

Expanding human immunodeficiency virus testing: whole society participation and multilevel promotion

Qing-Hai Hu^{1,2,3,4}, Jun-Jie Xu^{1,2,3,4}, Yong-Jun Jiang^{1,2,3,4}, Hong Shang^{1,2,3,4}

¹NHC Key Laboratory of AIDS Immunology (China Medical University), National Clinical Research Center for Laboratory Medicine, The First Affiliated Hospital of China Medical University, Shenyang, Liaoning 110001, China;

²Key Laboratory of AIDS Immunology, Chinese Academy of Medical Sciences, Shenyang, Liaoning 110001, China;

³Key Laboratory of AIDS Immunology of Liaoning Province, Shenyang, Liaoning 110001, China;

⁴Collaborative Innovation Center for Diagnosis and Treatment of Infectious Diseases, Hangzhou, Zhejiang 310003, China.

Human immunodeficiency virus (HIV) testing is the only way to find people living with HIV (PLWH). Early diagnosis and early treatment of HIV can extend the life of PLWH and reduce the subsequent transmission of HIV. Therefore, HIV testing plays a crucial role in public health. The global scale of HIV testing has expanded significantly over the past 10 years. Of the estimated 37 million people with HIV worldwide, approximately 79% knew their HIV status in 2018, compared with 12% in 2005. By 2018, 68.9% of PLWH in China had received a diagnosis.^[1] This number is far from the target of 90% of PLWH knowing their HIV status, which is advocated in the implementation plan for containing the spread of HIV/acquired immunodeficiency syndrome (AIDS) (2019–2022).^[2] Expanding HIV testing has become an essential and challenging issue for China's current HIV/AIDS prevention and control.

Significant Increase in HIV Testing in China

In recent years, the number of people receiving HIV testing increased significantly in China, from 128 million in 2014 to 241 million in 2018.^[3] Newly diagnosed cases through HIV testing increased from around 100,000 in 2014 to around 148,000 in 2018.^[3] By improving passive approaches to HIV testing and promoting active approaches to HIV testing, China has gradually formed a comprehensive strategy for rolling out HIV testing.

Passive approaches to HIV testing include three essential methods. First, implementing HIV nucleic acid testing (NAT) at blood centers has become a national policy. In 2016, NAT testing became mandatory at blood centers, in addition to the existing enzyme-linked immunosorbent

assay (ELISA) method. China has had no reported instances of HIV transmission by blood transfusion or blood products. The combination of NAT and ELISA has raised China's blood safety to an advanced level. The second method is promoting provider-initiated HIV testing and counseling; health providers recommend HIV testing as a standard component of care for individuals attending health facilities. Medical institutions have multiple opportunities for contacting PLWH. Promoting HIV testing among key departments of medical institutions can increase the accessibility and convenience of HIV testing. Since 2013, medical institutions have accounted for >50% of diagnosed HIV cases, and detection in medical institutions has become the most important way to diagnose HIV infection in China.^[4] The third method of passive testing is encouraging HIV testing and consultation services during pre-marital medical examinations and pre-pregnancy eugenic health examinations. In some areas with a high incidence of HIV, it is also recommended that personnel in commercial, public places, such as entertainment venues and beauty salons, be tested for HIV every 6 months.

Voluntary consultation and testing (VCT) is one of the most effective strategies for HIV-active testing. China incorporated VCT as a part of its national HIV/AIDS program and had established >10,000 VCT clinics by 2018. VCT also plays an indispensable role in detecting HIV infections. In 2017, 27% of new HIV infections were diagnosed in VCT clinics.^[4] People with positive HIV tests in VCT clinics can start antiviral treatment earlier and therefore have a longer life expectancy. Good VCT services also ensure that individuals who test HIV negative are linked to appropriate, effective prevention services. Timely

Access this article online

Quick Response Code:



Website:
www.cmj.org

DOI:
10.1097/CM9.0000000000001812

Correspondence to: Dr. Hong Shang, NHC Key Laboratory of AIDS Immunology (China Medical University), National Clinical Research Center for Laboratory Medicine, The First Affiliated Hospital of China Medical University, No 155, Nanjing North Street, Heping District, Shenyang, Liaoning 110001, China
E-Mail: hongshang100@hotmail.com

Copyright © 2021 The Chinese Medical Association, produced by Wolters Kluwer, Inc. under the CC-BY-NC-ND license. This is an open access article distributed under the terms of the Creative Commons Attribution-Non Commercial-No Derivatives License 4.0 (CCBY-NC-ND), where it is permissible to download and share the work provided it is properly cited. The work cannot be changed in any way or used commercially without permission from the journal.

