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Challenges to eliminating the AIDS pandemic in China

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Abstract: Based on data from the Chinese Center for Disease Control and Prevention (CDC), there were a total of 861,042 people with human immunodeficiency virus (HIV)/ immune deficiency syndrome (AIDS) as of December 31, 2018 in China, a total of 148,589 new HIV infections, and 38,134 AIDS-related deaths in the year 2018. As of 2017, only 74% of people living with HIV knew their status, 80% of people living with HIV were receiving treatment, and 91% were virally suppressed in China. Although mankind has made great progress in the fight against AIDS in recent years, the vision of ending the AIDS epidemic still faces many challenges in China. Due to the huge population and the imbalance in the prevalence of HIV/AIDS in China, expanding HIV screening and early detection remains the key to China's response to HIV. Limitations of antiviral therapy (ART), rejection or discontinuation of an immediate ART strategy by people infected with HIV, and the difficult search for a cure for AIDS all limit the coverage and quality of treatment. The high price of drugs and lack of vaccines present enormous challenges; social discrimination still exists, and participation by non-governmental organizations in prevention, treatment, and care is limited. As part of the future response to HIV, HIV eradication programs should continue to be explored, and attention should be paid to long-term care for people living with HIV.

***Keywords*:** HIV/AIDS, diagnosis, treatment, prevention, social support

Introduction

Due to complexity and lethality of human immunodeficiency virus (HIV)/acquired immune deficiency syndrome (AIDS), there were globally a total of 36.9 million people living with HIV and 1.7 million people newly infected with HIV in 2018 (*1*). On February 5, 2019, the United States announced the goal to end the HIV epidemic in the United States within 10 years. The US Department of Health and Human Services (HHS) then proposed a new initiative to address this ongoing public health crisis with the goal of first reducing the number of incident infections in the United States by 75% within 5 years and then by 90% within 10 years (*2*). The initiative features strategies in 5 areas (Table 1). In recent years, mankind has made great progress in the fight against AIDS, but the vision of ending the AIDS epidemic still faces many challenges in terms of HIV screening, treatment, prevention, and social support.

Outbreaks and characteristics in China

Based on data from Chinese Center for Disease Control and Prevention (CDC), there were a total of 861,042 people with HIV/AIDS as of December 31, 2018 in China, a total of 148,589 new HIV infections, and 38,134 AIDS-related deaths in the year of 2018 (*3-4*).

The epidemiological characteristics of HIV/AIDS in China are as follows: *i*) AIDS remains prevalent at a low level nationwide, with higher prevalence in some areas and groups; *ii*) The number of people living with HIV/AIDS continues to increase (Figure 1) (*3-10*), with the prevalence of AIDS differing widely in different groups; *iii*) Sexual transmission is the most prevalent method of transmission, and sexual transmission between men has increased markedly.

Given these circumstances, a comprehensive strategy for prevention, drug treatment, and even a functional cure will be crucial for curbing the HIV epidemic in China in the coming days.

Challenges of eliminating the AIDS epidemic

Key issue of HIV Screening

Based on data from the 5th National Conference on HIV/AIDS, as of 2017, only 74% of people living with HIV knew their status, 80% of people living with HIV were receiving treatment, and 91% were virally

Table 1. The plan for ending the HIV epidemic in the US*

Key strategies	Content
Diagnose	Implement routine testing during key healthcare encounters and increase access to and options for HIV testing.
Treat	Implement programs to increase adherence to HIV medication, help people get back into HIV medical care, and research innovative products that will make it easier for patients to access HIV medication.
Protect	Implement extensive provider training, patient awareness, and efforts to expand access to PrEP.
Respond	Ensure that states and communities have the technological and personnel resources to investigate all related HIV cases to stop chains of transmission.
HIV HealthForce	A boots-on-the-ground workforce of culturally competent and committed public health professionals that will carry out HIV elimination efforts in HIV hot spots.

*Generalized from the article "Ending the HIV epidemic: A plan for the United States" by Fauci *et al*. (*2*).

