MSM

- IPERGAY: randomized double-blind trial of event-driven oral TDF/FTC  
2 tablets taken 2-24 hrs before sex; 1 tablet 24 hrs after sex; 1 tablet 48 hrs after first event-driven dose

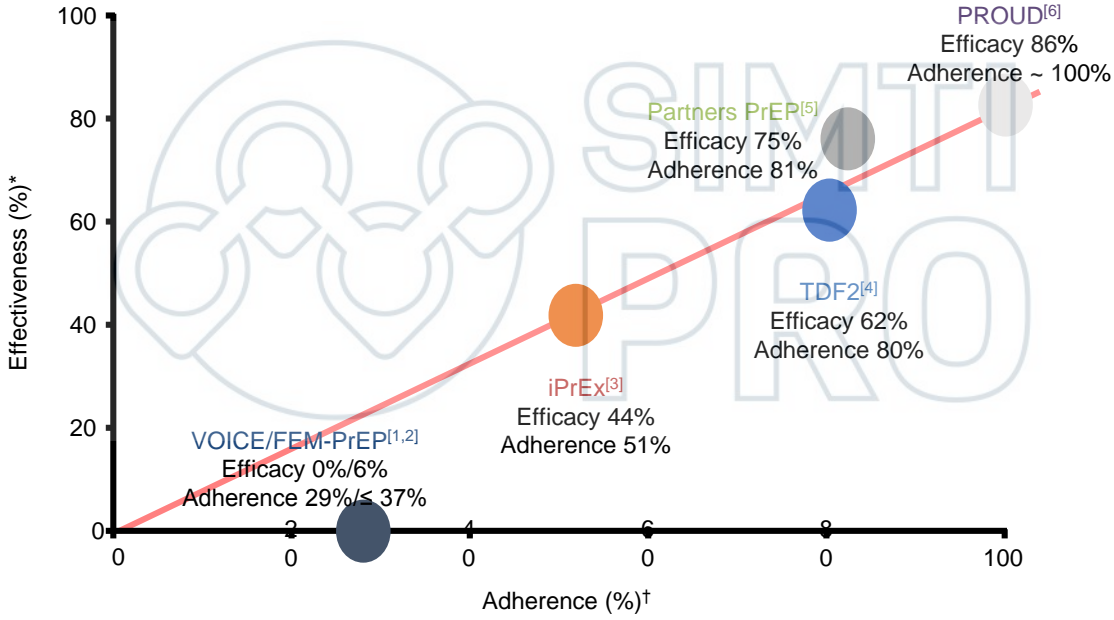


1. Molina JM, et al. N Engl J Med. 2015;373:2237-2246.
2. Molina JM, et al. IAC 2016. Abstract WEAC0102.



**PrEP works if you take it!!**

# Effectiveness of TDF/FTC PrEP improves with adherence

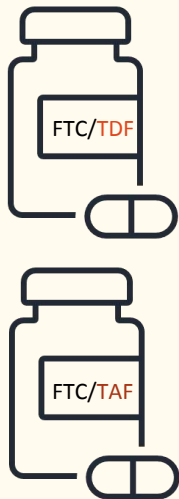


1. Murrain JM, et al. N Engl J Med. 2015;372:509-518.
2. Van Damme L, et al. N Engl J Med. 2012;367:411-422.
3. Grant RM, et al. N Engl J Med. 2010;363:2587-2599.
4. Thigpen MC, et al. N Engl J Med. 2012;367:423-434.

# Expanding PrEP Options to Facilitate Adherence and Persistence: Today and in the Near Future

Present

Once-Daily\* Oral Tablets



Long-acting antiretroviral drug is injected into the body.

Emerging

Long-Acting Options

LA CAB  
INJECTABLE



INTRAVAGINAL RING  
(IVR)



Polymer ring inserted into the vagina releases antiretroviral drug over time.

IMPLANT



Device implanted in the body releases antiretroviral drug over time.

ANTIBODY



Antibody is infused or injected into the body.

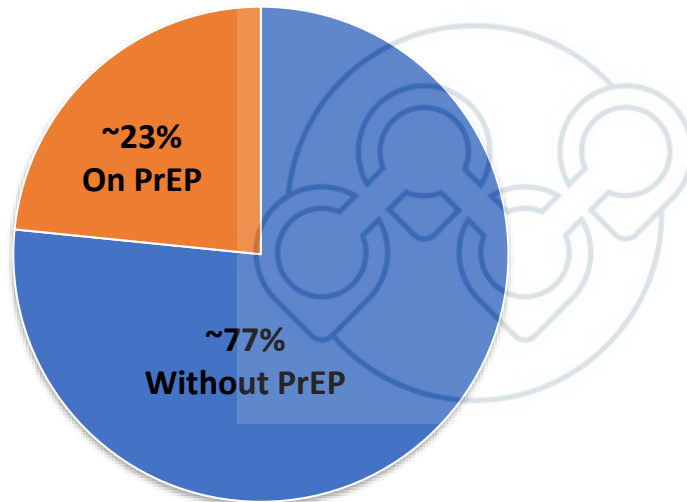
Future

\*Off-label on-demand use of FTC/TDF supported by international guidelines.