Chinese Medical Journal 2021;134(23)

Received: 09-07-2021 Edited by: Peng Lyu

HIV diagnosis will, in turn, help reduce new HIV infections occurring every year.

HIV self-testing (HIVST) is an innovative and reliable strategy to promote HIV testing among high-risk populations. HIVST cannot only protect people's privacy but also allows individuals to know their HIV infection status. The "Guidelines for HIV Self-Testing and Partner Notification," issued by the World Health Organization (WHO) in December 2016,^[5] proposed that HIVST can be used as a supplement to existing HIV testing services. To implement the 13th Five-Year Plan for the National Economic and Social Development of China, the Chinese Center for Disease Control and Prevention issued the First Edition of HIV Self-Testing Guidelines, launched HIVST through the drugstore and online shopping, established comprehensive follow-up services, and provided technical support for medical workers, volunteers, and self-testers. From 2016 to 2019, anonymous urine testing for HIV through vending machines was assessed at 73 universities in 11 Chinese provinces. The results showed that this strategy effectively improved active testing among college students at high risk for HIV infection.^[6]

Challenges for HIV Testing for China

Although the scale of testing has been expanded and the proportion of PLWH being diagnosed has increased in China, there are still several challenges for HIV diagnosis.

First, the proportion of PLWH diagnosed remains low and is even lower in key populations. By 2018, an estimated 68.9% of all PLWH in China know their status, a huge discrepancy with the target of 95% and eradication of HIV in 2030. It is more concerning that only 56.4% of men who have sex with men (MSM) who are HIV positive know their infection status. In the context of expanding treatment programs, PLWH who do not know their infection status have become the primary source of HIV transmission. Therefore, it is necessary for the whole society to participate in HIV/AIDS prevention and control programs and spread HIV/AIDS-related knowledge through various channels to popularize the importance of HIV testing.

Second, the active testing rate in China is low. In 2018, active testing accounted for only a quarter of all HIV tests. The themes for the 2018 World AIDS Day in China as well as worldwide were "Testing Actively, Understanding and Preventing HIV, Staying Healthy Together" and "Know Your Status," respectively. Active testing has become an important method of combatting HIV/AIDS and should be significantly promoted.

Third, China has a high proportion of PLWH who have had a delayed diagnosis for HIV. From 2010 to 2014, the percentage of delayed HIV diagnoses was between 35% and 42%. These infected individuals lost the opportunity to receive early treatment and were already in the late infection stage when they first received treatment. Moreover, the number of people aged over 50 years diagnosed with HIV has increased steadily over the years. From 2008 to 2014, for people aged over 50 years, the average time between infection and diagnosis was 6.8

years, and the percentage of individuals whose first CD4 cell count was <350 cells/mm³ was 70.6%.^[7] Therefore, it is critical to explore HIV testing strategies targeting people aged 50 years and above. Although China's health funding for AIDS prevention and control ranks at the forefront of all infectious disease funding, AIDS still ranks first among the deaths from infectious diseases in recent years. In 2020, 18,800 PLWH died, which was four times as great as that of people who died of coronavirus disease 2019. Implementing a more effective strategy to expand HIV testing to detect PLWH earlier is imperative to enable every PLWH to receive appropriate treatment and care and reduce mortality.

Recommendations for Expanding HIV Testing Services

Given the significant challenges for HIV testing, several active measures should be taken to achieve China's HIV/AIDS prevention and control objectives as early as possible.

The first recommendation is to promote the idea that everyone is responsible for their health and advertise educational materials about active testing. Knowledge about essential HIV testing—such as who should get HIV testing, where one can get HIV testing, what kinds of HIV testing methods are available, and what to do after testing positive—should be systematically promoted among the public. This helps increase public awareness of testing and encourages people to get HIV testing if they have engaged in risky behaviors.

The second recommendation is to increase the accessibility of HIV testing in the community. Social organizations play a positive role in helping risky populations and following up with PLWH. In turn, the existence of these social organizations enhances China's HIV/AIDS prevention and control programs. The next step is to use the power of social organizations to improve the accessibility of HIV testing in the community, especially home testing.

The third recommendation is to combine different testing resources based on online HIV testing services. Integration of online and offline resources can be achieved by establishing comprehensive online and offline testing platforms. The online platform provides health information, testing locations, and testing results, and the offline platform delivers HIVST kits, personalized VCT consultation, and testing services.

