HIV Update

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MedNet21
Center for Continuing Medical Education

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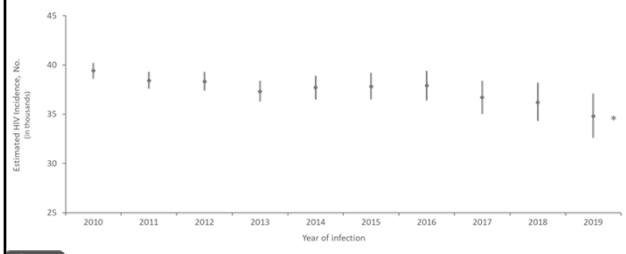
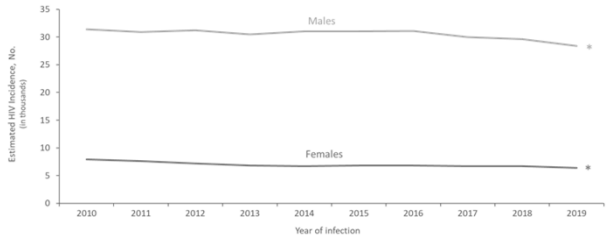
Estimated HIV Incidence among Persons Aged ≥13 Years
2010–2019—United States



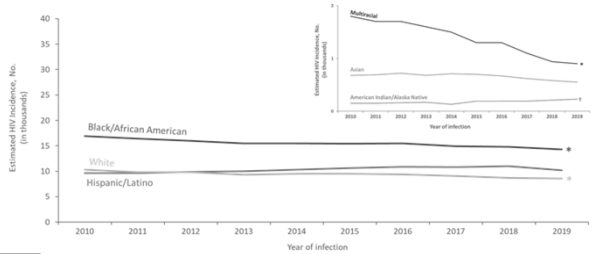
Note. Estimates were derived from a CD4 depletion model using HIV surveillance data. Bars indicate the range of the lower and upper bounds of the 95% confidence intervals for the point estimate.
* Difference from the 2010 estimate was deemed statistically significant (P < .05).

Estimated HIV Incidence among Persons Aged ≥13 Years, by Sex at Birth
2010–2019—United States



Note. Estimates were derived from a CD4 depletion model using HIV surveillance data.
* Difference from the 2010 estimate was deemed statistically significant (P < .05).

Estimated HIV Incidence among Persons Aged ≥13 Years, by Race/Ethnicity
2010–2019—United States



Note. Estimates were derived from a CD4 depletion model using HIV surveillance data. Hispanic/Latino persons can be of any race.
* Difference from the 2010 estimate was deemed statistically significant (P < .05).
† Estimates should be used with caution; relative standard errors are 30%–50%.

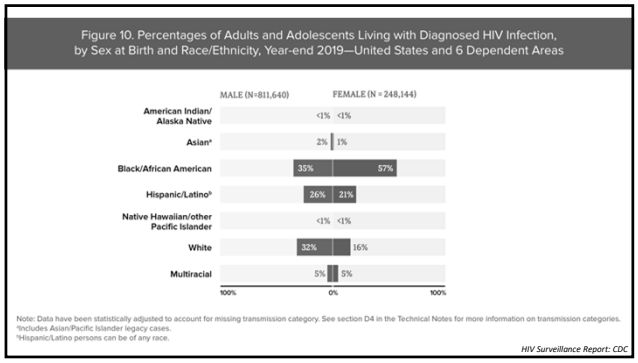
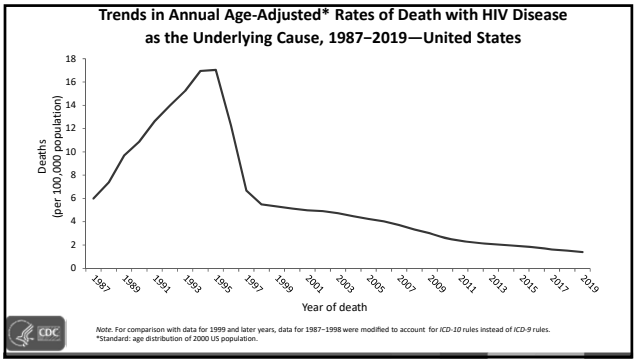
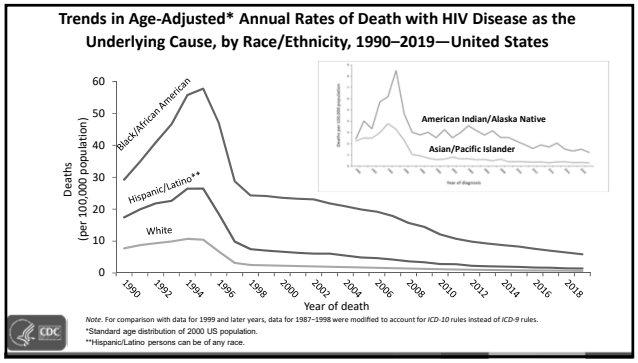
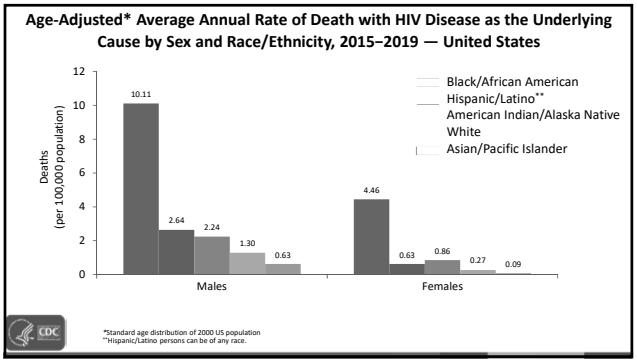


