HIV Prevention and Control in China

High Quality Development

Current Situations and Challenges

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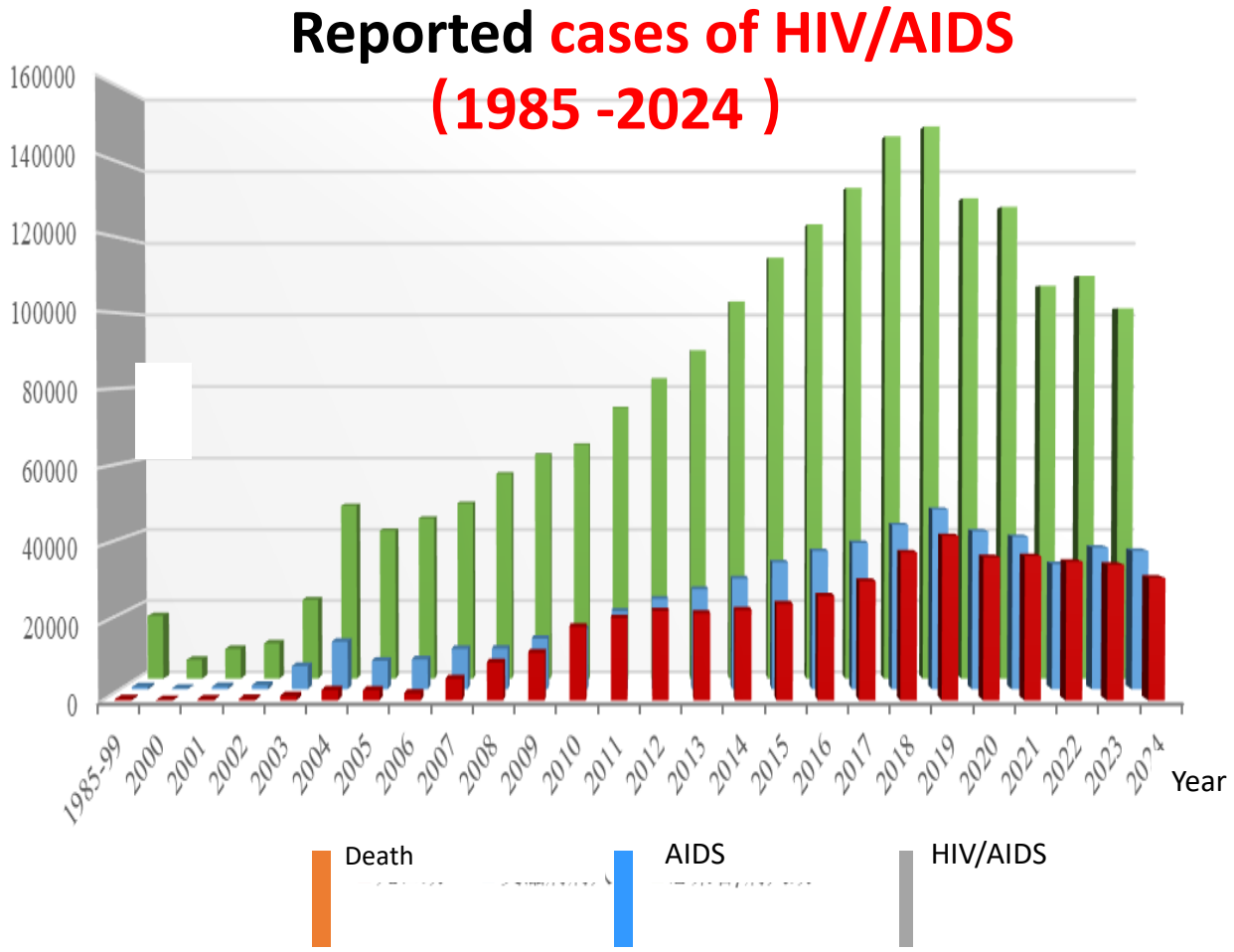
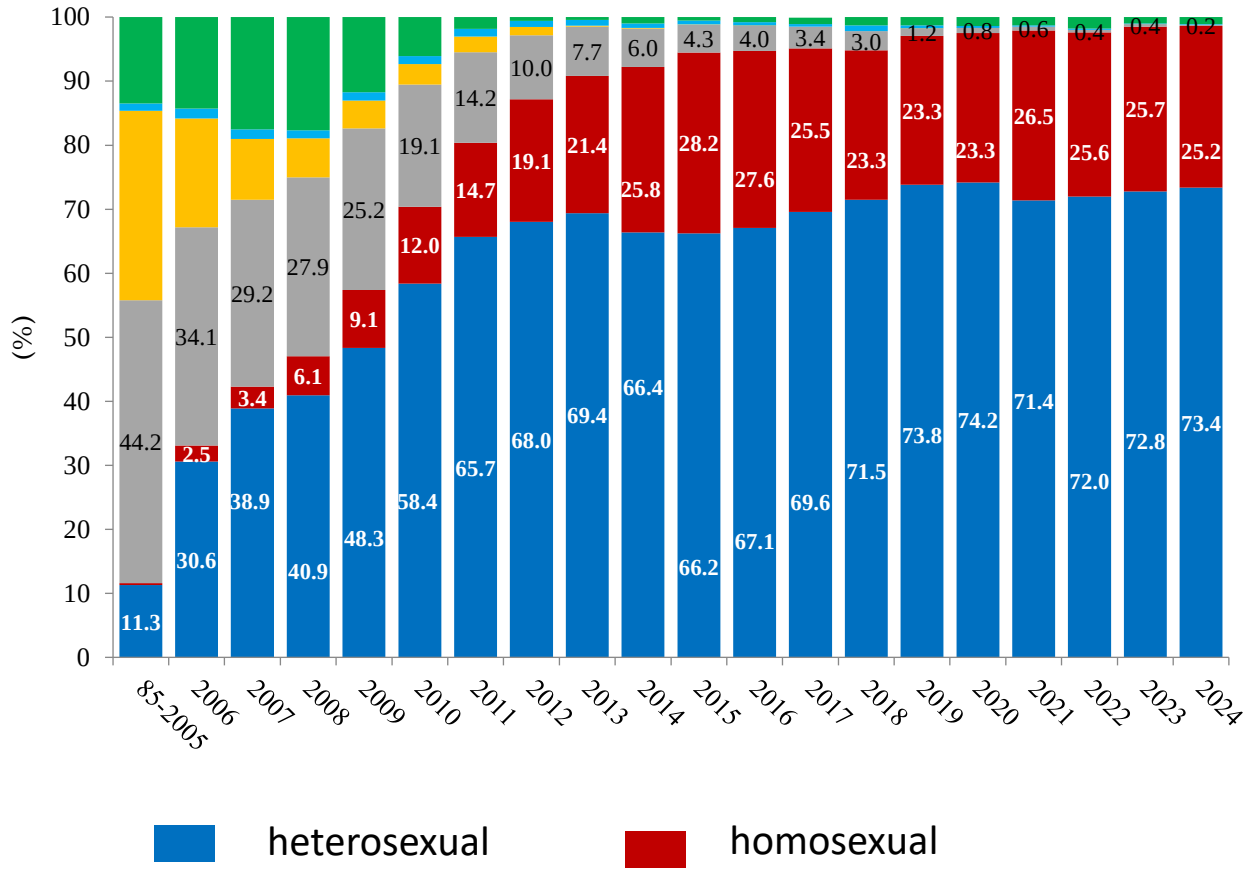
HIV/AIDS Epidemic

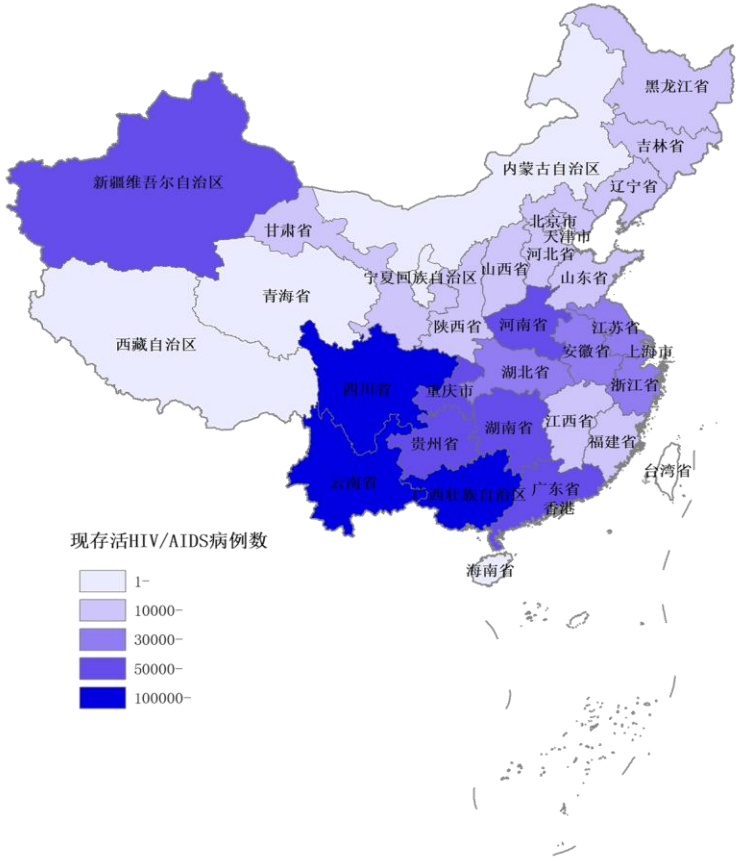
The first case of AIDS in China was detected in 1985. As of the end of 2024, there were 1.35 million people diagnosed living with HIV/AIDS. In 2024, more than 100,000 people with HIV/AIDS newly diagnosed.



HIV/AIDS Epidemic

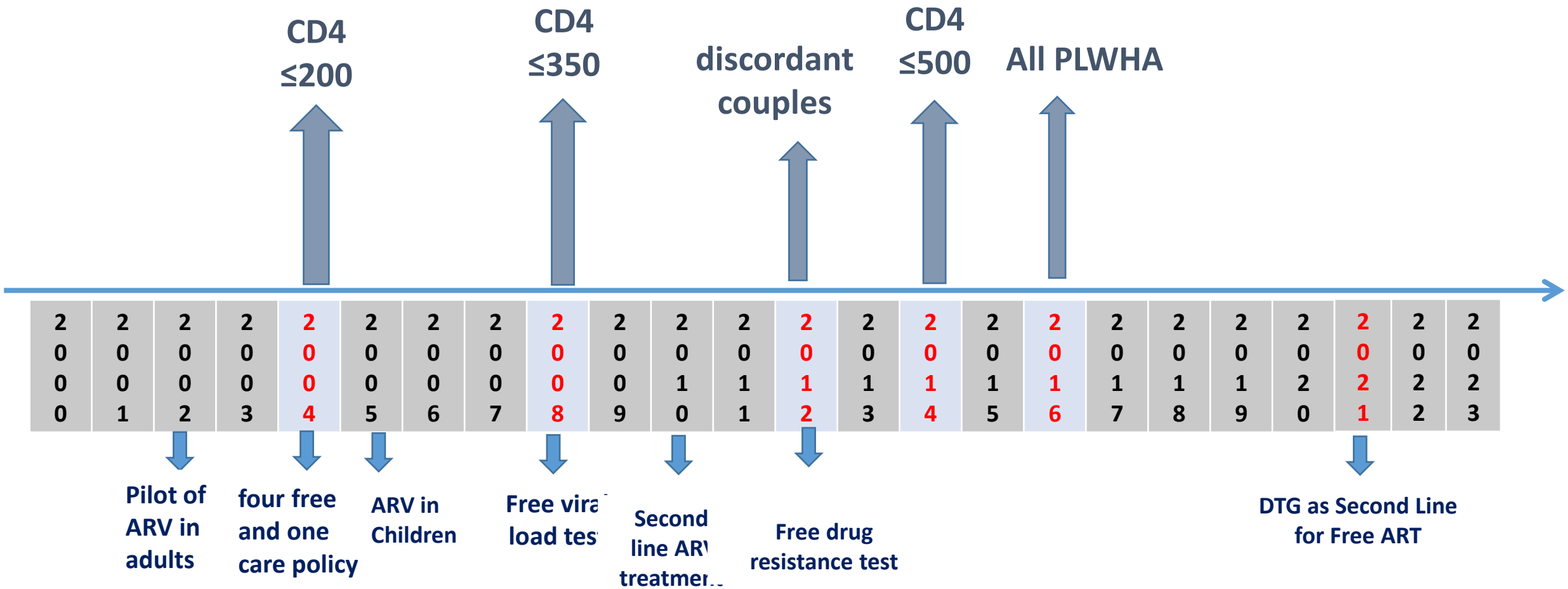


Sexual contact is the primary mode of transmission



Regional disparity in HIV epidemic

Increasing Access to ARV Services



Current ART drugs and recommended regimens in China

National Free ART Guidelines (2023)

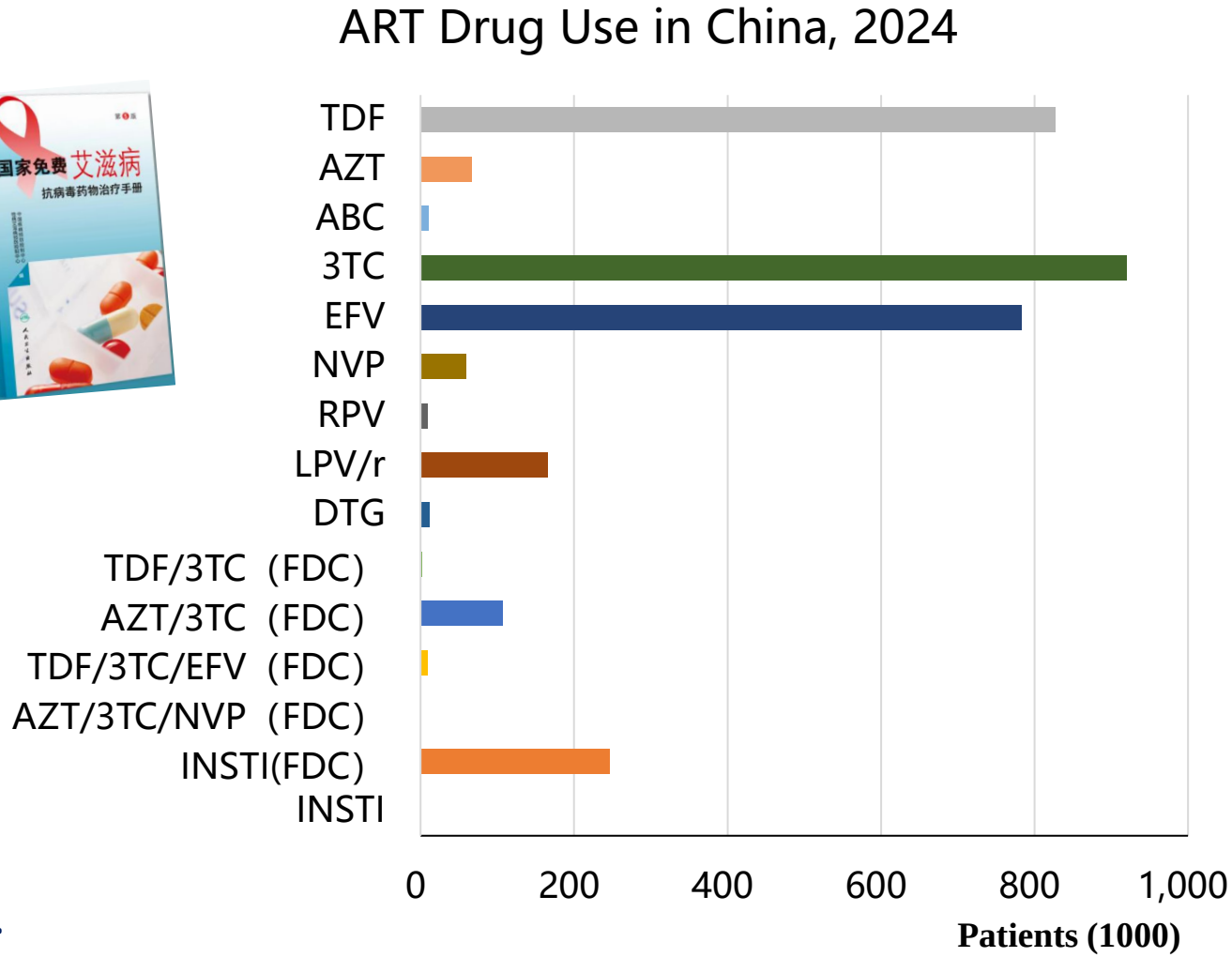
First-line regimen： TDF+3TC+EFV_{400} or RPV