[hiv.gov/hiv-basics/hiv-prevention/potential-future-options/long-acting-prep](https://hiv.gov/hiv-basics/hiv-prevention/potential-future-options/long-acting-prep)

# Preventing HIV Transmission: The PrEP Gap in the United States

## People With An Indication for PrEP (2019)<sup>1</sup>

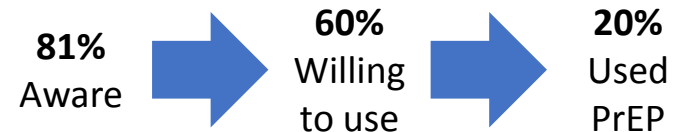


- **~1.2 million Americans are likely to benefit from PrEP<sup>2</sup>**

- 1 in 4 MSM<sup>3</sup>: 492,000
- 1 in 5 PWID<sup>3</sup>: 115,000
- 1 in 200 heterosexual adults<sup>3</sup>: 624,000

## Gaps Between PrEP Awareness, Willingness, and Use<sup>4</sup>

American Men's Internet Survey 2017  
(n = 4475 MSM PrEP eligible)



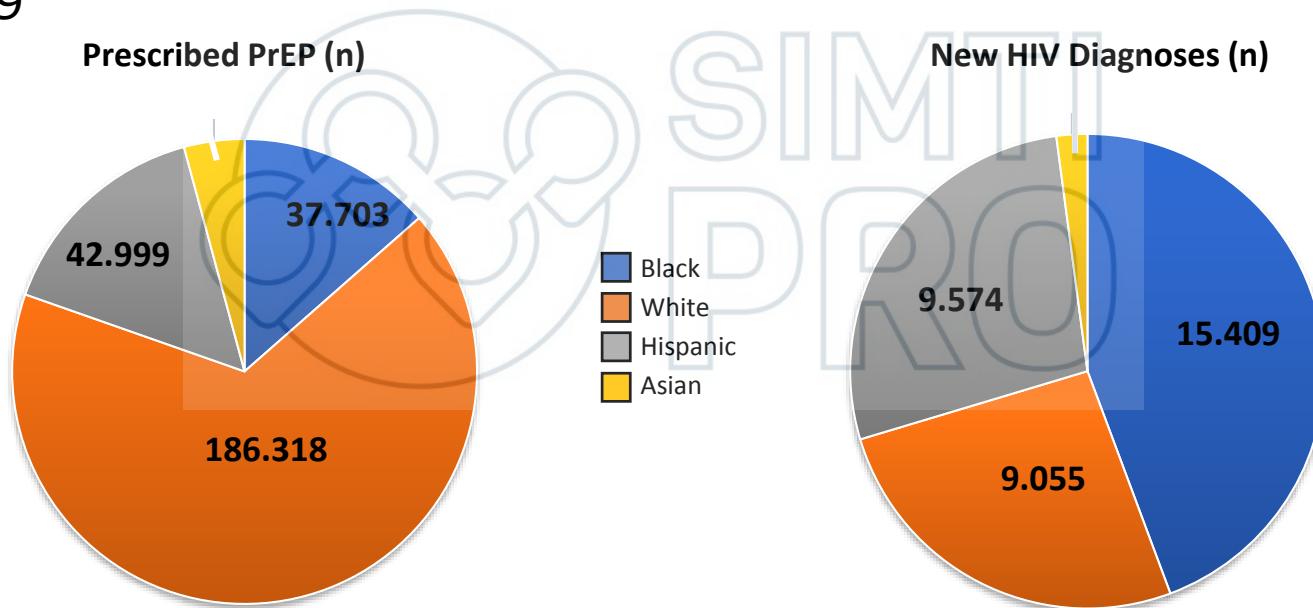
1. [cdc.gov/hiv/pdf/library/reports/surveillance/cdc-hiv-surveillance-report-vol-26-no-2.pdf](https://www.cdc.gov/hiv/pdf/library/reports/surveillance/cdc-hiv-surveillance-report-vol-26-no-2.pdf).