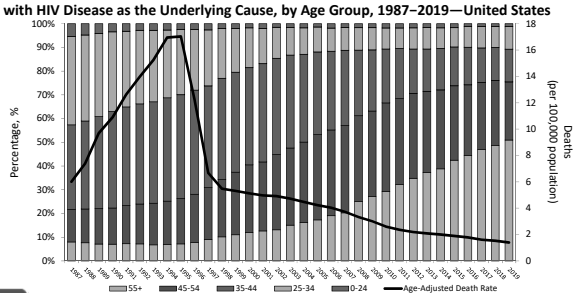
Figure 10. Percentages of Adults and Adolescents Living with Diagnosed HIV Infection, by Sex at Birth and Race/Ethnicity, Year-end 2019—United States and 6 Dependent Areas
MALE (N=811,640)
FEMALE (N = 248,144)
American Indian/ Alaska Native
<1% <1%
Asian[a]
2% 1%
Black/African American
35% 57%
Hispanic/Latino[b]
26% 21%
Native Hawaiian/other Pacific Islander
<1% <1%
White
32% 16%
Multiracial
5% 5%
100% 0% 100%
Note: Data have been statistically adjusted to account for missing transmission category. See section D4 in the Technical Notes for more information on transmission categories.
[a]Includes Asian/Pacific Islander legacy cases.
[b]Hispanic/Latino persons can be of any race.
HIV Surveillance Report: CDC


Trends in Annual Age-Adjusted* Rates of Death with HIV Disease as the Underlying Cause, 1987–2019—United States
Deaths (per 100,000 population)
Year of death
Note. For comparison with data for 1999 and later years, data for 1987–1998 were modified to account for ICD-10 rules instead of ICD-9 rules.
*Standard: age distribution of 2000 US population.


Trends in Age-Adjusted* Annual Rates of Death with HIV Disease as the Underlying Cause, by Race/Ethnicity, 1990–2019—United States
Deaths (per 100,000 population)
Black/African American
Hispanic/Latino**
White
American Indian/Alaska Native
Asian/Pacific Islander
Year of death
Note. For comparison with data for 1999 and later years, data for 1987–1998 were modified to account for ICD-10 rules instead of ICD-9 rules.
*Standard age distribution of 2000 US population.
**Hispanic/Latino persons can be of any race.


Age-Adjusted* Average Annual Rate of Death with HIV Disease as the Underlying Cause by Sex and Race/Ethnicity, 2015–2019 — United States
Deaths (per 100,000 population)
Black/African American
Hispanic/Latino**
American Indian/Alaska Native
White
Asian/Pacific Islander
10.11
2.64
2.24
1.30
0.63
4.46
0.63
0.86
0.27
0.09
Males
Females
*Standard age distribution of 2000 US population
**Hispanic/Latino persons can be of any race.

Trends in Annual Age-Adjusted* Rates of Death and the Percentage Distribution of Deaths with HIV Disease as the Underlying Cause, by Age Group, 1987–2019—United States

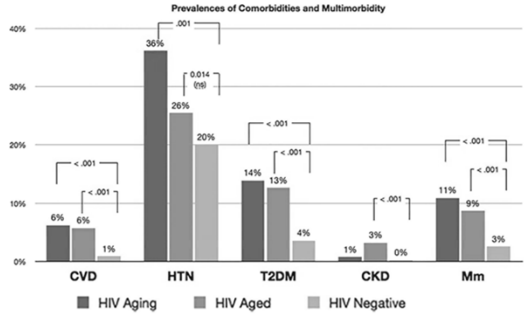


Note. For comparison with data for 1999 and later years, data for 1987–1998 were modified to account for *ICD-10* rules instead of *ICD-9* rules.
*Standard: age distribution of 2000 US population.

Reported Persons Living with HIV in Ohio, 2020 (n=25,096)

Characteristic	Living With Diagnosed HIV Infection in 2020 Rate*	No.	%
Sex at birth			
Males	346.4	19,856	79%
Females	87.9	5,240	21%
Age at end of year			
<13	2.7	49	<1%
13-14	7.1	21	<1%
15-19	15.3	114	<1%
20-24	97.1	726	3%
25-29	243.0	1,927	8%
30-34	350.2	2,693	11%
35-39	322.4	2,339	9%
40-44	346.9	2,377	9%
45-49	380.4	2,634	10%
50-54	474.5	3,452	14%
55-64	400.9	6,362	25%
65+	114.5	2,402	10%
Race/Ethnicity[b]			
American Indian/Alaska Native	66.3	15	<1%
Asian/Pacific Islander	56.7	173	1%
Black/African American	745.4	11,095	44%
Hispanic/Latino	373.7	1,824	7%
White	118.7	10,828	43%

Ohio Department of Health



Guaraldi G, Zona S, Brothers TD, Carli F, Stentarelli C, Dolci G, et al. (2015) Aging with HIV vs. HIV Seroconversion at Older Age: A Diverse Population with Distinct Comorbidity Profiles. PLoS ONE 10(4): e0118531. doi:10.1371/journal. pone.0118531