Second-line regimen： AZT+3TC+DTG or LPV/r

Optimization Plan for National Free Treatment Drug Catalog

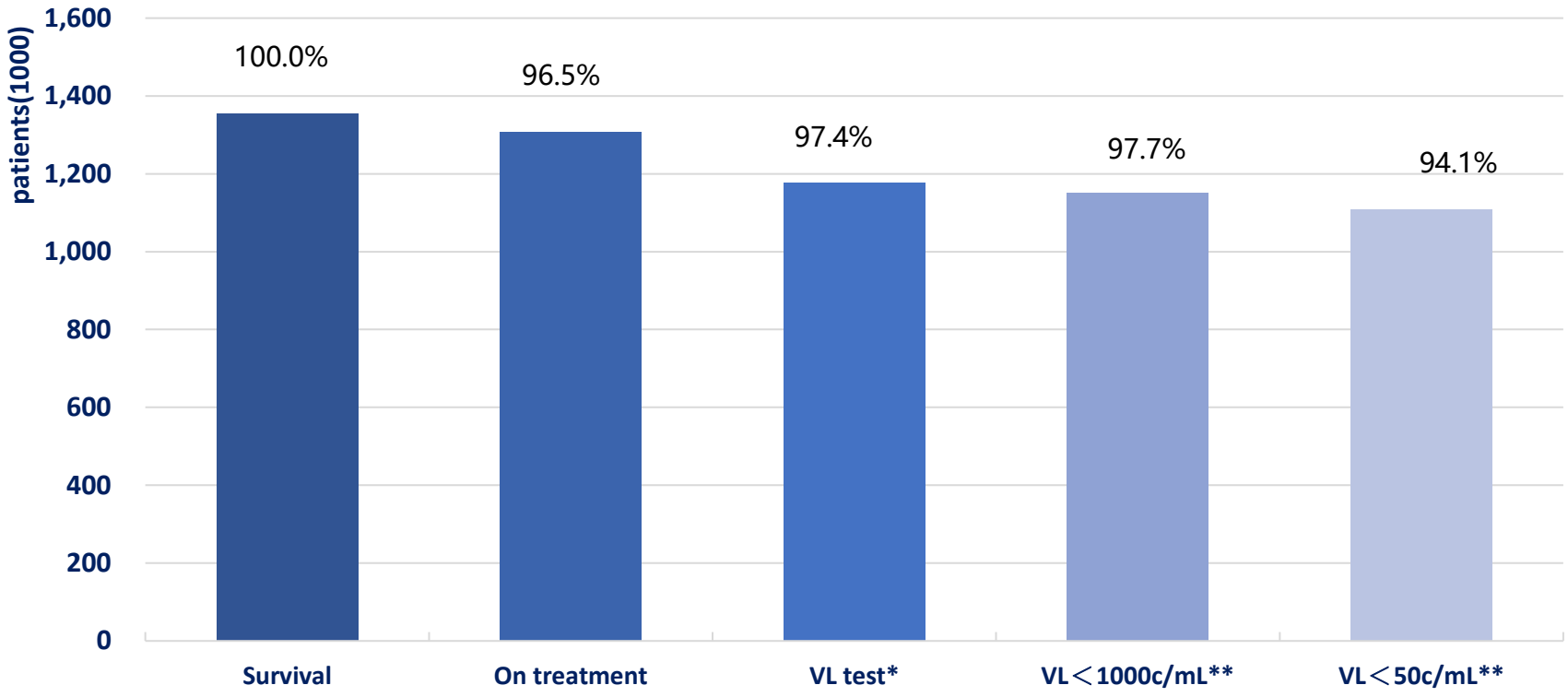
1. DTG will be adjusted as the recommended drug for first-line regimen when generic drugs are available

2. Consider more alternative drugs based on the development of domestic new drugs and generics.



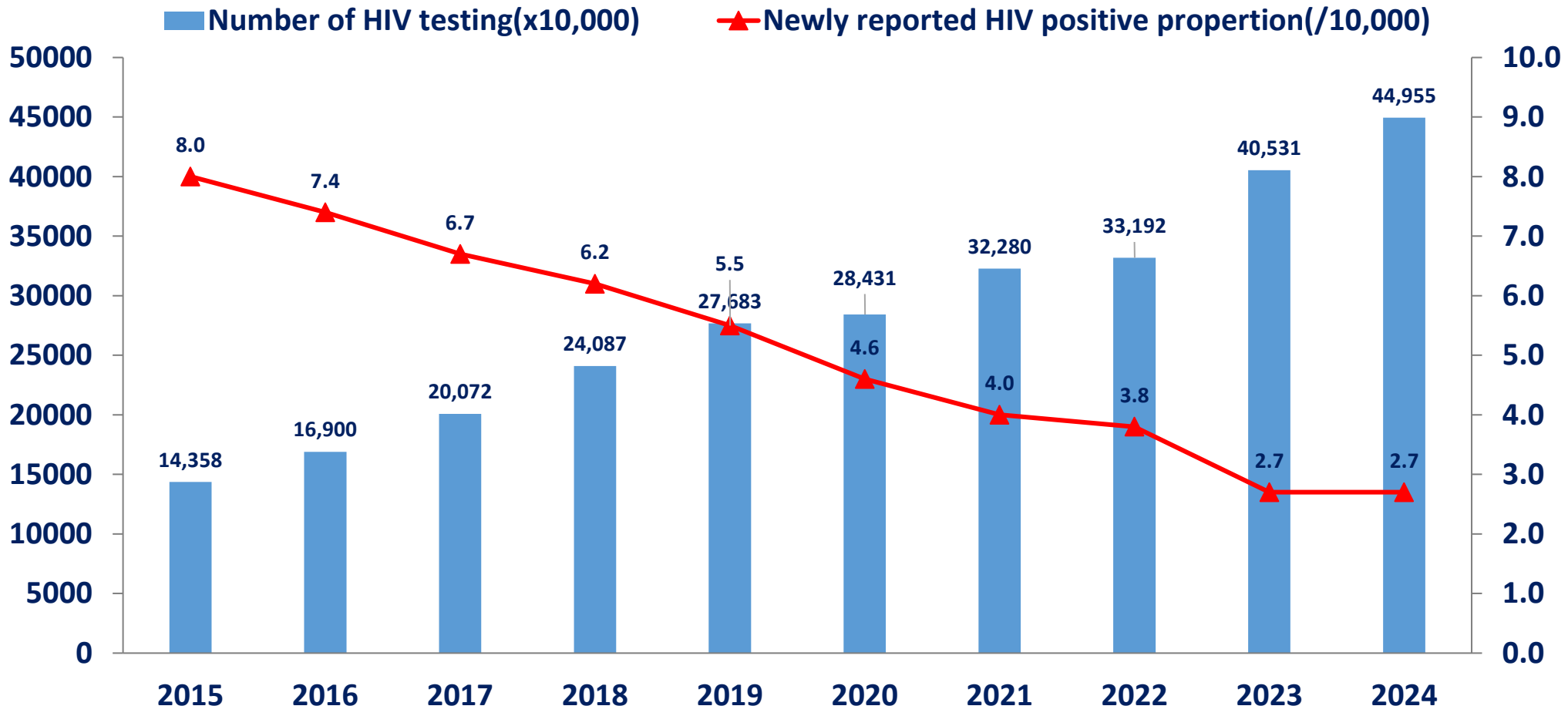
INSTI is mainly obtained from the National Medical Insurance Program

Cascade of 95-95-95 in China, 2024



* The denominator is based on people on treatment more than one year.
** The denominator is based on people with VL testing.

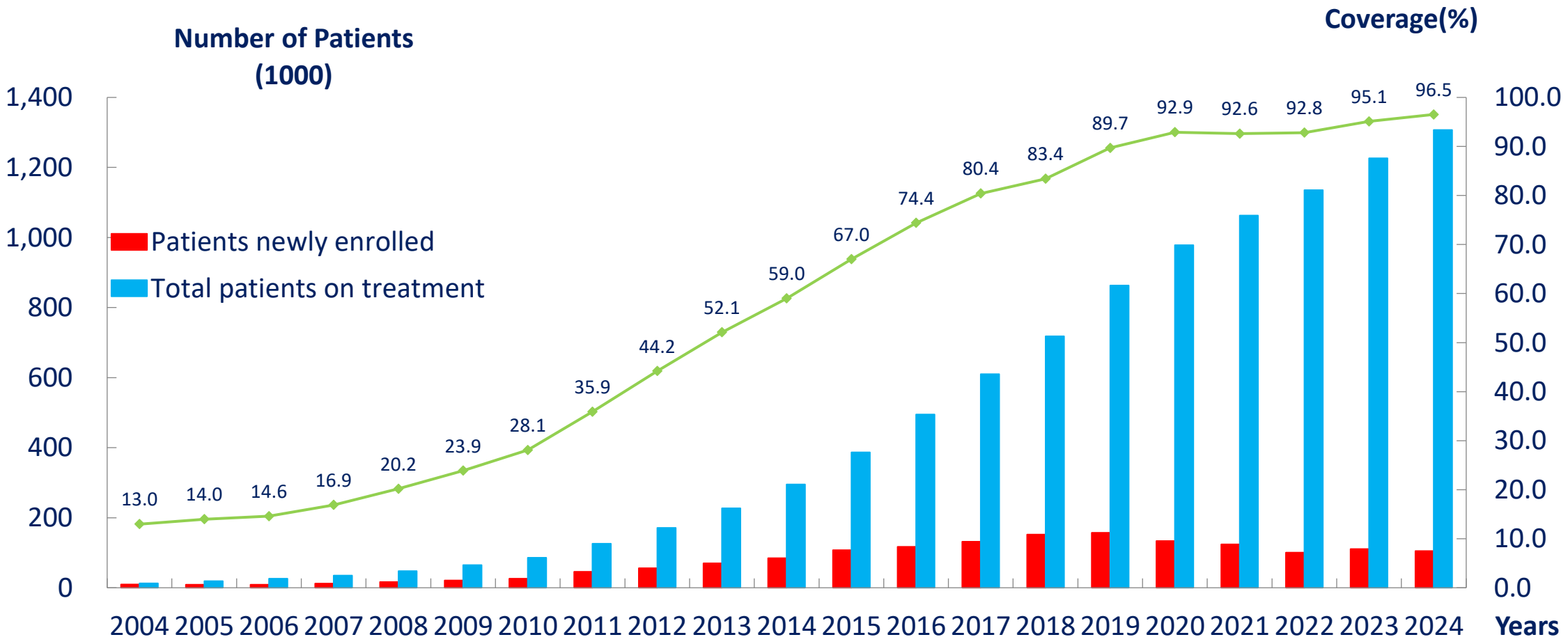
Progress of HIV Testing



Number of HIV Tests and newly reported HIV postive propertion, China, 2015-2024

Increasing Access to ART Services

96.5% of People with HIV/AIDS were on treatment in 2024



HIV Drug Resistance Monitoring

Established an array of HIV DR assays and network at the beginning of free ART

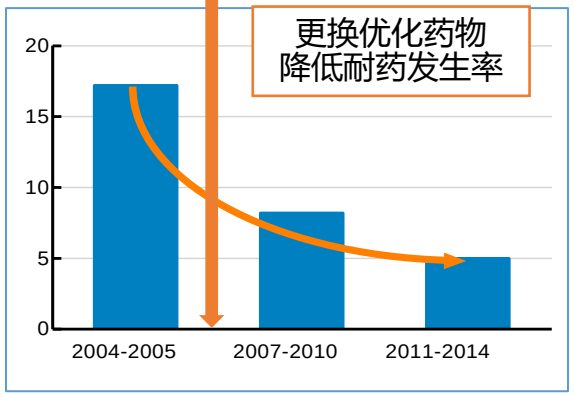
Conducted the first national survey on HIVDR , and found that patients receiving the earlier 1st line regimens had high rates of virologic failure and HIVDR

Distributed national guideline for HIVDR surveillance, and became WHO/ResNet regional HIVDR laboratory

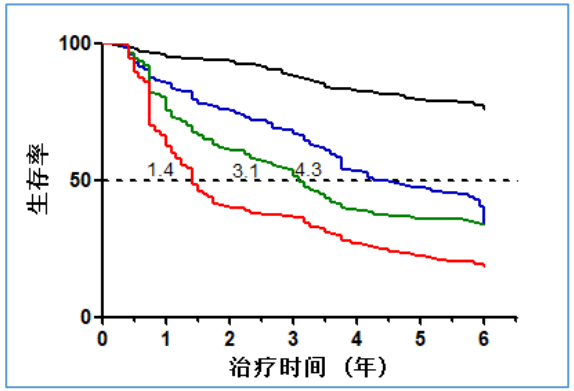
Continue to conduct national HIVDR survey to inform policy makers of national free ART program

2003 → 2004 → 2012 → 2020年

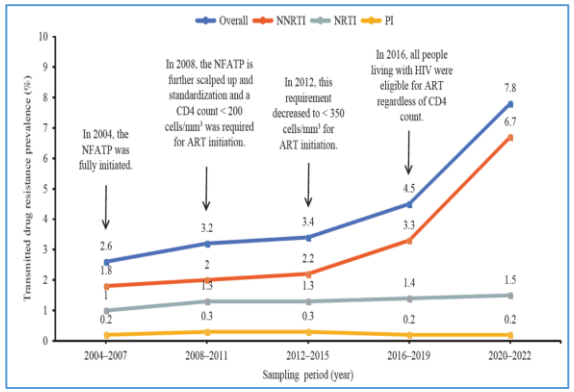
The national network for HIVDR surveillance



The trend of HIVDR prevalence among patients on ART



VF HIVDR IF
1.5y 1.5y



Pretreatment HIVDR is arising up in recent years, and NNRTI-related resistance mainly contributed the rise.

To achieve the goal of an AIDS-free world, the new National AIDS Prevention and Control Plan of China explicitly prioritizes high-quality development.[1-3]

中华人民共和国中央人民政府
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国务院办公厅关于印发《中国遏制与防治艾滋病规划（2024—2030年）》的通知

国办发〔2024〕51号

各省、自治区、直辖市人民政府，国务院各部委、各直属机构：

《中国遏制与防治艾滋病规划（2024—2030年）》已经国务院同意，现印发给你们，请认真贯彻执行。

国务院办公厅

2024年12月6日

High-quality development stands as the central theme of China's economic and social progress during the 14th Five-Year Plan period.[1]

In December 2024,
the State Council formulated the **Plan for HIV/AIDS Prevention and Control in China (2024-2030)**, which articulates the establishment of a **high-quality development strategy for HIV/AIDS prevention and control**.

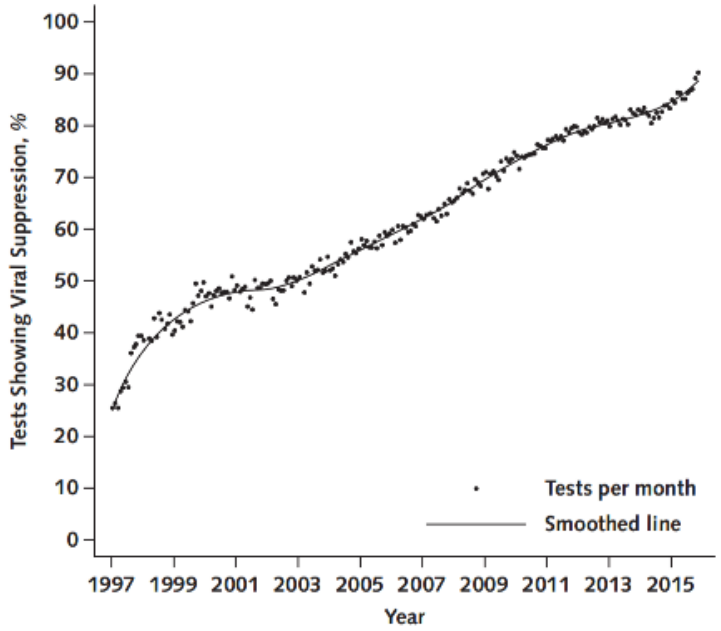
1. Xu Peng, et al. Chinese Journal of AIDS and STDs, 2023, 29(05): 491-493.
2.https://www.gov.cn/zhengce/zhengceku/202412/content_6992033.htm

Different first-line treatment regimens impact treatment failure rates

A Longitudinal Cohort Study in the United States (1997–2015)

The study was performed at eight HIV clinics in the United States, with an enrollment of 31,930 individuals receiving clinical treatment for HIV infection. It analyzed viral load suppression (≤400 copies/mL).