The fourth recommendation is to explore innovative HIV testing methods. For instance, partner notification helps increase HIV testing by encouraging PLWH to notify their partners about their infection status. A randomized controlled trial conducted in Shenyang, China, shows that combining partner notification with HIVST and community-based organization services can significantly increase the testing rate among HIV-positive MSM's partners.^[8] According to a study by the Southern Medical University, pay-it-forward as a sustainable method can increase Chinese MSM's acceptance of comprehensive HIV testing. This provides an opportunity for expanding HIV-related testing and medical services for MSM.^[9] At the end of 2019, WHO renewed its "Consolidated

Guidelines on HIV Testing Services,” which recommended HIV testing based on social networks. Social networks can reach the key populations (ie, MSM, injection drug users, and commercial sex workers) with a high risk of contract HIV but less access to HIV care services to promote timely detection of PLWH who have not yet been diagnosed.^[10]

To conclude, diagnosing all individuals with HIV as early as possible is one of the core strategies for AIDS prevention, and it is also one of the six major projects of the “Implementation Plan for Containing the Spread of AIDS (2019–2022)” in China. We must adhere to “people-centered” principles, raise awareness of active testing, expand the role of social organizations, gradually improve and optimize the VCT layout, increase the accessibility of HIV testing, develop innovative HIV testing strategies, and explore easy-to-accept testing methods. The participation of the whole society and support at many levels will be important in achieving the goal of 95% of PLWH knowing their status through HIV testing by 2030 and achieving HIV/AIDS epidemic prevention and control goals.

Funding

This work was funded by the Mega-Projects of National Science Research for the 13th Five-Year Plan (No. 2017ZX10201101) and the National Natural Science Foundation of China (No. 82073620).

Conflicts of interest

None.

References

1. World Health Organization. Key Facts HIV 2020. Available from: [https://cdn.who.int/media/docs/default-source/hq-hiv-hepatitis-and-](https://cdn.who.int/media/docs/default-source/hq-hiv-hepatitis-and-stis-library/key-facts-hiv-2020.pdf?sfvrsn=582c3f6e_3)

- stis-library/key-facts-hiv-2020.pdf?sfvrsn=582c3f6e_3. [Accessed June 21, 2021]
2. National Health Commission of the People’s Republic of China. The Implementation Plan to Stop HIV Transmission (2019–2022), 2019. Available from: <http://www.nhc.gov.cn/kj/s7925/201910/adc374d0613144b2b7bb5d6c58a60223.shtml>. [Accessed June 21, 2021]
3. Zhao Y, Han M, Ma Y, Li D. Progress towards the 90-90-90 targets for controlling HIV – China, 2018. *China CDC Weekly* 2019;1:4–7. doi: 10.46234/ccdcw2019.003.
4. Wu ZY, Scott SR. Human immunodeficiency virus prevention strategies in China. *Chin Med J* 2020;133:318–325. doi: 10.1097/CM9.0000000000000647.
5. World Health Organization. Guidelines on HIV Self-Testing and Partner Notification: Supplement to Consolidated Guidelines on HIV Testing Services, 2016. Available from: <https://www.who.int/hiv/pub/vct/hiv-self-testing-guidelines/en/>. [Accessed June 21, 2021]
6. Lv Y, Li G, Hu M, Xu C, Lu H, Chen L, *et al.* Anonymous linkage between college students and human immunodeficiency virus (HIV) facilities: systematic evaluation of urine self-collection for HIV testing initiative in China. *Clin Infect Dis* 2021;73:e1108–e1115. doi: 10.1093/cid/ciaa1816.
7. Wang LY, Qin QQ, Ge L, Ding ZW, Cai C, Guo W, *et al.* Characteristics of HIV infections among over 50-year-olds population in China (in Chinese). *Chin J Epidemiol* 2016;37:222–226. doi: 10.3760/cma.j.issn.0254-6450.2016.02.015.
8. Hu QH, Qian HZ, Li JM, Leuba SI, Chu ZX, Turner D, *et al.* Assisted partner notification and uptake of HIV testing among men who have sex with men: a randomized controlled trial in China. *Lancet Reg Health West Pac* 2021;12:100171. doi: 10.1016/j.lanwpc.2021.100171.
9. Yang F, Zhang TP, Tang W, Ong JJ, Alexander M, Forastiere L, *et al.* Pay-it-forward gonorrhoea and chlamydia testing among men who have sex with men in China: a randomised controlled trial. *Lancet Infect Dis* 2020;20:976–982. doi: 10.1016/s1473-3099(20)30172-9.
10. World Health Organization. Consolidated Guidelines on HIV Testing Services 2019. Available from: <https://www.who.int/publications/i/item/978-92-4-155058-1>. [Accessed June 21, 2021]

How to cite this article: Hu QH, Xu JJ, Jiang YJ, Shang H. Expanding human immunodeficiency virus testing: whole society participation and multilevel promotion. *Chin Med J* 2021;134:2773–2775. doi: 10.1097/CM9.0000000000001812