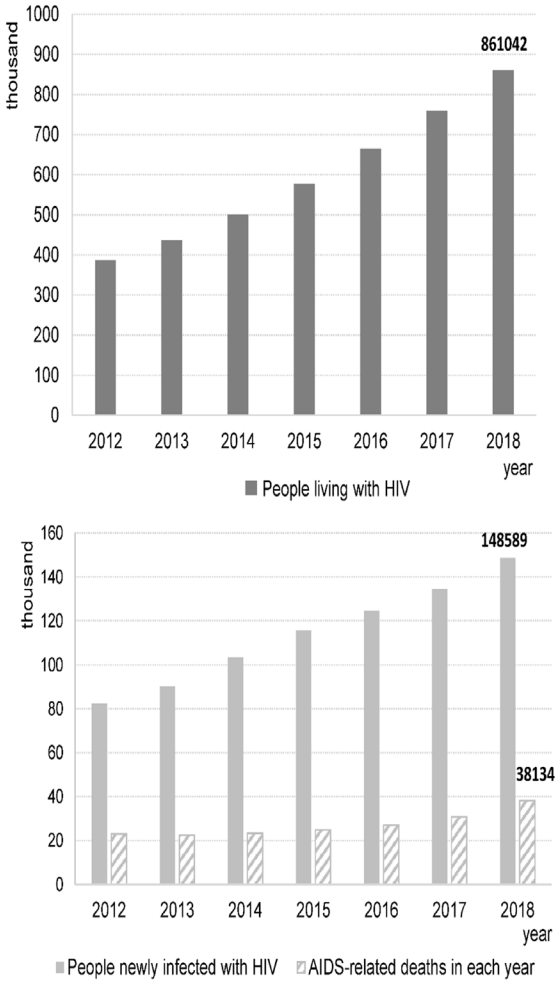

Figure 1. HIV/AIDS epidemics in China annually from 2012 to 2018. There were a total of 861,042 people living with HIV as of December 31, 2018, 148,589 people newly infected with HIV, and 38,134 AIDS-related deaths in 2018 in China. New HIV infections have steadily increased in China over the past few years. Data sources: Chinese Center for Disease Control and Prevention (*3-10*).

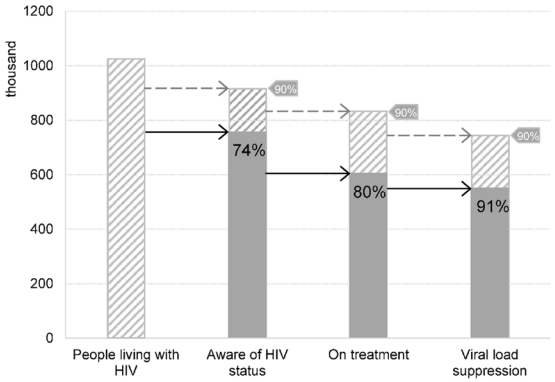

Figure 2. The status of "90-90-90" targets in 2017 in China. As of 2017, only 74% of people living with HIV knew their status, 80% of people living with HIV were receiving treatment, and 91% were virally suppressed in China. HIV screening still has difficulty preventing and controlling HIV/AIDS. Data source: The 5th National Conference on HIV/AIDS (*11*).

suppressed in China (*11*) (Figure 2). HIV screening still has difficulty preventing and controlling HIV/AIDS.

A fact worth noting is the sudden increase in new HIV infections in 2018, and this was closely related to the expansion of HIV testing in China (*12-13*). China has implemented an expanded HIV testing strategy, with the number of people tested increasing from 100 million in 2012 to 200 million in 2017 (*14*). However, expanding HIV screening and early detection remain the key to China's response to HIV because of the country's huge population and the imbalance in the prevalence of HIV/AIDS in China (*15*). Most of the people infected with HIV were found passively, and many of them had entered the middle and late stages of the disease, precluding the possibility of early treatment. Moreover, some people who are infected still do not know their infection status and have not taken the initiative or are unwilling to go to a medical facility for testing. Therefore, the current methods of detection at medical facilities cannot fully meet the goal of finding people infected with HIV as soon as possible (*16*).