The viral load suppression rate increased significantly from 32% in 1997 to 86% in 2015, demonstrating remarkable improvement in treatment outcomes.



Individuals using integrase inhibitors, older age, male gender, and Caucasian ethnicity
are associated with relatively higher rates of viral load suppression.

Table 2. Factors Associated With Detectable VL or Amount of VL in Adjusted Models Among Patients Receiving ART*

Covariate	Joint Longitudinal and Survival Model†		Linear Mixed Model‡	
	OR (95% CI)	*P* Value	Relative VL (95% CI)	*P* Value
Integrase strand transfer inhibitor use	0.54 (0.51-0.57)	<0.001	0.71 (0.69-0.74)	<0.001
Female	1.01 (0.93-1.08)	0.89	0.98 (0.92-1.05)	0.64
Age (per decade, centered at 40 y)	0.76 (0.74-0.78)	<0.001	0.83 (0.81-0.85)	<0.001
Race/ethnicity (reference is white race)				
Black	1.68 (1.57-1.80)	<0.001	1.60 (1.51-1.70)	<0.001
Hispanic	0.81 (0.74-0.90)	<0.001	0.89 (0.82-0.96)	0.003
Other	0.83 (0.73-0.96)	0.009	0.90 (0.80-1.00)	0.053
Calendar time (year of cohort entry, centered around 2010)	0.83 (0.83-0.84)	<0.001	0.84 (0.83-0.84)	<0.001
Years of follow-up	0.79 (0.79-0.80)	<0.001	0.74 (0.74-0.75)	<0.001

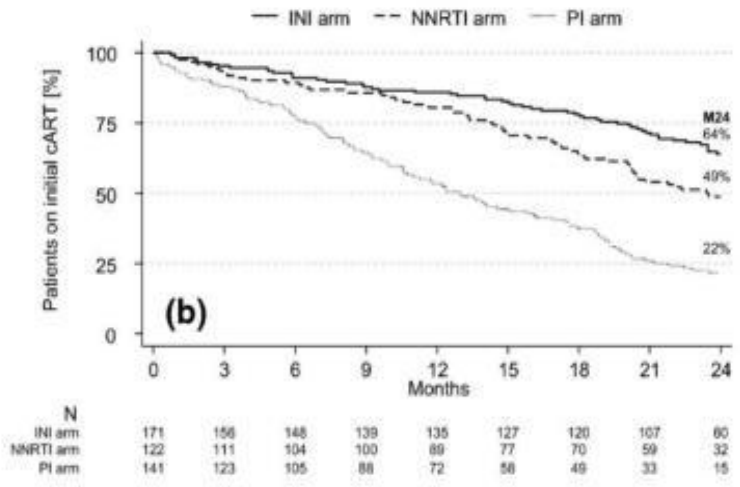
Nance, Robin M et al. “HIV Viral Suppression Trends Over Time Among HIV-Infected Patients Receiving Care in the United States, 1997 to 2015: A Cohort Study.” Annals of internal medicine vol. 169,6 (2018): 376-384. doi:10.7326/M17-2242

Different first-line treatment regimens impact treatment retention rates

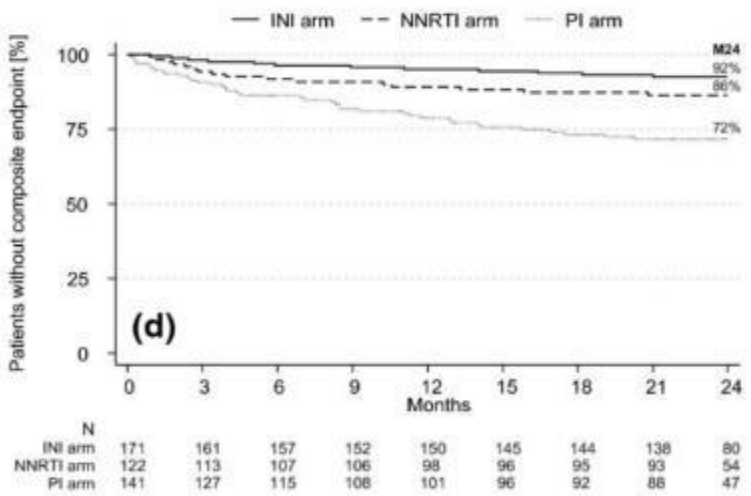
Integrase inhibitor regimens can significantly improve treatment retention rates

PROPHET Study in Germany: Different first-line treatment regimens demonstrate significant differences in treatment retention rates

At Month 24, in the INST, NNRT, and P groups,
The retention rates for first-line treatment regimens were 64%, 49%, and 22%, respectively.



With virologic failure and/or treatment discontinuation due to adverse drug reactions as the composite endpoint, the difference between two groups decreased to 92%, 86%, and 72%, respectively, but **remained statistically significant**.



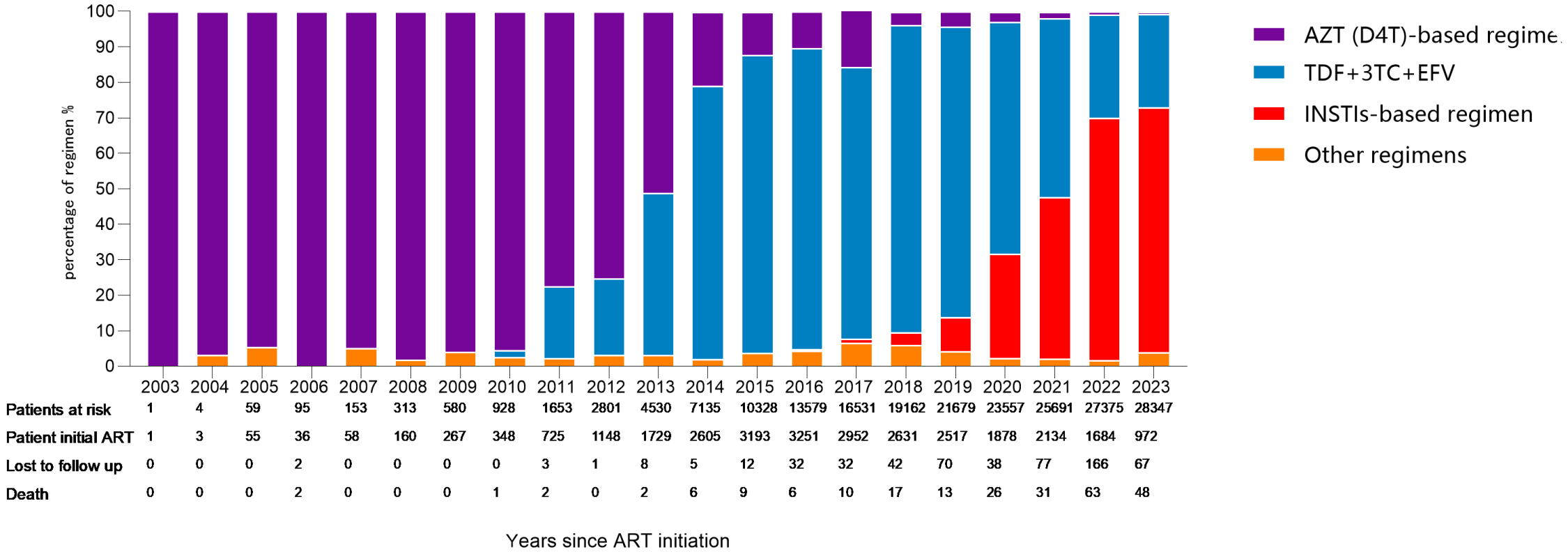
Reasons for Changing the Initial Third Drug

- “treatment simplification”, which is the most common cause(37/129)
- Gastrointestinal adverse events (23/129)
- Patient consent (10/129)
- Central nervous system adverse events (AEs) (7/129)

Bickel, M., Hoffmann, C., Wolf, E. et al. High effectiveness of recommended first-line antiretroviral therapies in Germany: a nationwide, prospective cohort study. Infection 48, 453–461 (2020).

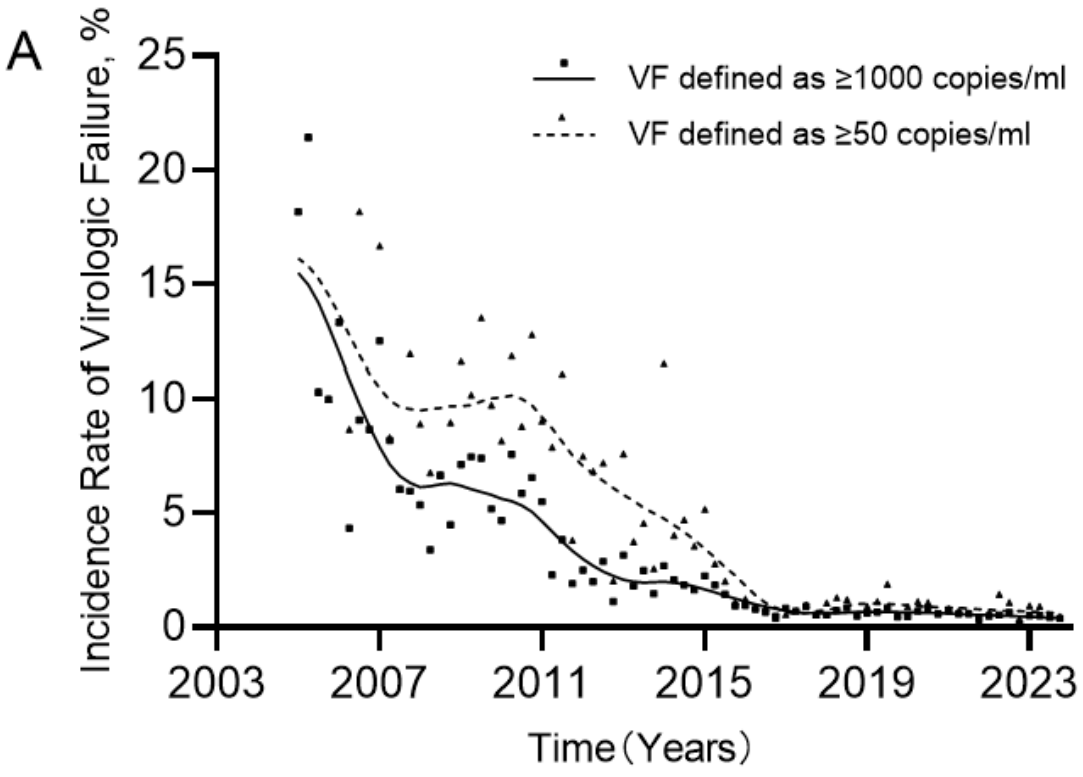
Evolution of HIV Antiviral Therapy in China

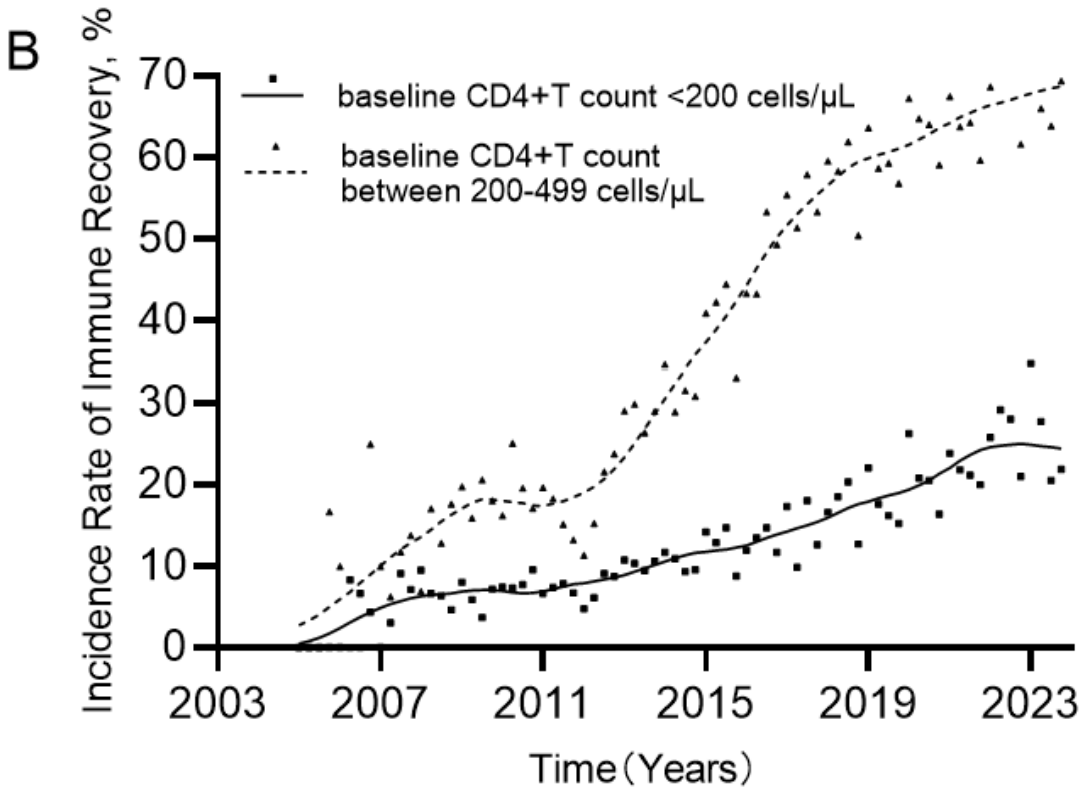
A Retrospective Cohort Analysis at Beijing Ditan Hospital, Beijing You'an Hospital, and Hangzhou Xixi Hospital from 2003 to 2023



Evolution of HIV Antiviral Therapy in China

From 2003 to 2023, the proportion of virological failures decreased while baseline immune function increased.