Trends in MI Risk in 2 United States Healthcare Systems

- Cohort study (2005-2010)
  - Kaiser Permanente Northern California (n=4.5 million)
  - Partners cohort (Massachusetts General Brigham) (n=1.5 million)
- Similar CVD risk profiles at baseline
- Outcomes during calender era 2005-2009 and 2010-2017
  - New MI diagnosis by HIV status
- MI risk (HIV versus no HIV)
  - 2005-2009: no difference (aHR 1.1 95% CI 0.8, 1.5)
  - 2010-2017: higher in HIV (aHR 1.6 95% CI 1.1, 2.4; *P*=0.007)
  - HIV-specific factors, such as longer HIV duration and newer ART, may have prevented PWH from realizing the same improvements in MI risk as person without HIV

Cumulative Incidence of MI

	With HIV	No HIV
2005-2009 (%)	1.1	1.1
2010-2017 (%)	1.2	0.9

*P<0.03 versus no HIV.

Silverberg MJ, et al. CROI 2022. Abstract 53.

2014 CDC Revised Classification System: Stage 3-Defining Opportunistic Illnesses in HIV Infection

- Bacterial infections, multiple or recurrent*
- Candidiasis of bronchia, trachea, or lungs
- Candidiasis of esophagus
- Cervical cancer, invasive*
- Coccidioidomycosis, disseminated or extrapulmonary
- Cryptococcosis, extrapulmonary
- Cryptosporidiosis, chronic intestinal (>1 month)
- Cytomegalovirus disease (other than liver, spleen, or nodes), onset age > 1 month
- Cytomegalovirus retinitis (with loss of vision)
- Encephalopathy attributed to HIV^
- Herpes simplex: chronic ulcers (present for >1 month) or bronchitis, pneumonitis, or esophagitis (onset at age > 1 month)
- Histoplasmosis, disseminated or extrapulmonary
- Isosporiasis, chronic intestinal (> 1 month's duration)
- Kaposi's sarcoma
- Lymphoma, Burkitt's (or equivalent term)
- Lymphoma, immunoblastic (or equivalent term)
- Lymphoma, primary of brain
- *Mycobacterium avium* complex or *Mycobacterium kansasii*, disseminated or extrapulmonary
- *Mycobacterium tuberculosis* of any site, pulmonary*, disseminated, or extrapulmonary
- *Mycobacterium*, other species or unidentified species, disseminated or extrapulmonary
- *Pneumocystis jirovecii* (previously known as "*Pneumocystis carinii*") pneumonia
- Pneumonia, recurrent*
- Progressive multifocal leukoencephalopathy
- Salmonella septicemia, recurrent
- Toxoplasmosis of brain, onset at age > 1 month
- Wasting syndrome attributed to HIV

*Only among children aged < 6 years
*Only among adults, adolescents, and children aged ≥ 6 years
^Suggested diagnostic criteria for these illnesses are defined in prior surveillance case definitions

CDC.gov. Revised surveillance case definition for HIV Infection – United States, 2015. MMWR Recomm Rep. 2014;63(RR-03):1-10.

Guidelines for the Prevention and Treatment of Opportunistic Infections in Adults and Adolescents with HIV

Recommendations from the Centers for Disease Control and Prevention, the National Institutes of Health, and the HIV Medicine Association of the Infectious Diseases Society of America

https://aidsinfo.nih.gov/guidelines

Last update: February 17, 2022

Primary Prophylaxis

OI	Indication	Preferred
Pneumocystis Pneumonia (PCP)	CD4 < 200 CD4 < 14% If ART initiation has to be delayed, CD4 ≥ 200, but < 250 and can't monitor every 3 mos	1. TMP-SMX 1 DS tab PO daily 2. TMP-SMX 1 SS tablet daily
Toxoplasma gondii Encephalitis	Toxoplasma IgG positive with CD4 < 100	TMP-SMX 1 DS PO daily
Mycobacterium avium Complex (MAC)	CD4 < 50 • Not recommended for those who immediately start ART • Rule out active disease before starting	1. Azithromycin 1200 mg PO once weekly 2. Clarithromycin 500 mg PO BID 3. Azithromycin 600 mg PO twice weekly

Excerpted from Table 1

Why do we still see OIs?

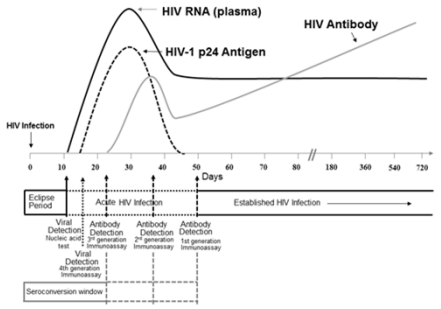
- Undiagnosed or late diagnosis of HIV
- Known HIV infection with poor retention in care
- Not on stable antiretroviral therapy (ART)

HIV testing in the US

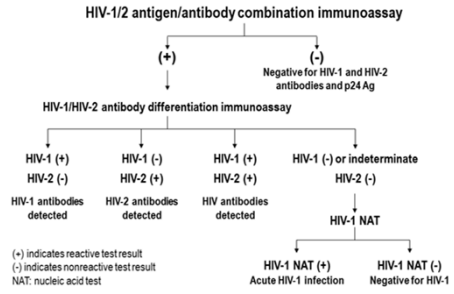
4 generations of assays to test for HIV:

- 1st: detects IgG (examples: Western Blot, IFA)
- 2nd: detects IgG (examples: HIV-1 EIA, rapid HIV Ab tests)
- 3rd: detects IgM & IgG (examples: HIV-1/2 immunoassay and HIV1/2 chemiluminescent immunoassays
- 4th: detects IgM & IgG and p24 Antigen (example: combination test - 3rd gen plus one rapid test that uses separate indicators for HIV-1/2 antigen and antibodies

CDC: Laboratory Testing for the Diagnosis of HIV Infection: Updated Recommendations June 27, 2014



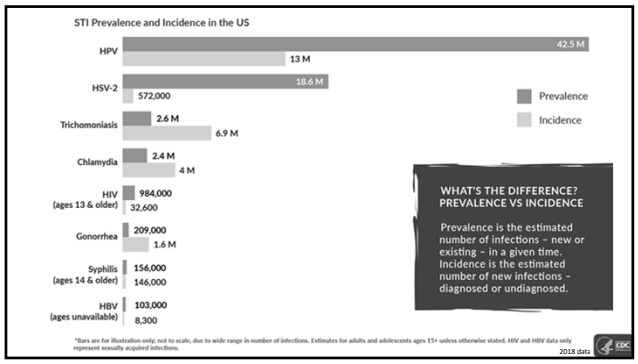
Source: CDC

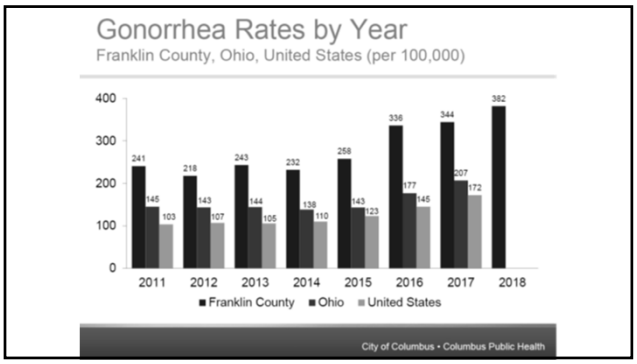


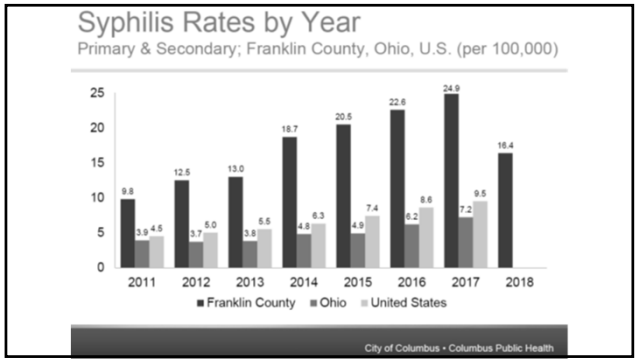
Source: CDC

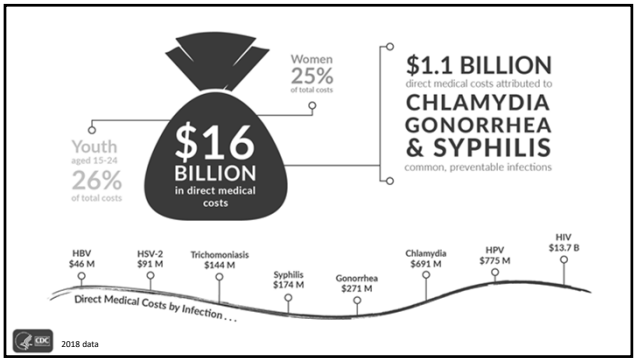
Benefits of Testing/Knowing HIV Status

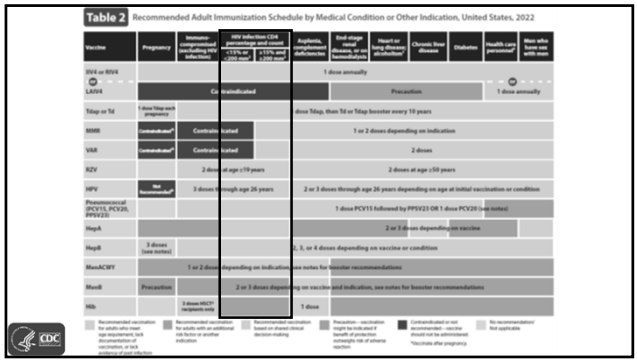
- Individual health
- Public Health

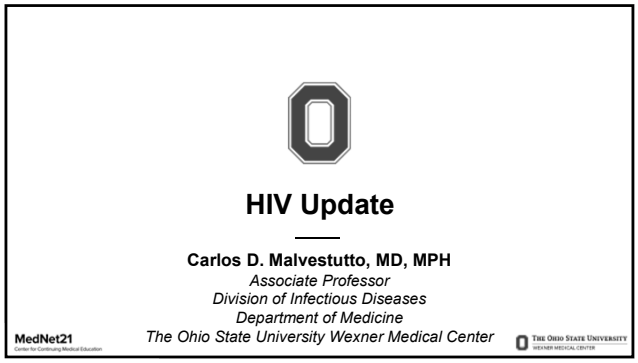

STI Prevalence and Incidence in the US
HPV
42.5 M
13 M
HSV-2
18.6 M
572,000
Trichomoniasis
2.6 M
6.9 M
Chlamydia
2.4 M
4 M
HIV (ages 13 & older)
984,000
32,600
Gonorrhea
209,000
1.6 M
Syphilis (ages 14 & older)
156,000
146,000
HBV (ages unavailable)
103,000
8,300
Prevalence
Incidence
WHAT'S THE DIFFERENCE? PREVALENCE VS INCIDENCE
Prevalence is the estimated number of infections – new or existing – in a given time. Incidence is the estimated number of new infections – diagnosed or undiagnosed.
*Bars are for illustration only; not to scale, due to wide range in number of infections. Estimates for adults and adolescents ages 15+ unless otherwise stated. HIV and HBV data only represent sexually acquired infections.
2018 data


Gonorrhea Rates by Year
Franklin County, Ohio, United States (per 100,000)
400
300
200
100
0
241
145
103
218
143
107
243
144
105
232
138
110
258
143
123
336
177
145
344
207
172
382
2011
2012
2013
2014
2015
2016
2017
2018
Franklin County
Ohio
United States
City of Columbus • Columbus Public Health


Syphilis Rates by Year
Primary & Secondary; Franklin County, Ohio, U.S. (per 100,000)
25
20
15
10
5
0
9.8
3.9
4.5
12.5
3.7
5.0
13.0
3.8
5.5
18.7
4.8
6.3
20.5
4.9
7.4
22.6
6.2
8.6
24.9
7.2
9.5
16.4