Treatment quality needs to be improved

The number of people receiving ART in China

increased from 171,000 in 2012 to 610,000 in 2017, treatment coverage was 80.4% in 2017, and the success rate of treatment remained above 90% (*14*). Nonetheless, the treatment of HIV/AIDS still faces the following challenges.

Limitations of antiviral therapy (*ART*). At present, integrase inhibition has become the first-line recommendation of major guidelines worldwide, but the types of free medicines offered in China are still relatively limited. Free drugs do not include integrase inhibitors, protease inhibitors offered are only effective against Klebsiella spp., few varieties of nucleoside inhibitors are offered, and few combination therapies are offered (*17*). Coverage of medicines by health insurance will help to further improve compliance with and the willingness to receive antivirals, so such a policy might prompt development in the future.

An immediate ART strategy is rejected or discontinued by people infected with HIV. Patients are worried about the physical impact of adverse drug reactions and drug-drug interactions (DDI) (*18-22*).

Searching for a cure for AIDS. A patient in Germany, the "Berlin Patient" appeared to be free of HIV a decade ago, and two new patients Britain and Germany, the "London patient" and the "Dusseldorf patient," now also appear to be free of the virus. The two patients both received a bone marrow transplant from a donor with a CCR5 gene mutation, and these may be the second and third cases in which AIDS was "cured." These findings provide new evidence for use of hematopoietic stem cell transplantation to cure AIDS, and modification of the CCR5 gene may be a breakthrough for a functional cure for AIDS. However, points worth noting are that the CCR5Δ32 mutation is very rare and that the rate of donor and recipient matching in stem cell transplantation is already very low, so this approach has little practical value at present (*23*).

HIV Prevention is not widely used

Pre-exposure prophylaxis (*PrEP*). Although many research institutes in China have conducted pilot studies on the efficacy and safety of PrEP in high-risk HIV populations, Truvada has not been formally approved by the State Food and Drug Administration for HIV pre-exposure prevention. In addition, Truvada is currently sold at a higher price in China and it is unlikely to be self-financing because the medication would need to be affordable for long-term use. Moreover, the best way to prevent HIV infection with Truvada would be to combine it with regular checkups and drug-related counseling and education. However, HIV infection is still highly stigmatized in China, and people infected with HIV are still seriously discriminated against in all aspects of life and work, which may lead to the failure of effective screening and counseling related to PrEP. Therefore, PrEP in China is still in its infancy and pilot stage, and it still faces enormous challenges in terms of its use and subsidized cost.

Development of AIDS vaccines. Since the discovery of HIV, researchers from around the world have applied the previous concepts of viral vaccine development to the development of an HIV vaccine, but few vaccines are able to progress to clinical trials. Even if they progress to clinical trials, they fail to exhibit clinical efficacy. Vaccines are crucial to HIV prevention and curing AIDS, but the research and development of suitable vaccines for HIV/AIDS still has a long way to go.

Barriers of stigma and discrimination

Stigma and discrimination are still major barriers to expansion of the scale of prevention and treatment of and care for people living with HIV in China. This is particularly true for some key populations, such as men who have sex with men (MSM), injection drug users, and sex workers. Discrimination may occur in health care settings, barring people from accessing health services, enjoying quality health care, and receiving poor treatment in educational and work settings, all of which limit access to HIV testing, treatment, and other HIV services.

Moreover, non-governmental organizations (NGOs) are still not sufficiently participating in prevention, treatment, and care. Most NGOs involved in HIV/AIDS prevention and control in China lack legal protection and have limited ability to raise funds. Their activities are mainly concentrated in the field of campaigns and education, and they mainly operate in small and medium-sized cities and rural areas.

Conclusion

As treatment programs continue to advance, HIV/AIDS has gradually evolved from an incurable disease into a controllable and treatable chronic disease. That said, a point worth remembering is that eliminating AIDS does not mean the end of HIV. If AIDS is ended by 2030, 35 million people will still be living with HIV for 30 years or longer afterwards. Sustained care and support will be required unless a cure is found. As part of the future response to HIV, HIV eradication programs should continue to be explored, and attention should be paid to long-term care for people living with HIV.

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