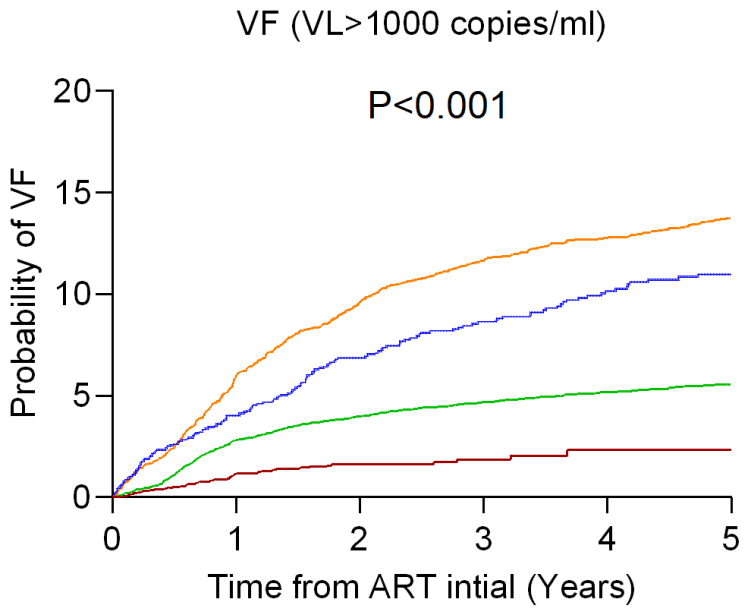




Evolution of HIV Antiviral Therapy in China

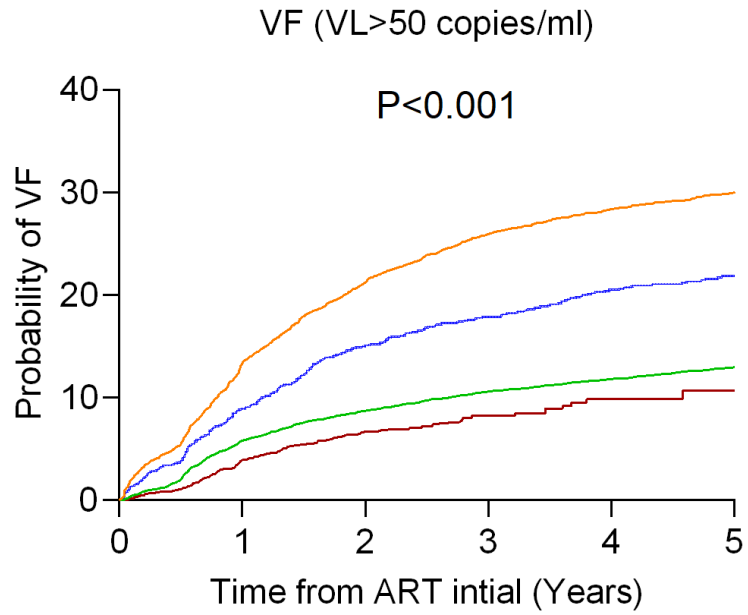
Integrase inhibitors demonstrate the lowest virological failure rates

A



Number at risk						
AZT/D4T-based regimen	5021	4200	3592	3220	2893	2602
TLE-based regimen	17258	15541	13861	12432	10900	9246
INSTIs-based regimen	3948	3283	2051	1029	401	128
Other regimens	2120	1773	1460	1050	866	675

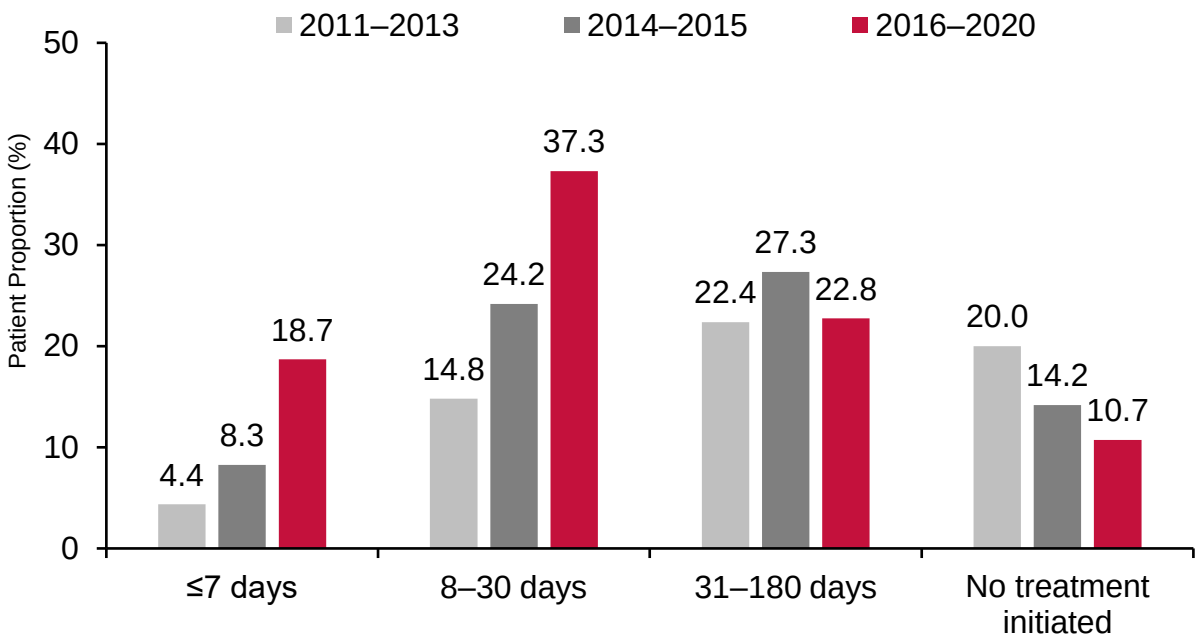
B



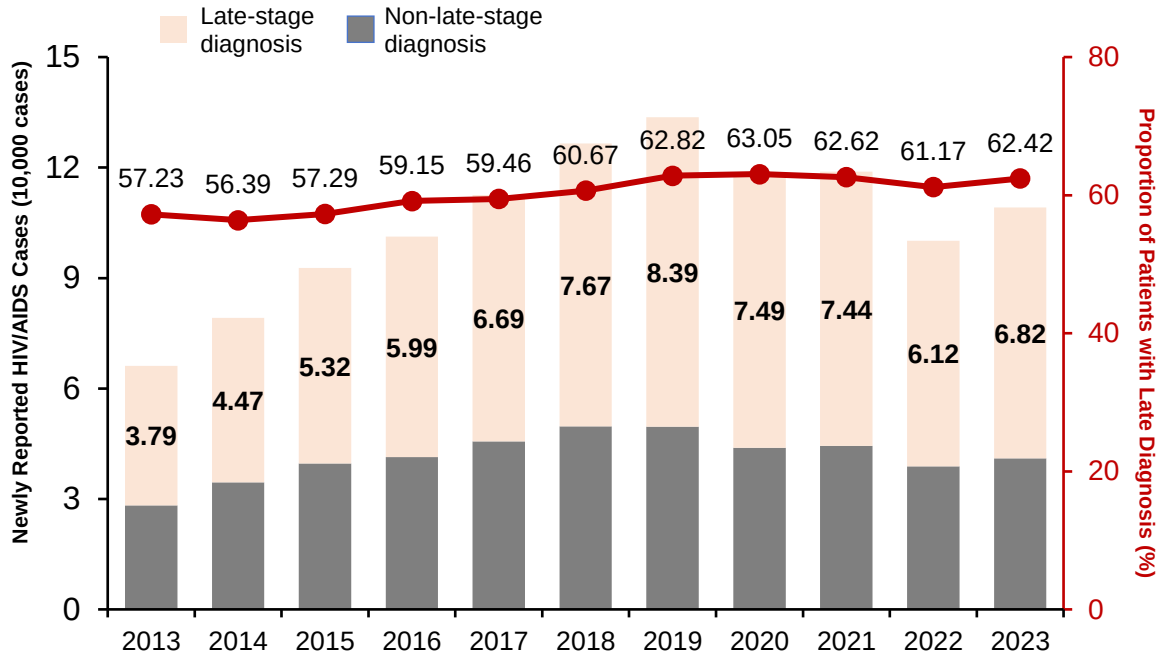
Number at risk						
AZT/D4T-based regimen	5021	4200	3349	2893	2551	2267
TLE-based regimen	17258	15541	13487	11941	10384	8748
INSTIs-based regimen	3948	3283	1978	967	370	113
Other regimens	2120	1773	1388	966	785	607

Reason 1: Slow response timing, high proportion of late detection, and persistent transmission risks among sexually active populations.

The treatment initiation rate within seven days of diagnosis among HIV-infected individuals in China remains below 20%, indicating ongoing room for improvement.



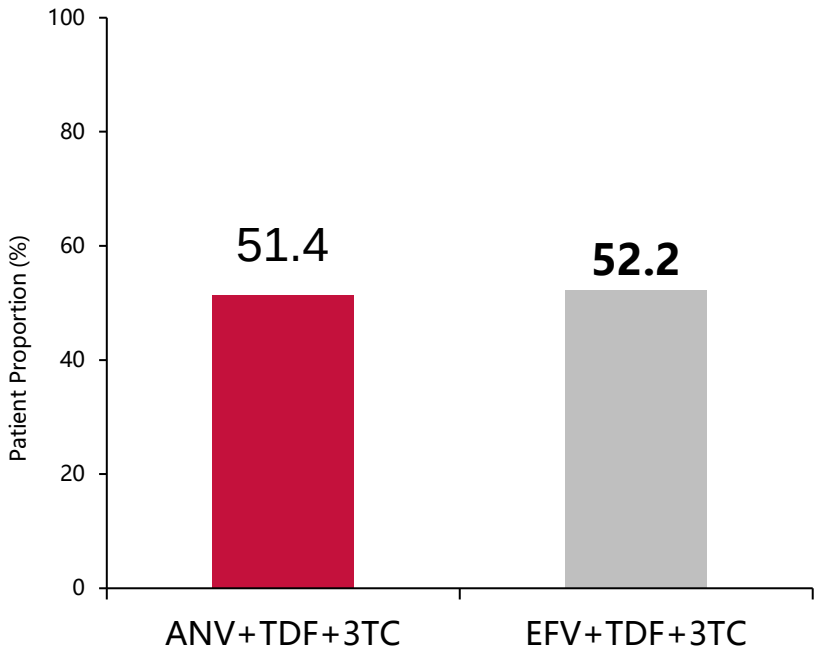
CCDC data: Over 60% of newly diagnosed HIV infections in China have CD4 cell counts <350 cells/μL2



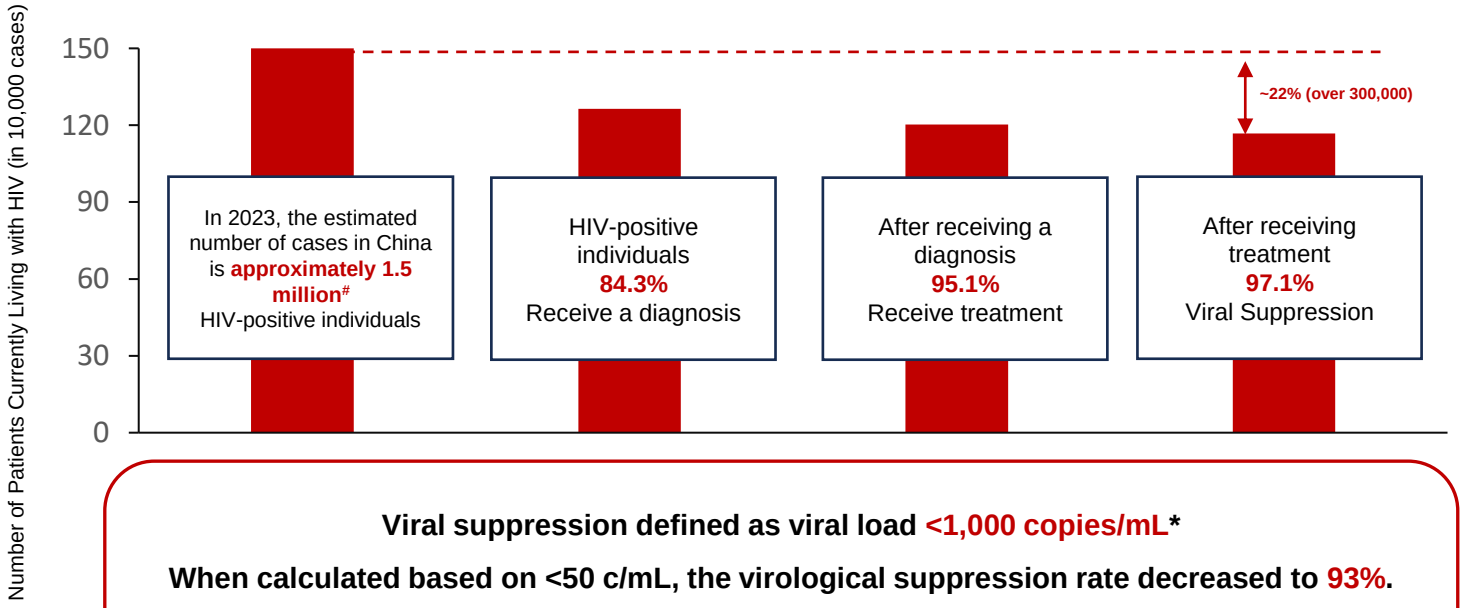
1. Wei Lai et al. *Analysis of Timeliness of Antiretroviral Therapy Among HIV-Infected Individuals in China (2011–2020)*. International Journal of Epidemiology and Infectious Diseases, 2022, 49(6): 365–370.
2. Yang Zhongnian et al. Chinese Journal of AIDS and STDs. 2025;31(1):17-23.

Reason 2: Slow decline in viral load and suboptimal control have led to further transmission, including the spread of drug-resistant strains.

Week 12 virological suppression rate[1] (HIV-1 RNA < 50 copies/mL)



Achievement of China's 95-95-95 Goals[2]



Viral suppression defined as viral load <1,000 copies/mL*

When calculated based on <50 c/mL, the virological suppression rate decreased to 93%.

The goal of eliminating the HIV epidemic still faces challenges

log_{10} represents exponential decreases in viral load, where a log10 decrease of 1 indicates a tenfold reduction in viral load, a log_{10} decrease of 2 indicates a hundredfold reduction, and so on.

[1]A 48-week, multicenter, randomized, double-blind, double-dummy, positive-parallel, non-inferiority Phase 3 clinical trial enrolling 630 treatment-naive HIV-1-positive adults. Participants were randomly assigned to receive either ANV+TDF+3TC or EFV+TDF+3TC regimens to compare the efficacy and safety of the two treatment options. Following a 48-week double-blind treatment period, the study transitioned to an open-label phase extending to 96 weeks, with participants continuing treatment of their choice upon unblinding.* The treatment success rate is calculated by taking the denominator as individuals meeting the viral load testing criteria and having completed at least one test during the year, with viral load <1,000 copies/ml. Individuals newly initiating treatment during the year are excluded from the treatment success rate evaluation. #The above information is estimated based on data released in 2023 and should be interpreted with caution.

1. Su B, et al. Lancet Reg Health West Pac. 2023;36:100769.
2. China Center for Disease Control and Prevention, 9th National AIDS Conference, 2024.

Initiate high-barrier regimen on the same day to achieve U=U as early as possible.

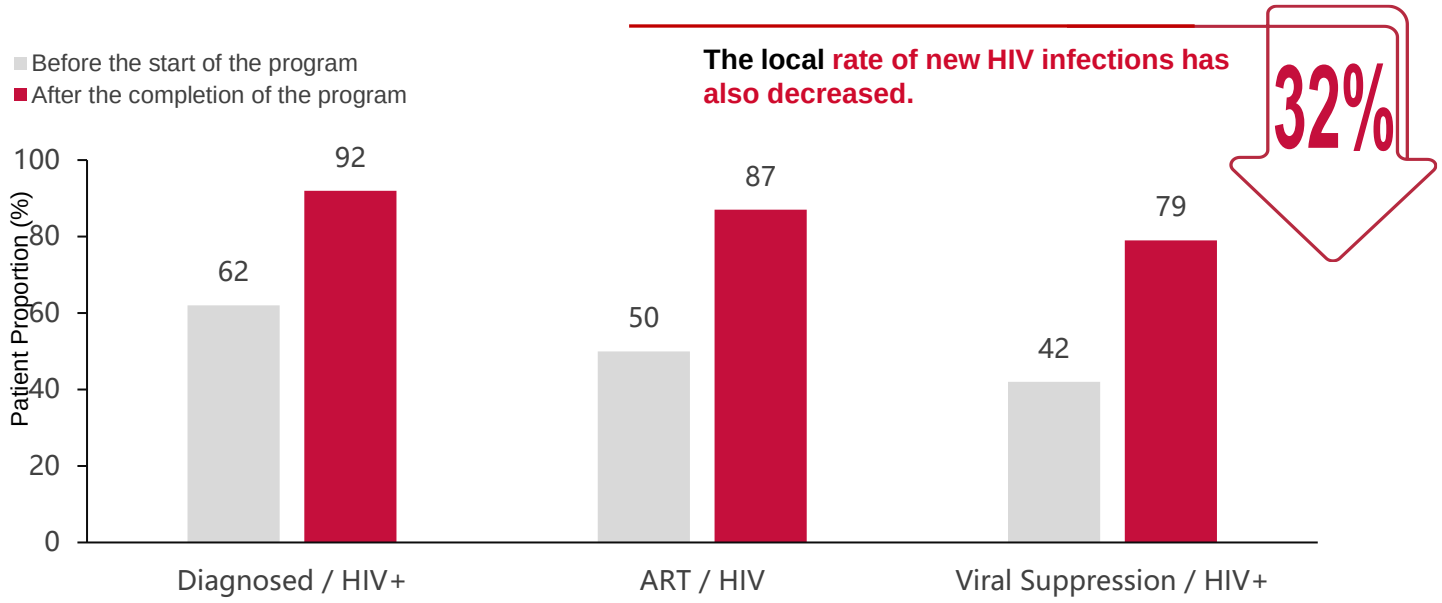
IAS-USA[1] 2024

If ART requires initiation prior to receiving drug resistance test results, **the INSTI regimen is recommended: BIC** or DTG + TXF/XTC (applicable for F/TDF or F/TAF PrEP users).

EACS[2] 2024

ART initiation may be necessary prior to receiving resistance test results. **High-barrier INSTI regimens (e.g., BIC** or DTG) or PI/booster regimens are recommended; dual-drug regimens are not recommended.