2011
2012
2013
2014
2015
2016
2017
2018
Franklin County
Ohio
United States
City of Columbus • Columbus Public Health


Women
25%
of total costs
Youth
aged 15-24
26%
of total costs
$16
BILLION
in direct medical costs
$1.1 BILLION
direct medical costs attributed to
CHLAMYDIA
GONORRHEA
& SYPHILIS
common, preventable infections
HBV
$46 M
HSV-2
$91 M
Trichomoniasis
$144 M
Syphilis
$174 M
Gonorrhea
$271 M
Chlamydia
$691 M
HPV
$775 M
HIV
$13.7 B
Direct Medical Costs by Infection . . .
2018 data





PrEP

Pre-Exposure Prophylaxis

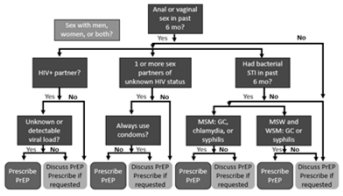
Pre-exposure Prophylaxis: A pharmacologic HIV prevention intervention for persons at high risk of acquiring HIV.

A person without HIV takes antiretroviral medication(s) ***before*** potential HIV exposure

First option was daily oral TDF/FTC (FDA approved in 2012)

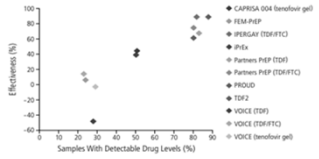
TAF/FTC is an alternative oral option (not evaluated in cis-gender women)

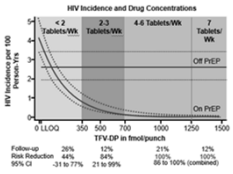
"All sexually active adults and adolescents should be informed about PrEP for prevention of HIV acquisition"



CDC. PrEP Guidelines. 2021.

Adherence is Important for Oral PrEP





Buchbinder. Top Antivir Med. 2018;25(4):138-142

- In Men Who have Sex With Men 100% adherence was not required to attain full benefit from PrEP
- Benefit of 4-6 tablets/wk similar to 7 tablets/wk

1. Grant R, et al. IAC 2014. Abstract TUAC0105LB.

Oral PrEP Safety

TDF/FTC is well tolerated

Start-up syndrome
- 1-18.5% with nausea, vomiting ± dizziness

Renal safety
- 0.2% Grade 2-4 elevations in creatinine among 5469 participants randomized to TDF/FTC

Bone safety
- 0.4 to 1.5% loss of BMD across total hip, spine
- Return to baseline after discontinuation
- Not associated with increased fracture risk

1. Grant RM, et al. N Engl J Med. 2010;363:2587-2599.
2. Van Damme. N Engl J Med 2012; 367:411-422
3. Thigpen MC, et al. N Engl J Med 2012; 367:423-434
4. Grant, et al. Abstract 48 LB. CROI 2016. Boston, MA
5. Baeten JM, et al. N Engl J Med. 2012;367:399-410.