2. Harris. Morb Mortal Wkly Rep. 2019;68:1117. 3. MMWR Morb Mortal Wkly Rep. 2015;64:1291.

4. Sullivan. J Int AIDS Society. 2020;23:e25461.

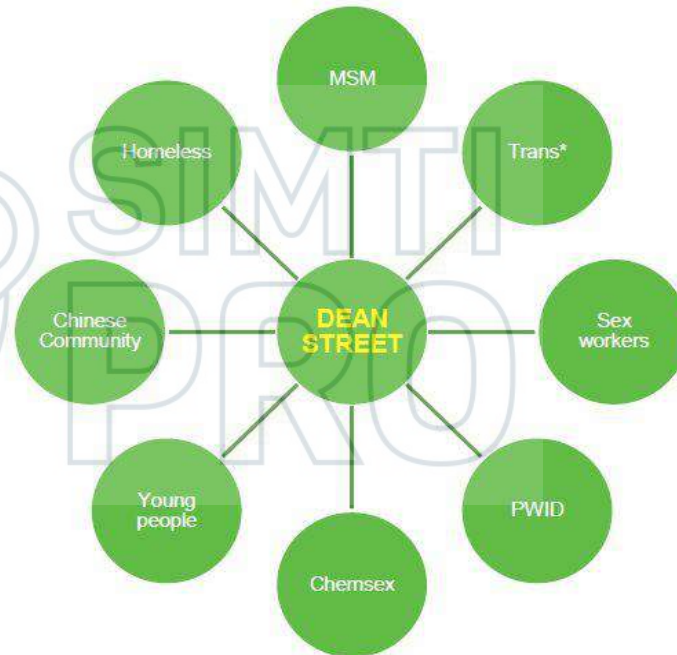
# Low PrEP Uptake in Black and Hispanic People Compared With White People

- Black and Hispanic people accounted for 70% of new HIV diagnoses but only 18% of people prescribed PrEP in the US in 2019



[cdc.gov/hiv/library/reports/surveillance-data-tables/vol-1-no-7/index.html](https://cdc.gov/hiv/library/reports/surveillance-data-tables/vol-1-no-7/index.html)

# High-risk population



# Creating Change: Education of Patients and Providers Is Key Addressing Inequities in PrEP Uptake

- ✓ Community-based education to raise awareness, combat implicit and unconscious bias, and instill trust in the healthcare system
- ✓ More Black healthcare professionals as trusted community sources of knowledge
- ✓ Address unfounded beliefs about risk compensation that feeds reluctance to PrEP
- ✓ Positive messaging to patients via social networks and social media to improve knowledge and attitudes and reduce stigma
- ✓ Support prevention messages for HIV and STIs through monitoring and testing

Mayer. Adv Ther. 2020;37:1778.



# Moving towards zero new HIV infections: the importance of combination prevention

Intensity	Intervention	Year of elimination of HIV transmission						
		Scenario 1 (Sensitivity range)	Scenario 2 (Sensitivity range)	Scenario 3 (Sensitivity range)	Scenario 4 (Sensitivity range)	Scenario 5 (Sensitivity range)	Scenario 6 (Sensitivity range)	Comprehensive interventions (Sensitivity range)
Weak	Partner reduction: 10%	After 2050		After 2050				
	Condom use rate: 40%		After 2050					
	Testing and treatment: 50%				After 2050			
Moderate	PrEP coverage rate: 10%					2047 (2046 – 2049)		
	Partner reduction: 20%	After 2050		2037 (2031-2043)				2025 (2024 – 2026)
	Condom use rate: 50%		After 2050					
Strong	Testing and treatment: 70%				After 2050			2030 (2029 – 2031)
	PrEP coverage rate: 20%					2040 (2038 – 2041)		
	Partner reduction: 30%	After 2050		2030 (2026 -2032)				2024 (2023 – 2024)
	Condom use rate: 60%		After 2050					
	Testing and treatment: 90%				2034 (2030 – 2037)			2027 (2026 – 2028)
	PrEP coverage rate: 30%					2036 (2034 – 2037)		

Table 2: Years of elimination of HIV transmission under different intervention scenarios.

Wang Y Lancet Reg Health West Pac 2022

# Case study 1

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- 29-yr-old female
- Never performed HIV test in the past
- Stable relationship with a young man
- December 2021 unintended pregnancy and access at pregnancy termination clinic of our Hospital
- HIV test (December 2021): positive
- HIV test on partner (December 2021): positive

**What we missed?**

## Case study 2

- 36-yr-old MSM
- Last HIV test on January 2019
- Reports sexual exposure in the period June-August 2021
  - No condom use
  - Partners of unknown HIV status
- No symptoms reported in the past
- On December 1<sup>st</sup> 2021 access to salivary tests for HIV during a testing campaign carried out by volunteer association: positive
- ELISA and WB HIV test confirmed positivity

**What we missed?**

## Case study 3

- 27-yr-old MSM
- Last HIV test on September 2021
- Reports sexual exposure on January 2022
  - No condom use
  - Partner of unknown HIV status
- After 2 weeks fever and rash
- After 1 month from sexual exposure perform HIV test: HIV Ag/Ab indeterminate; WB: p24+, gp160+

**What we missed?**

# What's next?



**Diagnose all people with HIV as early as possible**



**Prevent new HIV transmissions by using proven interventions, including pre-exposure prophylaxis (PrEP)**



**Treat people with HIV rapidly and effectively to reach sustained viral suppression**



**Respond quickly to potential HIV outbreaks to get vital prevention and treatment services to people who need them**

# Acknowledgments

## ***Infectious Diseases Unit***

*Fondazione IRCCS Ca' Granda -Ospedale Maggiore  
Policlinico-MI*