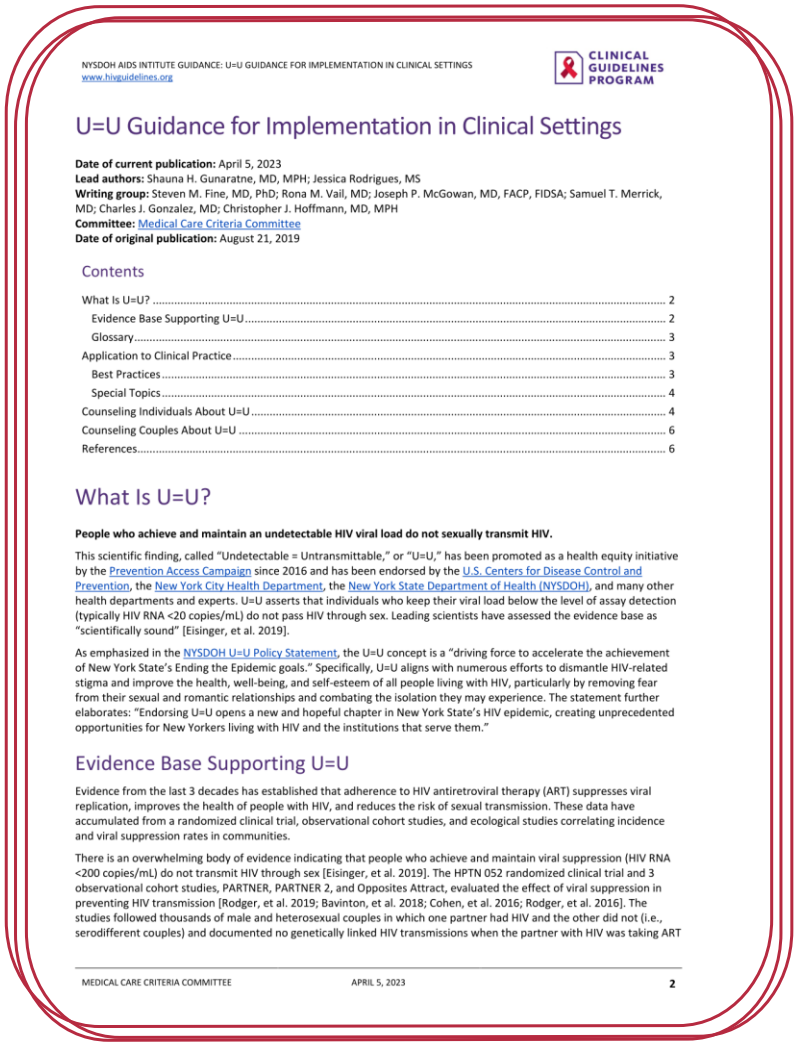
Following the launch of the rapid-start intervention program, the rate of viral suppression among people living with HIV has significantly increased.



East Africa SEARCH Multi-Community Rapid Start* Integrated Intervention Program 3: Launched in 32 communities across Kenya and Uganda, with approximately 320,000 residents screened.

1. Gandhi et al. JAMA. 2023;329(1):63–84
2. EACS Guidelines Version 12.1. Oct 202.
3. Chamie G, et al. Curr Opin HIV AIDS. 2019, 14(6): 449-454.

Long-term virological suppression is essential to maintain U=U



NYSDOH AIDS INTITUTE GUIDANCE: U=U GUIDANCE FOR IMPLEMENTATION IN CLINICAL SETTINGS
www.hivguidelines.org

CLINICAL GUIDELINES PROGRAM

U=U Guidance for Implementation in Clinical Settings

Date of current publication: April 5, 2023
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Committee: Medical Care Criteria Committee
Date of original publication: August 21, 2019

Contents

What Is U=U?

People who achieve and maintain an undetectable HIV viral load do not sexually transmit HIV.

This scientific finding, called "Undetectable = Untransmittable," or "U=U," has been promoted as a health equity initiative by the Prevention Access Campaign since 2016 and has been endorsed by the U.S. Centers for Disease Control and Prevention, the New York City Health Department, the New York State Department of Health (NYSDOH), and many other health departments and experts. U=U asserts that individuals who keep their viral load below the level of assay detection (typically HIV RNA <20 copies/mL) do not pass HIV through sex. Leading scientists have assessed the evidence base as "scientifically sound" [Eisinger, et al. 2019].

As emphasized in the NYSDOH U=U Policy Statement, the U=U concept is a "driving force to accelerate the achievement of New York State's Ending the Epidemic goals." Specifically, U=U aligns with numerous efforts to dismantle HIV-related stigma and improve the health, well-being, and self-esteem of all people living with HIV, particularly by removing fear from their sexual and romantic relationships and combating the isolation they may experience. The statement further elaborates: "Endorsing U=U opens a new and hopeful chapter in New York State's HIV epidemic, creating unprecedented opportunities for New Yorkers living with HIV and the institutions that serve them."

Evidence Base Supporting U=U

Evidence from the last 3 decades has established that adherence to HIV antiretroviral therapy (ART) suppresses viral replication, improves the health of people with HIV, and reduces the risk of sexual transmission. These data have accumulated from a randomized clinical trial, observational cohort studies, and ecological studies correlating incidence and viral suppression rates in communities.

There is an overwhelming body of evidence indicating that people who achieve and maintain viral suppression (HIV RNA <200 copies/mL) do not transmit HIV through sex [Eisinger, et al. 2019]. The HPTN 052 randomized clinical trial and 3 observational cohort studies, PARTNER, PARTNER 2, and Opposites Attract, evaluated the effect of viral suppression in preventing HIV transmission [Rodger, et al. 2019; Bavinton, et al. 2018; Cohen, et al. 2016; Rodger, et al. 2016]. The studies followed thousands of male and heterosexual couples in which one partner had HIV and the other did not (i.e., serodifferent couples) and documented no genetically linked HIV transmissions when the partner with HIV was taking ART

MEDICAL CARE CRITERIA COMMITTEE APRIL 5, 2023 2

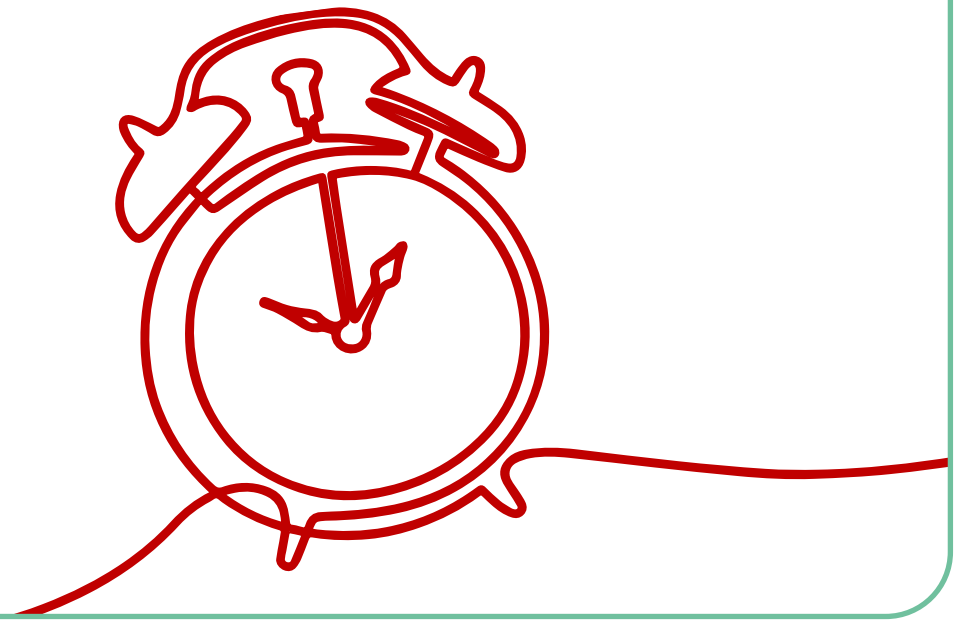
U=U Clinical Practice Guidelines

- Under the U=U assumption, if an individual adheres to antiviral treatment **and consistently takes antiviral medications as prescribed, this is the only way to maintain an undetectable viral load.**
- Discontinuation or intermittent treatment may lead to viral rebound, rendering U=U ineffective as a prevention strategy.

1. U=U Implementation Guide for Clinical Settings - Clinical Guideline Program

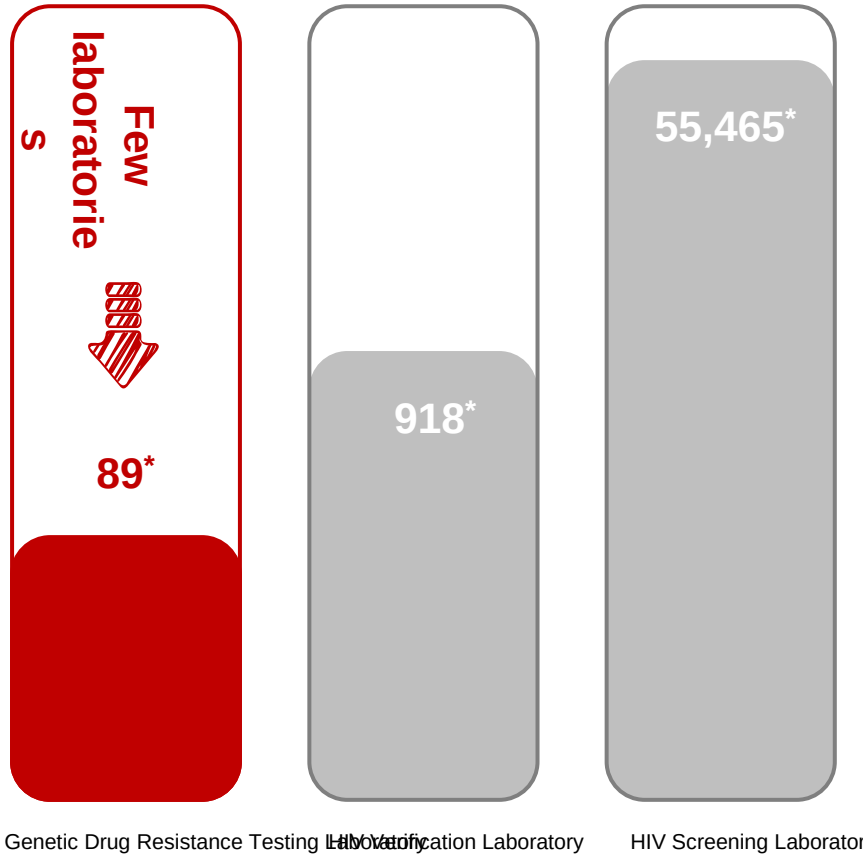
Access to drug resistance testing remains unattainable and is unlikely to be resolved in the near term.

How to manage a disease?



Access to HIV drug resistance testing in China remains relatively low, with challenges persisting in baseline resistance testing.

Low prevalence of drug resistance testing in China[1]



Low prevalence of drug resistance testing in China[1]

- Existing drug resistance testing methods are time-consuming and labor-intensive
- Difficult to roll out to remote areas
- Drug resistance testing is expensive
- Patients often need to go to designated hospitals for testing themselves

1. China Centers for Disease Control and Prevention. Unpublished data.
2. Zuo et al. Curr HIV Res. 2019;17(4):225–239.

Drug resistance testing has certain limitations, and results should be interpreted with caution.

Technical Issues

- **Genotype Testing: Limited to known mutation sites**
  - **Sanger sequencing: Difficult to detect low-abundance (<20%) HIV quasispecies**
- Phenotype Testing: Time-consuming

Timing of Testing

- **Strains with high adaptive costs (e.g., M184V/I and K65R causing NRTI resistance) may undergo reversion mutations to wild-type or be gradually replaced by wild-type under no drug selection pressure, becoming recessive variants that are difficult to detect by conventional methods.**
- Upon ART initiation, these variants may regain dominance under drug pressure, compromising treatment efficacy.

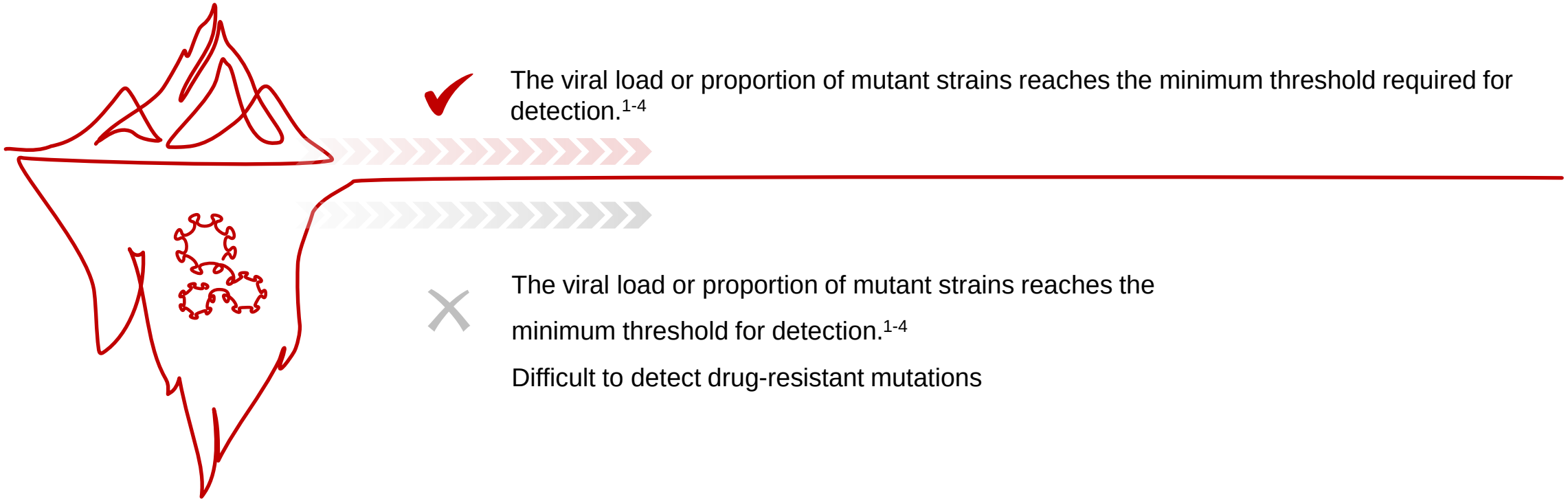
Accessibility Issues

- NGS technology: Though capable of detecting sequences of recessive drug-resistant strains at relatively low abundance, it remains less accessible in China.
- Phenotypic testing: High technical barriers and costs, making widespread adoption in routine clinical practice challenging

1. Expert Consensus on Management of Antiretroviral Therapy Resistance in HIV Infection in China

It is important to note that "undetected" does not mean "absent"

Since no single detection method can identify all drug-resistant mutations, it is essential to comprehensively evaluate the patient's drug exposure history and prior resistance test results to aid in identifying potential low-frequency resistance mutations or those stored within proviral DNA.



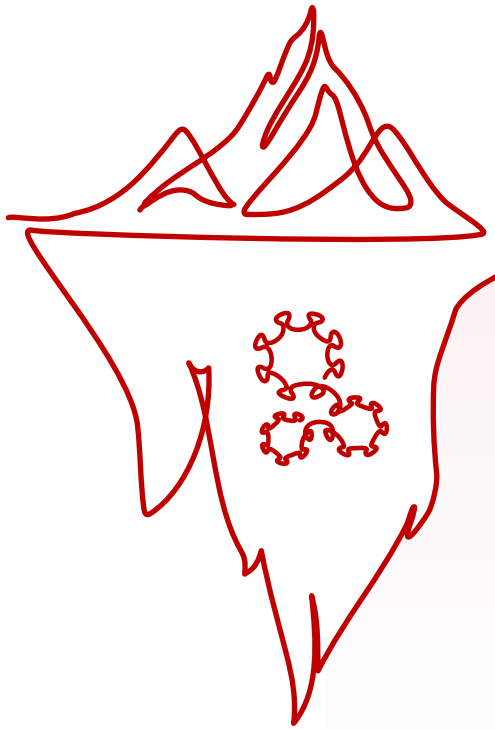
✔ The viral load or proportion of mutant strains reaches the minimum threshold required for detection.[1-4]

✘ The viral load or proportion of mutant strains reaches the minimum threshold for detection.[1-4]

Difficult to detect drug-resistant mutations

1. NYSDOH AIDS Institute. HIV Resistance Assays. June 2016 (Updated Feb 2020). https://www.hivguidelines.org/antiretroviral-therapy/hiv-resistance-assays/.
2. DHHS. Guidelines for the Use of Antiretroviral Agents in Adults and Adolescents with HIV. Sep 2024.
3. Campagna et al. Viruses. 2024;16(11):1697.
4. Liao Lingjie, Xing Hui. Chinese Journal of AIDS and STDs. 2023;29(2):127–131.