PrEP Highly Effective in "Real World" Evaluation

PROUD Trial: Randomized, multi-center, open-label pilot study in London

Study Design

High-risk, HIV-uninfected MSM engaging in Condomless Anal Intercourse N=545

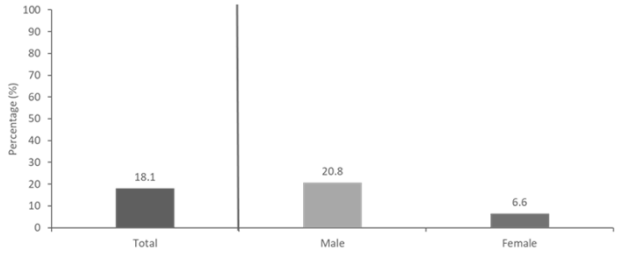
→ **Immediate (IMM) FTC/TDF (n=276)**

→ **Deferred (DEF) FTC/TDF (start at Month 12) (n=269)**

- **DSMB stopped study early due and recommended that all participants be offered PrEP**
- **86%** reduction in risk seen over 60 wks with immediate PrEP (90% CI: 58% to 96%, *P* = .0002)
  - Rate difference: 7.6 (90% CI: 4.1-11.2)
  - Number needed to treat to prevent 1 infection: 13 (90% CI: 9-25)

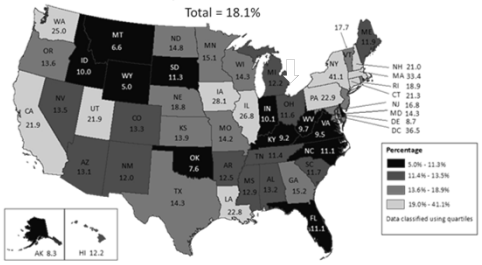
McCormack S, et al. CROI 2015; Seattle, WA #22LB

PrEP Coverage among Persons at Risk Remains Very Low



Abbreviation: PrEP, preexposure prophylaxis.
Note. PrEP coverage, reported as a percentage, was calculated as the number who have been prescribed PrEP divided by the estimated number of persons who had indications for PrEP. Different data sources were used in the numerator and denominator to calculate PrEP coverage.

PrEP Coverage among Persons Aged ≥16 Years, by Area of Residence, 2018—United States



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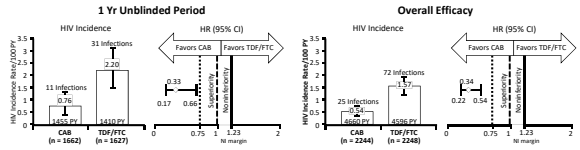
Source: CDC

Long Acting Acting Cabotegravir Superior to TDF/FTC

HPTN 083: DSMB stopped study early due to superiority of LA-CAB arm (HR 0.75) Landovitz et al. N Engl J Med 2021; 385:595-608



Landovitz. CROI 2022. Abstr 96

Primary Efficacy Endpoint	HPTN 083[1,2]		HPTN 084[3,4]	
	CAB (n = 2244)	FTC/TDF (n = 2247)	CAB (n = 1614)	FTC/TDF (n = 1610)
HIV infections, n	13*	39	4*	36
HR for CAB vs FTC/TDF (95% CI)	0.34 (0.18-0.62)		0.11 (0.04-0.32)	

*Includes 1 case readjudicated post hoc as a baseline infection

1. Landovitz. NEJM 2021 Aug 12;385:595. 2. Landovitz. AIDS 2020. Abstr OAXLB0101.
3. Delany-Moretlwe. HIVR4P 2021. Abstr HY01.02. 4. Marzinke. IAS 2021. Abstr PECLB25.

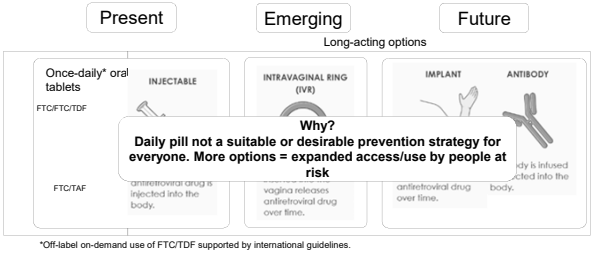
New Long-Acting Option for PrEP

Long-acting cabotegravir (IM injection every 2 months)

- For use as PrEP in at-risk adults and adolescents weighing ≥35 kg to reduce the risk of sexually acquired HIV
- Initiated as 2 injections administered 1 mo apart, and then every 2 mo thereafter
- Patients can either start with cabotegravir injections or take oral cabotegravir for 4 wk to assess how well they tolerate the drug

Cabotegravir extended-release injectable suspension PI.

HIV PrEP: Present, Emerging, and 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

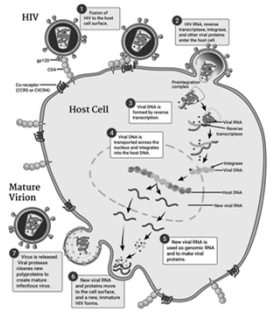
Resources

Guidelines for the Use of Antiretroviral Agents in HIV-Infected Adults and Adolescents
http://aidsinfo.nih.gov/contentfiles/lvguidelines/AdultandAdolescentGL.pdf

PrEP Guideline 2021 Update-CDC
https://www.cdc.gov/hiv/pdf/risk/prep/cdc-hiv-prep-guidelines-2021.pdf

Primary Care Guidelines for the Management of Persons Infected With HIV: 2020 Update by the HIV Medicine Association of the Infectious Diseases Society of America
https://academic.oup.com/cid/article-lookup/doi/10.1093/cid/ciaa1391

Antiretroviral Treatment (ART)



HIV Replication Cycle

1. **Binding and Fusion**
   CD4 receptor, two co-receptors
3. **Reverse Transcription**
   ss HIV RNA → ds HIV DNA
4. **Integration**
   HIV DNA "hides" in cell DNA (provirus)
5 and 6. **Assembly**
   HIV protease cuts long chains of HIV proteins
7. **Budding**
   Final stage, "buds" taking part of cell membrane and glycoproteins → ready to infect new cells