Even if data is detected, it may only be the tip of the iceberg.



Beyond the currently available and observable antimicrobial resistance data,

some resistance is underestimated due to limitations in detection methods.[1]

Some resistance have been overlooked due to delayed detection.[2]

Urgent Need to Strengthen Drug Resistance Monitoring and Prevention[3]

国务院 STATE COUNCIL

Plan for HIV/AIDS Prevention and Control in China (2024-2030)[4]:

- Efforts should be made to intensify sentinel surveillance and **drug resistance surveillance** among key populations, promote information exchange among institutions, and effectively utilize data from sentinel surveillance, **drug resistance**, molecular epidemiology, and border entry/exit channels to enhance epidemic assessment and trend analysis.
- Efforts should also be made to strictly implement clinical practice guidelines, enhance treatment evaluation, disease monitoring, and **drug resistance surveillance**.

1. Le T, et al. PloS one, 2009, 4(6): e6079
2. Zuo et al. Curr HIV Res. 2019;17(4):225–239.
3. Hao J, et al. Clinical Infectious Diseases, 2025: ciaf159.
4. General Office of the State Council. *Notice of the General Office of the State Council on Issuing the Plan for HIV/AIDS Prevention and Control in China (2024-2030).* State Council General Office Issue [2024] No. 51.

HIV drug resistance or failure to perform resistance testing significantly increases the risk of patient mortality

Multivariate logistic regression analysis: Risk of death among HIV-infected individuals (compared to ARV-responsive patients)

Presence of resistance

(Based on resistance test results)

Increased risk of death

3.25 times

(aOR=4.25; 95% CI: 2.10, 8.62)

Viral load >1,000 copies/mL

No resistance testing performed

Increased risk of death

3.65 times

(aOR=4.65; 95% CI: 1.74, 12.39)

The most recent viral load and drug resistance tests were both not performed.

Increased risk of death

16.52 times

(aOR=17.52; 95% CI: 8.73, 35.19)

Case-control study in China: Analyzing the association between HIV drug resistance and mortality among antiretroviral therapy (ART)-treated patients, including 19,235 HIV-infected individuals from seven provincial-level administrative regions† between 2010 and 2019, comprising 5,719 deceased patients and 13,516 surviving patients.

1. Zhang et al. China CDC Wkly. 2021 Apr 2;3(14):291-297.

Drug resistance testing unlikely to become widespread in the short term
“High resistance barrier regimens” may be a key consideration in treatment

Simple Treatment

- Rapid/same-day initiation, with straightforward prescribing
- Single-tablet regimen for easy administration
- High tolerance for uncomplicated adherence

Simple Testing

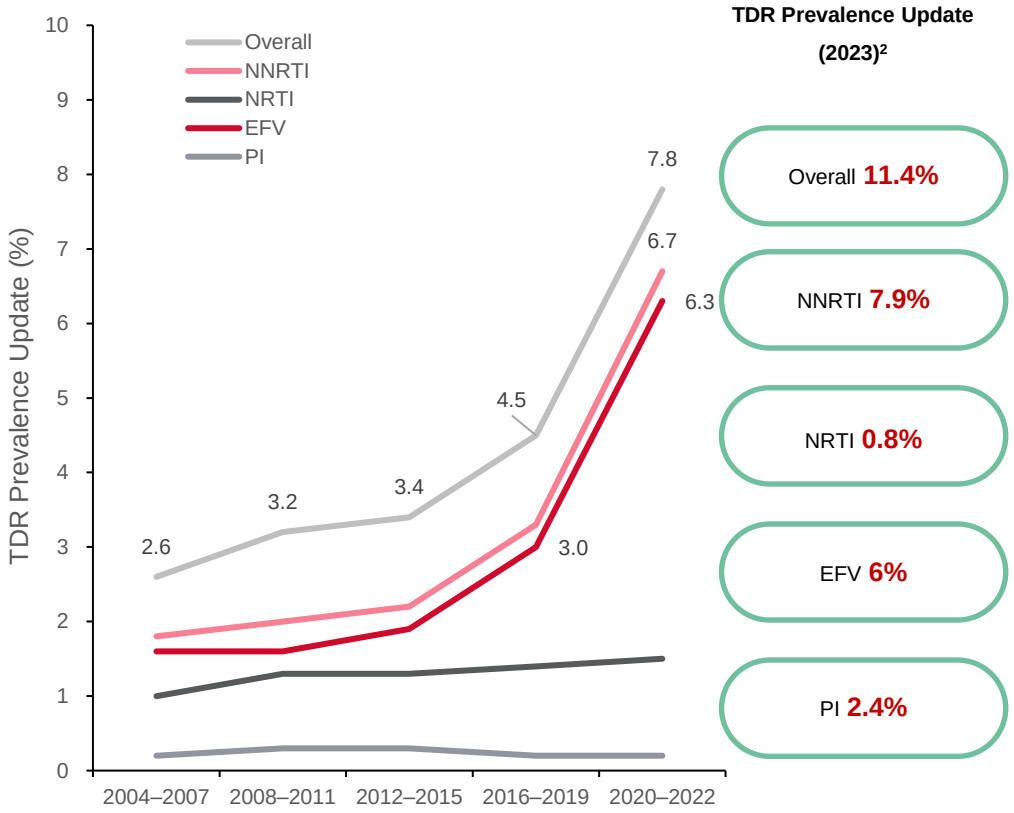
- Treatment can begin without waiting for baseline test results
- High resistance barrier reduces need for resistance testing
- No frequent monitoring of liver or kidney function during treatment

In the context of high pre-treatment drug resistance prevalence

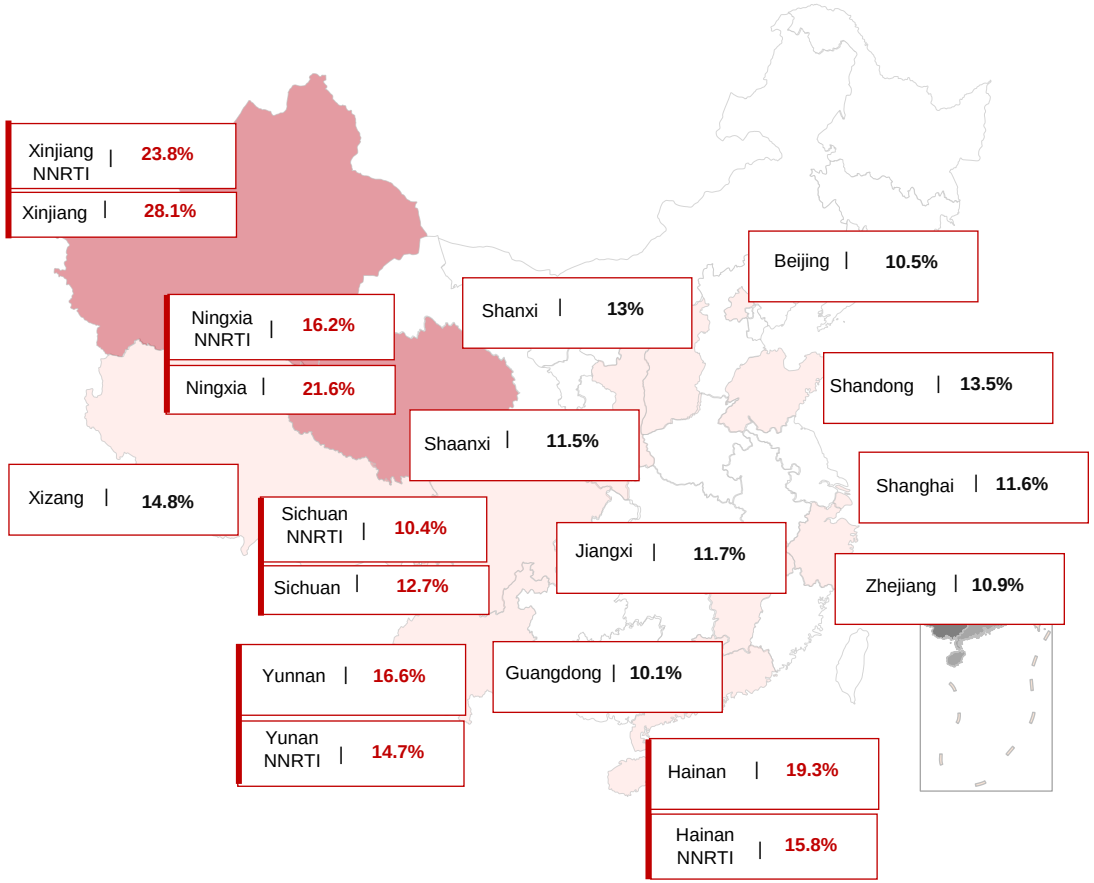
What adjustments are required to the diagnostic and treatment pathway?

The prevalence of NNRTI TDRs in China continues to rise, with multiple regions already exceeding the 10% threshold.

The prevalence of NNRTI TDRs in China has been increasing year by year.



According to the latest 2023 data, NNRTI TDR exceeds 10% in multiple regions.[2]



TDR: Transmissible Drug Resistance; Research based on drug resistance surveillance across 31 provincial-level administrative regions in China.

1. Liu et al. China CDC Wkly. 2023;5(30):664–671.
2. Hao J, et al. Clinical Infectious Diseases, 2025: ciaf159.

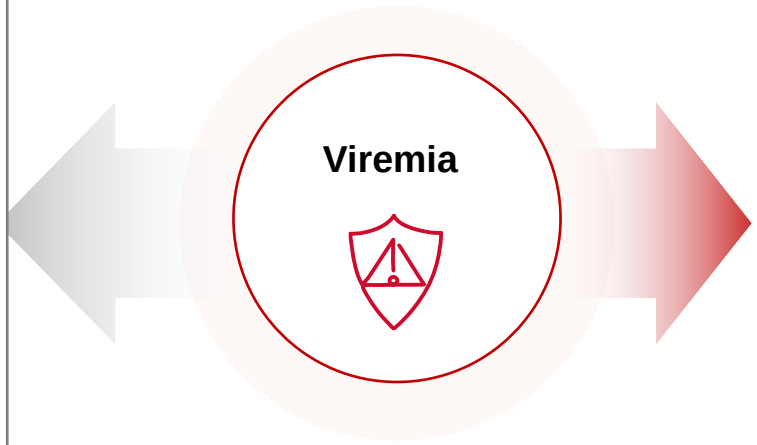
The spread of drug resistance increases the risk of viremia, thereby promoting the emergence of resistance and creating a vicious cycle.

With relatively high TDR levels, initiating treatment directly with regimens that lack baseline resistance testing and feature low resistance barriers increases the risk of viremia, thereby promoting the emergence of resistance, further exacerbating the prevalence of transmissible resistance, and creating a vicious cycle.

Drug-resistant strains are selected, generating resistance

Acquired drug resistance (ADR)

Driven by host factors (compliance) or treatment-related factors (PK/PD) [2–5]



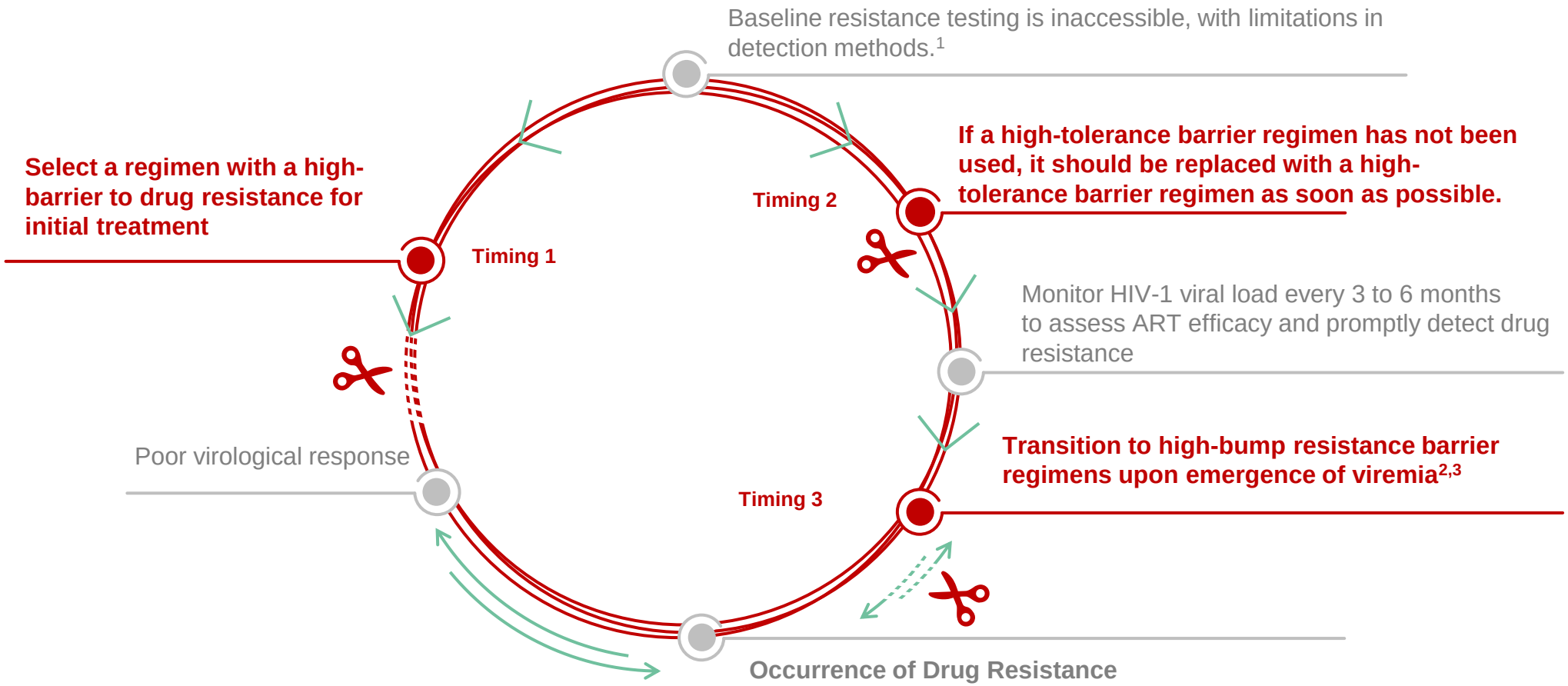
Resistance may intensify

Transmissible Drug Resistance (TDR)[1]

Driven by viral factors (initial infection with resistant strains or natural resistance) [6,7]

1. Carr et al. Antiviral Ther. 2023;28:13596535231201162
2. Clumeck et al. HIV Medicine. 2008;9:65-71.
3. Endebu et al. Int J HIV AIDS Prev Educ Behav Sci. 2018;4:44-51.
4. Nega et al. AIDS Res Ther. 2020;17:39.
5. Tang & Shafer. Drugs. 2012;72:e1-e25.
6. Rhee et al. J Int AIDS Soc. 2020;23:e25611.
7. Peterson et al. AIDS Res Treat. 2011;2011:463704.

How to Break the “Vicious Cycle”?

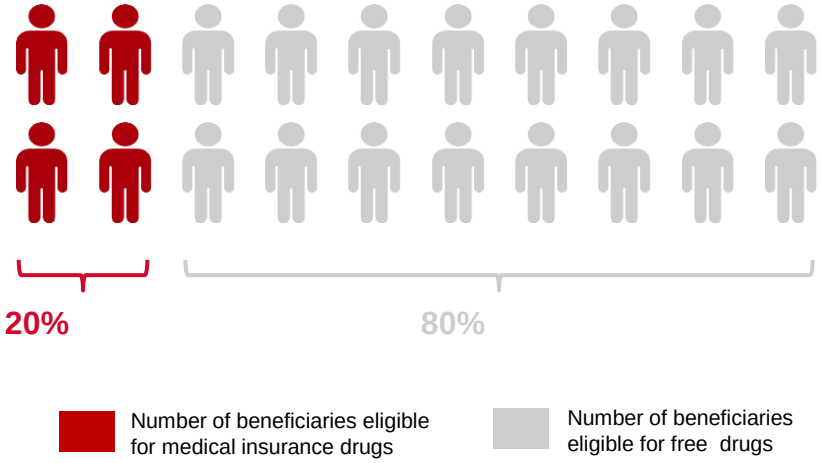


1. National Clinical Research Center for Infectious Diseases, et al. Chinese Journal of Clinical Infectious Diseases (Chinese and English), 2025, 18(03):161-171.
2. 2024 DHHS. Guidelines for the Use of Antiretroviral Agents in Adults and Adolescents with HIV;
3. Expert Consensus on Low Viral Load Management in HIV-Infected Individuals (2025 Edition)

Timing 1: International guidelines no longer recommend NNRTI regimens as the first-line choice for first-time treatment

In the absence of resistance test results, ART with a high resistance barrier may be selected for rapid initiation

There are still over 1 million people living with HIV in China receiving free antiretroviral treatment.