Source: https://www.niaid.nih.gov/diseases-conditions/hiv-replication-cycle

Current ARV Medications 2022

NRTIs (Nucleoside RTIs)
- abacavir (ABC)
- didanosine (ddI)
- emtricitabine (FTC)
- lamivudine (3TC)
- stavudine (d4T)
- tenofovir (TDF/TAF)
- zidovudine (AZT, ZDV)

Integrase Inhibitor
- raltegravir (RAL)
- elvitegravir (ELV)
- dolutegravir (DTG)
- Cabotegravir (CAB)*

Non-NRTIs
- delavirdine (DLV)
- efavirenz (EFV)
- etravirine (ETR)
- nevirapine (NVP)
- rilpivirine (RPV)
- Doravirine (DOR)

Entry Inhibitors

Fusion Inhibitor
- enfuvirtide (T-20)

CCR5 Antagonist
- maraviroc (MVC)

CD4 Blocker
- Ibalizumab

Protease Inhibitors
- atazanavir (ATV)
  - ATV/c
- darunavir (DRV)
  - DRV/c
- fosamprenavir (FPV)
- indinavir (IDV)
- lopinavir/rtv (LPV/r)
- nelfinavir (NFV)
- ritonavir (RTV)
- saquinavir (SQV)
- tipranavir (TPV)

Current Combination ARV Medications

NRTIs (Nucleoside RTIs)

- abacavir (ABC)/lamivudine (3TC) = **Epzicom**
- zidovudine (ABC)/lamivudine (3TC) = **Combivir**
- abacavir (ABC)/lamivudine (3TC)/zidovudine (AZT) = **Trizivir**
- emtricitabine (FTC)/tenofovir (TDF) = **Truvada** **TAF Version: Descovy**

Protease Inhibitors

- lopinavir (LPV) + ritonavir (r) = **Kaletra**
- atazanavir (ATV) + cobicistat* = **Evotaz**
- darunavir (DRV) + cobicistat = **Prezcobix**

Current Combination ARV Medications

"Complete" Single Tablet Regimens

- Descovy+BIC=**Biktarvy**
- Truvada + EFV (Sustiva) = **Atripla**
- Truvada + RPV (Edurant) = **Complera** **TAF Version: Odefsey**
- Truvada + EGV/cobi = **Stribild** **TAF Version: Genvoya**
- Epzicom + DTG (Tivicay) = **Triumeq**
- Rilpivirine+DTG (Tivicay)=**Juluca**
- Lamivudine+DTG (Tivicay)=**Dovato**

Principles of HIV Treatment

- 2-3 fully active drugs given together to maintain viral suppression
- Current ART regimens are potent and safe with minimal adverse effects
- ART should be fully suppressive
  - Target HIV RNA<limit of quantification
  - "Detectable HIV RNA on Rx=**Failure**"
- All or none principle (decreases risk of viral resistance)
- Compliance ≥95% with daily oral regimen to achieve goal HIV RNA
- CD4 T cell reconstitution occurs after HIV RNA=undetectable
- We can maintain viral suppression indefinitely but we are not yet able to eradicate long-lived latently infected cells ("HIV reservoir")

Undetectable HIV Viral Load Equals Untransmittable HIV Infection (U=U)

- In 2017, HIV Medical Association officially endorsed the U=U Consensus Statement
  - "When a person living with HIV has an undetectable viral load, they will

https://www.hivma.org

- Supported by data from several studies from 2008-2016 showing zero linked HIV transmissions after > 100,000 condomless sex acts within both female–male and male–male serodiscordant couples in which the partner living with HIV had a **durably undetectable viral load**

HPTN 052 | PARTNER

Opposites Attract | PARTNER 2

HIV START Trial

Early vs Delayed ART
CD4>500/mm3 and No Symptoms

Early therapy vs delay until CD4<350/mm3 or AIDS defining illness

Early therapy permits rapid achievement of viral suppression

Early ART prevents
- AIDS events
- AIDS related cancers
- Major cardiovascular, renal and liver disease
- Non-AIDS cancer
- Death not attributable to AIDS

Serious AIDS events, serious non-AIDS events and death 57%

START Study Group, Lundgren JD, et al. NEJM. 2015 Aug 27;373(9):795-807

Future of HIV Treatment

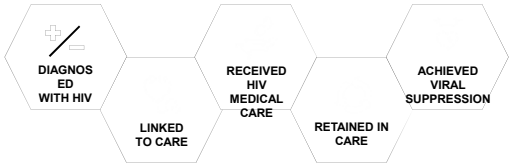
- Recent ART options are potent, well tolerated and safe and permit simplification to single tablet regimens with minimal DDIs
- New drug classes soon to become available (capsid inhibitors, broadly neutralizing antibodies, etc)
- More long-acting options (oral, injectable, implants) dosed every 2-4 months and possibly every 6 months!
- Lots of research ongoing to achieve functional cure

Putting It All Together

PrEP+Treatment as Prevention

HIV Care Continuum

- *"The HIV care continuum is a public health model that outlines the steps or stages that people with HIV go through from diagnosis to achieving and maintaining viral suppression"*