- EFV and other NNRTIs are no longer recommended as first-line treatment options[2-6].
- WHO recommends: For **countries and regions with pre-treatment resistance rates ≥10%** to NNRTIs, **NNRTI-based ART should be avoided** as an initial treatment regimen.
- Initiation may be necessary prior to receiving resistance test results. **High-barrier INSTI regimens (e.g., BIC** or DTG) or PI/booster regimens are recommended; dual-drug regimens are not recommended.

Individuals undergoing seroconversion after prior PrEP use represent a unique group of treatment-naive HIV-infected individuals warranting attention. **Improper PrEP use may increase the risk of drug resistance:**

According to reports from 2020 to 2023, 310 cases of seroconversion occurred in clinical settings among individuals taking oral TDF-containing PrEP. Of these, **20% developed resistance to TDF or 3TC**. Furthermore, if **pre-exposure prophylaxis is initiated during an undiagnosed infection, the resistance rate can be over 10 times higher.**

1. Lei Zhenglong, Department of Infectious Disease Prevention and Control, National Center for Disease Control and Prevention, Presentation: “China's HIV/AIDS Containment and Prevention Plan (2024–2030)” at the 10th National AIDS Conference, April 2025
2. DHHS. Updated: September 12, 2024.
3. EACS Guidelines. Oct 2015.
4. EACS Guidelines. Oct 2020.
5. EACS Guidelines. Oct 2023.
6. WHO Guidelines. July 2019.
7. WHO Guidelines. July 2021.
8. HIV Drug Resistance
9. HIV drug resistance Brief report 2024

Timing 2: Transitioning from a regimen with low resistance barriers to one with high resistance barriers as soon as possible

Low resistance barriers may lead to virological failure:

With EFV+2 NRTIs*, the proportion of new drug resistance emerging at Week 96 was **3.5%, accounting for 57.1% of virologic failures#**.

Low-barrier regimens with high rates of adverse reactions impair treatment adherence, resulting in virologic failure:

Patients randomized to the EFV regimen experienced adverse events at a rate of **91.4%** at Week 48, with **17.5% reporting neuropsychiatric symptoms**[2]. The risk of non-adherence significantly increased by **66%**[3] due to sleep disturbances. For individuals with HIV infection receiving NNRTI regimens, **non-adherence rates below 95%** resulted in up to **50%** developing drug resistance mutations[4].

As stated in the Chinese HIV/AIDS Guidelines and the IAS Guidelines:

HIV-infected individuals with sustained virologic suppression and no history of transmitted or acquired HIV resistance can typically be switched to **any preferred recommended initial ART regimens and maintain virologic suppression.**[5,6]

For infected individuals with unknown drug resistance history, it is not recommended to switch from a high-barrier regimen to a low-barrier regimen.[7]

* Including TDF/FTC, AZT/3TC, and ABC/3TC; #defined as two consecutive HIV RNA <50 copies/mL followed by two consecutive HIV RNA >50 copies/mL, or never achieving two consecutive HIV RNA <50 copies/mL with an increase of 0.5 log10 copies/mL from the nadir value

1. Rimsky et al. Antivir Ther. 2013;18(8):967-77.
2. Su B, et al. Lancet Reg Health West Pac. 2023;36:100769.
3. Saberi P, et al. AIDS Patient Care STDS. 2011 Sep;25(9):517-24.
4. von Wyl V et al. PLoS One. 2013 Oct 16;8(10):e77691.
5. Gandhi et al. JAMA. 2023;329(1):63–84.
6. Chinese Guidelines for HIV Diagnosis and Treatment (2024 Edition). Chinese Journal of Infectious Diseases. 2024;42(5):257–284.
7. DHHS Guidelines for the Use of Antiretroviral Agents in Adults and Adolescents with HIV. Sep 2024.

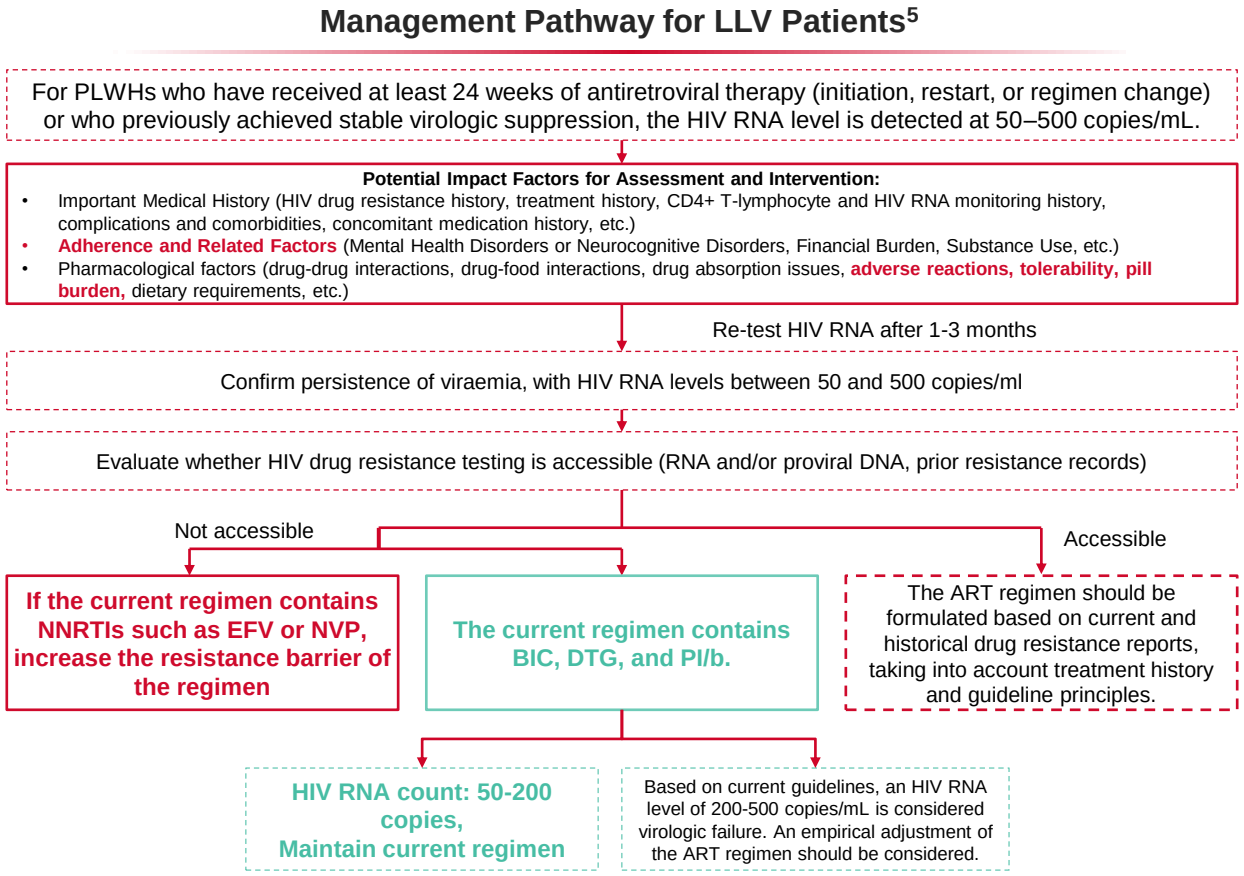
Timing 3: Transition to high-bump resistance barrier regimens upon emergence of viremia

Current Problems

1. When viremia occurs, improper stepwise treatment—sequentially replacing core drugs, resulting in fluctuating viral loads and increasing the risk of drug resistance.

2. The free medication guide defines virological failure as a viral load exceeding 1,000 c/ml. According to the latest guidelines, it is defined as **>200 c/ml**. With the new standard, consideration must be given to how to manage infected individuals with viral loads fluctuating between **50-200 or 200-1,000 c/ml**.

3. The adherence rate among HIV-infected individuals in China declines over time with prolonged treatment. The proportion with good adherence during the first week was **81.8%**. By Month 3, adherence was only **68.3%**, and individuals with viremic infection also faced challenges in managing adherence.

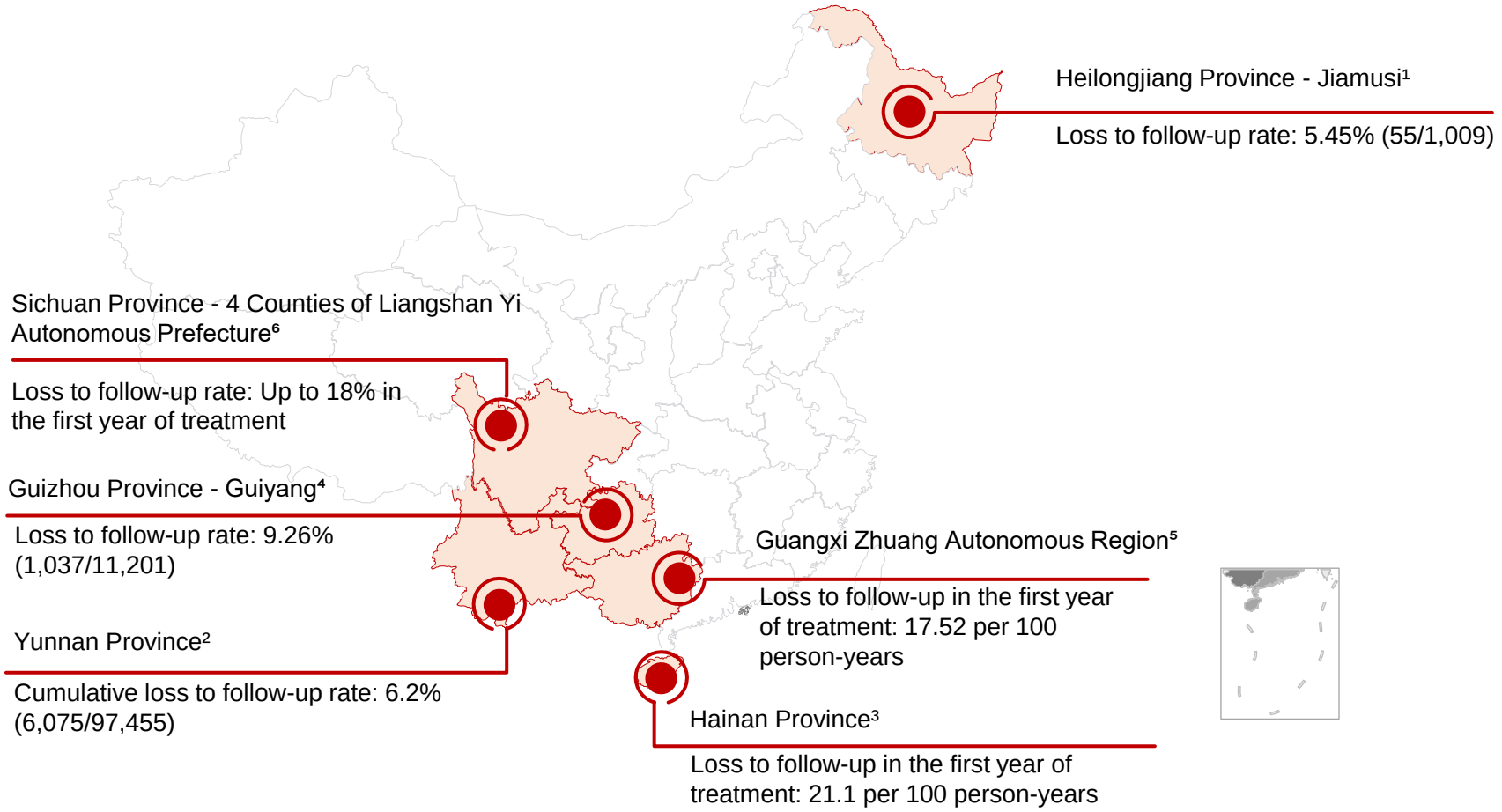


1. He Xiaoqing, Department of Infectious Diseases, Chongqing Public Health Medical Treatment Center September 5, 2025 Conference on Refractory Viremia
2. National Free Antiretroviral Therapy Manual for HIV/AIDS (2023 Edition)
3. Chinese Guidelines for the Diagnosis and Treatment of HIV/AIDS (2024 Edition)
4. Wang YY, et al. AIDS Care. 2019;31(8):913-922..
5. Expert Consensus on Low Viral Load Management in HIV-Infected Individuals (2025 Edition)

HIV-infected Patients Lost to Treatment Follow-up

How to Retrieve and Restart Treatment for HIV Patients Lost to Follow-up?

Current Status of HIV Treatment Loss to Follow-up in Some Provinces of China



1. Zhang Jinrui, et al. Disease Surveillance, 2025, 40(4): 465.
2. Lou Jincheng, et al. Chinese Journal of Infectious Diseases, 2022, 40(2): 79-83
3. Feng Yuting, et al. China Tropical Medicine, 2024, 24(3): 304-308.
4. Yang Xiaoyan, et al. Chinese Journal of Preventive Medicine, 2024, 25(2): 204-209.
5. ZHU JH, et al. Biomed Res Int, 2021, 2021: 6657112.
6. Zeng Yali, et al. Chinese Journal of Public Health, 2022, 38(10): 6.

Treatment regimen, time to treatment initiation, and viral suppression status are all associated with the risk of loss to follow-up.

Factor I: Treatment Regimen

Compared with EFV-containing regimens, the use of INSTI-containing regimens was associated with a significant reduction in the risk of loss to follow-up, p<0.01

-76%

+80%

Compared with treatment initiation within <1 month of diagnosis, starting treatment between 1-12 months was associated with a significant increase in the risk of loss to follow-up, p<0.01

Factor II: Start Time

+3.69 times

Compared with viral load below the limit of detection, a viral load of 20-1,000 copies/mL was associated with a significant increase in the risk of loss to follow-up, p<0.01

Factor III: Viral Suppression Status

1. Feng Yuting, Xu Yujun, Zhu Kaokao, et al. Analysis of Loss to Follow-up and Its Influencing Factors of HIV Antiretroviral Therapy in Hainan Province[J]. China Tropical Medicine, 2024, 24(3): 304-308.

Adherence education should be initiated when encountering individuals undergoing voluntary HIV testing or those proactively offering testing services.

Taking Yunnan Province as an example, retrieving and re-engaging patients lost to follow-up requires multi-sectoral collaboration but has shown suboptimal success rates

Among 5,340 patients lost to follow-up, only 923 (17.3%) were retrieved and re-enrolled in treatment[1]

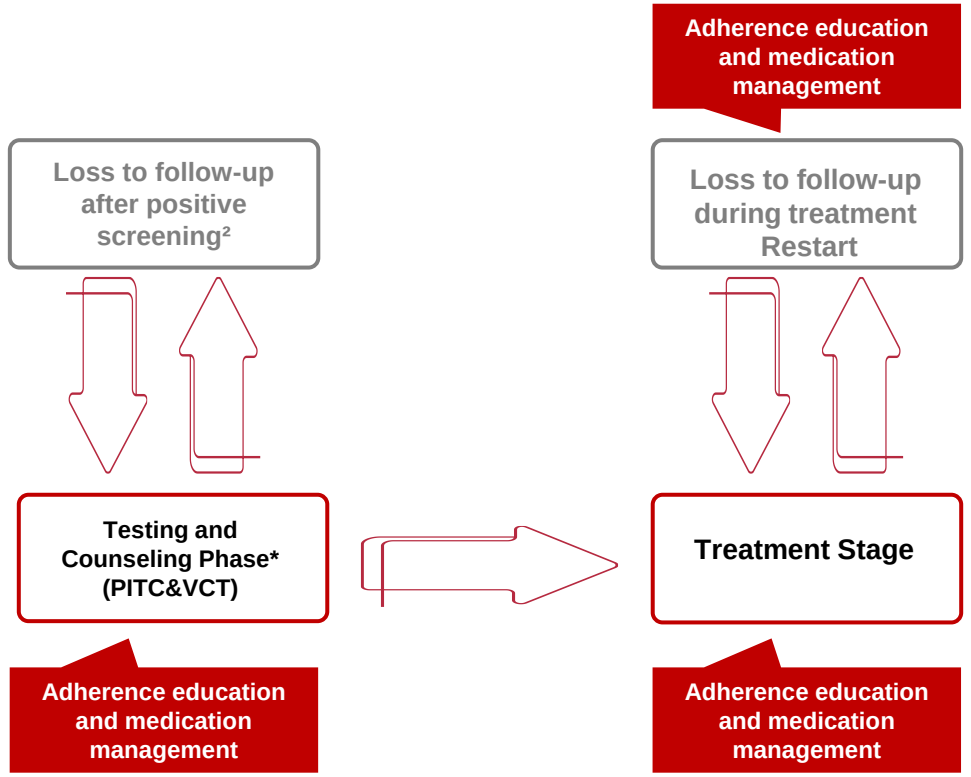
Retrieving Institution

- Designated Medical Institutions + CDC
- Designated Medical Institutions + Social Organizations
- CDC + Social Organizations
- Designated Medical Institutions
- CDC
- Others

Retrieval Method

- Phone Calls
- Phone calls + face-to-face communication
- Phone calls + home visits
- Face-to-face interviews after admission to hospital
- Others

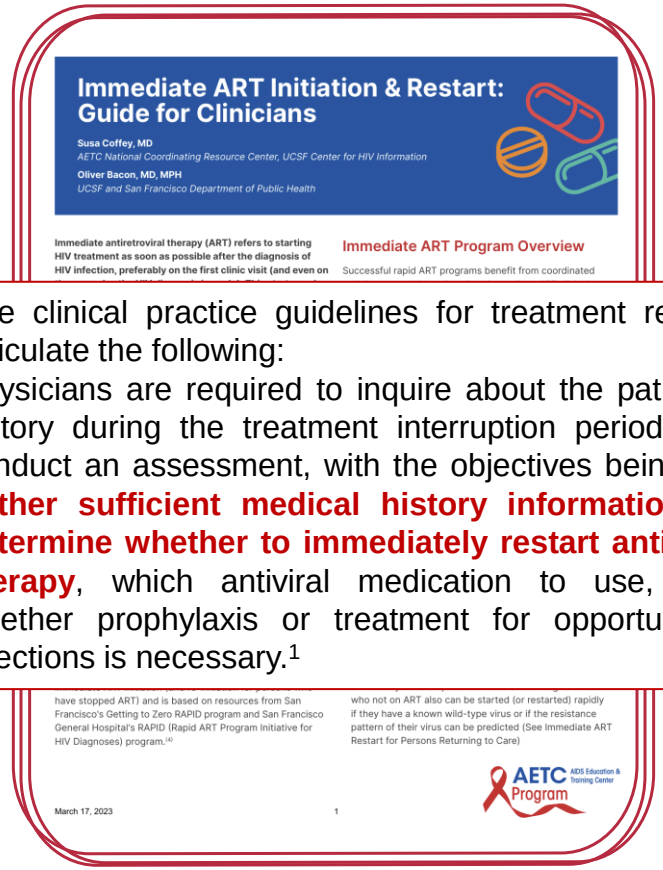
Adherence education should be provided throughout the entire process, starting from the testing phase



*Medical institutions proactively provide HIV testing and counseling services (PITC), while individuals undergo voluntary HIV counseling and testing (VCT)

1. Lou Jincheng, Wang Lin, Yang Gen, et al. Analysis of Retrieval, Re-engagement and Re-enrollment Status and Its Influencing Factors Among People Living with HIV During Antiretroviral Therapy in Yunnan Province[J]. Chinese Journal of Infectious Diseases, 2022, 40(2): 79-83.
2. Chen Lin, Chen Wanjun, Zhou Xin, et al. Current Status and Cause Analysis of Loss to Follow-up Among HIV-positive Individuals After Screening in Zhejiang Province[J]. Chinese Journal of AIDS & STD, 2020, 26(4): 4.

Problems in Restarting Treatment
Complex or unknown medical history; if drug resistance exists, it tis difficult for regimens with low genetic barrier to resistance to control the virus effectively


Immediate ART Initiation & Restart: Guide for Clinicians

Susa Coffey, MD
AETC National Coordinating Resource Center, UCSF Center for HIV Information
Oliver Bacon, MD, MPH
UCSF and San Francisco Department of Public Health

Immediate antiretroviral therapy (ART) refers to starting HIV treatment as soon as possible after the diagnosis of HIV infection, preferably on the first clinic visit (and even on

Immediate ART Program Overview

Successful rapid ART programs benefit from coordinated

have stopped ART) and is based on resources from San Francisco's Getting to Zero RAPID program and San Francisco General Hospital's RAPID (Rapid ART Program Initiative for HIV Diagnoses) program.[4]

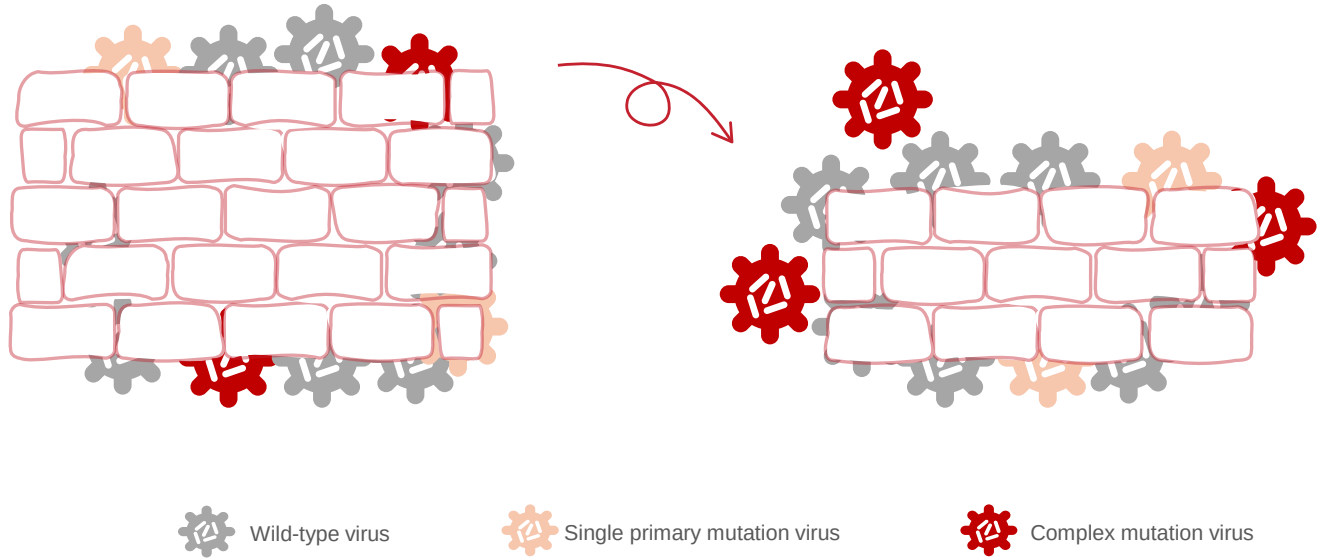
who not on ART also can be started (or restarted) rapidly if they have a known wild-type virus or if the resistance pattern of their virus can be predicted (See Immediate ART Restart for Persons Returning to Care)

AETC AIDS Education & Training Center Program

March 17, 2023 1

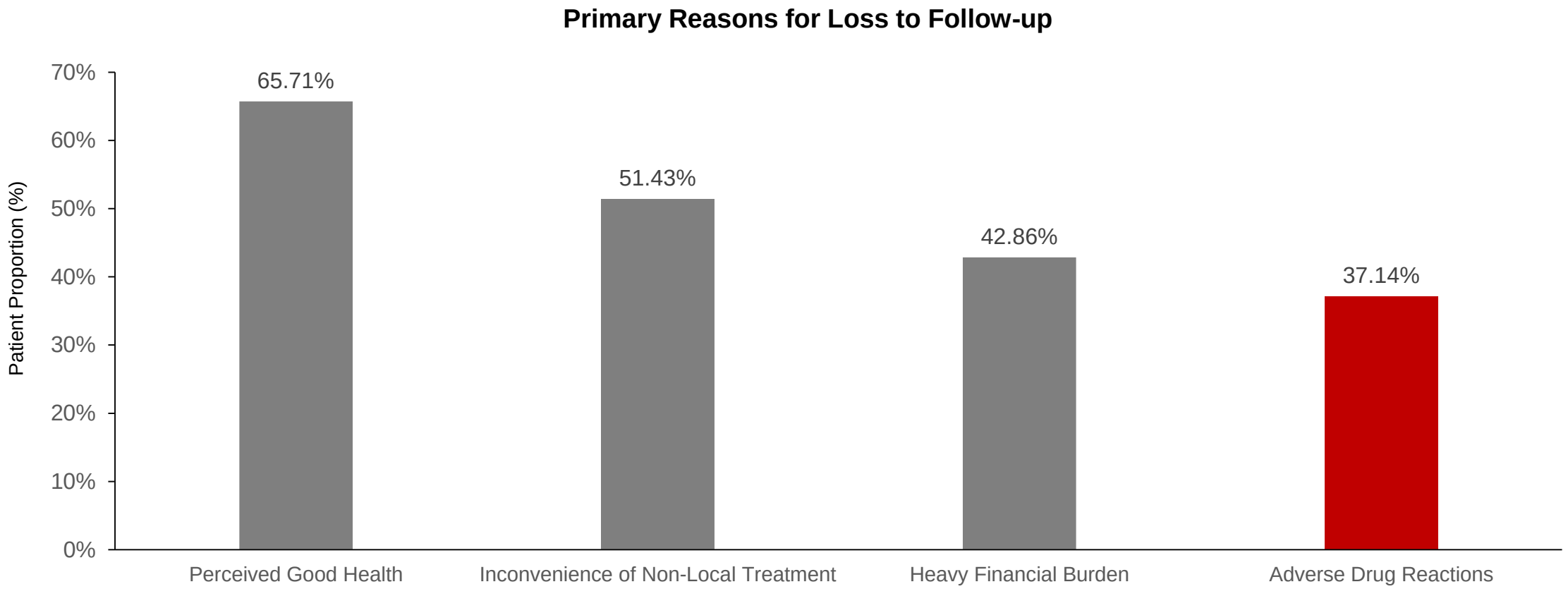
The clinical practice guidelines for treatment restart articulate the following:
Physicians are required to inquire about the patient's history during the treatment interruption period and conduct an assessment, with the objectives being: **to gather sufficient medical history information to determine whether to immediately restart antiviral therapy**, which antiviral medication to use, and whether prophylaxis or treatment for opportunistic infections is necessary.[1]

A high genetic barrier to resistance, a metaphorical "wall" in the antiviral treatment of HIV, demands numerous viral site mutations for the virus to breach it; and regimens with such a high barrier can effectively block those viruses that harbor complex mutations. Making an impetuous switch to low genetic barrier to resistance regimens in the absence of baseline testing may achieve effective suppression of single primary mutant viruses, yet it will induce massive replication of complex mutant viruses, which in turn elevates the dual risks of virological failure and the virus developing resistance to therapeutic drugs.[2,3,4]



1. Coffey S, Bacon O. Immediate ART Initiation & Restart: Guide for Clinicians[J].
2. DHHS Guidelines for the Use of Antiretroviral Agents in Adults and Adolescents with HIV. Feb 2024.
3. Podany et al. Clin Pharmacokinet. 2020 Sep;59(9):1085-1107.
4. Calcagno et al. Clin Infect Dis. 2015 Jan 15;60(2):311-7.

Challenges to be Addressed in Restart
37.14% of infected individuals were lost to follow-up due to adverse reactions. How can subsequent protocols mitigate this?



A total of 1,009 patients living with HIV/AIDS were enrolled in the study, with the loss to follow-up rate during antiretroviral therapy (ART) standing at 5.45% (55/1,009). The primary causes of loss to follow-up included perceived good physical health (65.71%), inconvenience of receiving medical treatment in other regions (51.43%), excessive economic burden (42.86%), adverse drug reactions (37.14%), private purchase of drugs or treatment with traditional Chinese medicine (14.28%), and poor treatment adherence (8.57%).

1. Zhang Jinrui, Liu Fengming, Chen Jianing, et al. Analysis of Loss to Follow-up Status and Its Impact on Survival Among HIV/AIDS Patients Receiving Antiretroviral Therapy in Jiamusi City, Heilongjiang Province from 2008 to 2022[J]. Disease Surveillance, 2025, 40(4): 465.

For HIV-infected patients retrieved after loss to follow-up, it is recommended that they select an appropriate regimen and restart treatment immediately.

General Principle[1]

- It is recommended that ART be restarted immediately at the first re-admission if the patient is willing to undergo treatment.
- Immediate treatment restart is particularly crucial for patients with a CD4 cell count of less than 200 cells/mm³.

Indications for Immediate Restart of Antiretroviral Therapy[1]

- Nearly all HIV-infected patients in need of treatment restart.
- HIV-infected patients with a history of antiretroviral therapy, for whom viral drug resistance is either known or predictable based on previous drug resistance testing, viral load during antiretroviral therapy and treatment adherence records.
- **HIV-infected patients for whom an appropriate antiretroviral therapy regimen can be formulated without reference to the results of current drug resistance testing.**

Contraindications for Immediate Restart of Antiretroviral Therapy[1]

- For HIV-infected patients with certain untreated opportunistic infections (OIs) (e.g., central nervous system OIs), it is recommended that OI treatment be administered for a period prior to the initiation of antiretroviral therapy (ART).
- **HIV-infected patients for whom an appropriate antiretroviral therapy regimen cannot be formulated without reference to the results of current drug resistance testing.**

What key characteristics should the regimens suitable for immediate treatment restart possess?

Characteristic I

Treatment initiation without waiting for test results[2,3]

Characteristic II

Excellent tolerability with few adverse events[4]

Characteristic III

Potent viral suppression[5] and high genetic barrier to resistance[6-14]

1. Coffey S, Bacon O. Immediate ART Initiation & Restart: Guide for Clinicians[J]
2. Biktarvy® US Prescribing Information. Gilead Sciences. June 2019.
3. DHHS. Guidelines for the use of antiretroviral agents in adults and adolescents living with HIV. 2023.
4. Mallolas J, et al. EACS 2021. PE2/57
5. Peng Y, et al. Chin Med J (Engl). 2023 Nov 20;136(22):2738-2740.
6. Sax PE, et al. eClinicalMedicine. 2023; 59: 101991
7. Schellberg S, et al. DÖAK 2023. Poster 80874.
8. Andreatta K, et al. CROI 2019. Seattle, WA. Poster 552.
9. Avihingsanon, A et al., Lancet HIV, 2023. 10(10): p. e640-e652.
10. Kityo C, et al. Open Forum Infectious Diseases. P-547.
11. Maggiolo F, et al. HIV Med. 2023; 24: 27−36.
12. Bachelard A, et al.J Antimicrob Chemother. 2023; 78: 769–778.
13. Hagins D, et al. JAcquir Immune Defic Syndr. 2021; 88: 86−95.
14. Kityo C, et al. IAS 2019. Presentation MOAB0106..

Summary

With over 100,000 new HIV infections reported annually, how can we achieve the goal of ending the HIV epidemic?

1 **Immediate/same-day treatment initiation for rapid achievement of U=U, long-term virological suppression, and sustained U=U**

Access to drug resistance testing remains unattainable and is unlikely to be resolved in the near term; how to conduct HIV disease management effectively in this context?

2 **Selecting a "high genetic barrier to resistance regimen" characterized by simple treatment implementation and easy testing constitutes a key consideration in treatment**

What adjustments are required to the diagnostic and treatment pathway against the backdrop of a high prevalence of pretreatment drug resistance?

3 **For treatment-naive patients, select high genetic barrier to resistance regimens; for treatment-experienced patients, switch to such regimens as early as possible; for patients with viremia, switch to high genetic barrier to resistance regimens, thereby breaking the "vicious cycle".**

How to retrieve and restart treatment for HIV patients lost to follow-up?

4 **Strengthen treatment adherence education, and for retrieved patients, select testing-free, well-tolerated, high genetic barrier to resistance regimens to initiate antiretroviral therapy restart immediately.**