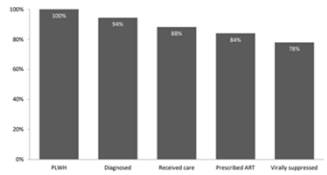


https://www.hiv.gov/federal-response/policies-issues/hiv-aids-care-continuum

90-90-90 UNAIDS Targets

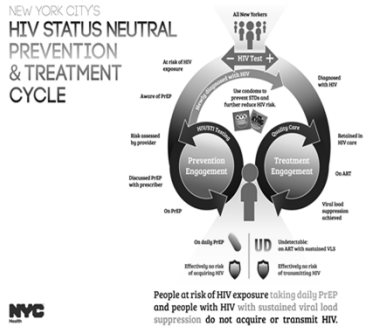
- By 2020
  - 90% of PLWH will know their HIV status
  - 90% of people with diagnosed HIV will receive ART
  - 90% of people receiving ART will be virally suppressed
- If 90-90-90 targets are achieved, 73% of PLWH would be virally suppressed and the HIV epidemic would end by 2030

HIV Care Continuum (New York City 2020)



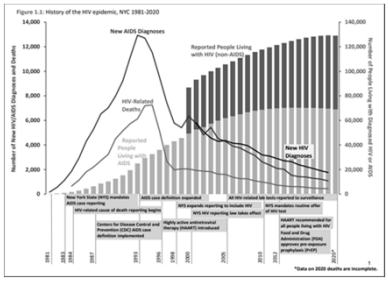
- NYC and other cities around the world have achieved 90-90-90 targets

HIV Epidemiology and Field Services Program. *HIV Surveillance Annual Report, 2020.* New York City Department of Health and Mental Hygiene: New York, NY. December 2021



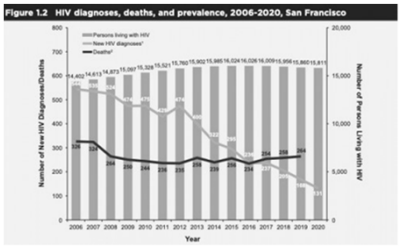
NYC Department of Health

Ending the HIV Epidemic in New York City



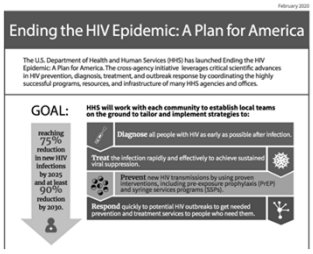
HIV Epidemiology and Field Services Program. *HIV Surveillance Annual Report, 2020.* New York City Department of Health and Mental Hygiene: New York, NY. December 2021

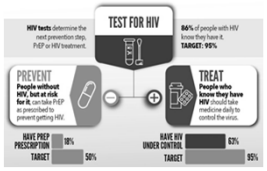
Declining HIV Incidence in San Francisco



San Francisco HIV Epidemiology Report 2020

Ending the HIV Epidemic: We have the tools to do it





https://www.cdc.gov/endhiv/about.html

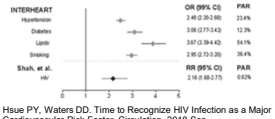
Comorbidities in HIV: Cardiovascular Disease

Cardiovascular Disease in HIV

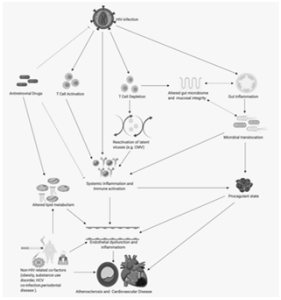
CVD is a leading cause of death for PWH

Associated in part to increased prevalence of traditional risk factors (smoking, HTN, diabetes)

But HIV itself is an independent risk factor for CVD (related to chronic inflammation and immune activation despite viral suppression)



Hsue PY, Waters DD. Time to Recognize HIV Infection as a Major Cardiovascular Risk Factor. Circulation. 2018 Sep 11;138(11):1113-1115

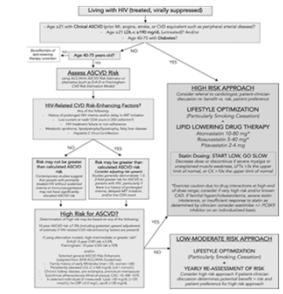


Titanji B, et al. J Am Heart Assoc. 2020 Feb 4;9(3):e014873

Management of CVD Risk in PWH

- ACC/AHA and Framingham risk ASCVD risk calculators may underestimate risk in PWH
- AHA Guidelines recommend taking into account HIV-related CVD Risk-Enhancing Factors

Triant VA, et al. *Circulation* 2018;137(19):2203-14

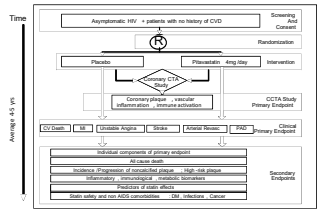


Feinstein MJ et al. Characteristics, prevention, and Management of CVD in People Living with HIV: A Scientific Statement from the American Heart Association. *Circulation* 2019;140(2):e98-e124.

Statins to Reduce Cardiovascular Events in PWH

- The JUPITER trial showed impact of statins on inflammation and mortality in people without HIV (Ridker et al. NEJM 2008;359:2195-2207)
- REPRIEVE Trial evaluating use of statin as primary prophylaxis in PWH on ART with mild to moderate ASCVD risk

REPRIEVE Trial Design
N=7700



Source: Steve Grinspoon MD