

New Strategies of control and prevention of HIV infection

疫情防治及感染预防的新策略

Although the incidence of human immunodeficiency virus (HIV) infection has dropped in recent years according to global statistics, still millions of new HIV infection occur globally each year. HIV infection is acquired through sexual intercourse, exposure to infected blood, or perinatal transmission. For all modes of transmission, a higher viral load in the HIV-infected source individual is associated with a greater risk of transmission. Aside from the traditional strategies of HIV prophylaxis, focusing on not sharing needles with others, condom use, avoidance of multiple sexual partners, or even abstinence, newer strategies are under development to prevent various risky groups from acquiring infection through different modes of transmission. The updated strategies for HIV prophylaxis mostly emphasized on drug-based prevention methods. The most powerful strategy is “treatment as prevention” (TasP), also known as “Undetectable equals untransmissible” (U=U), which stands for the concept that people living with HIV who take HIV medication daily as prescribed and get and keep an undetectable viral load have effectively no risk of sexually transmitting HIV to their HIV-negative partners. Study results from recent PARTNER study, recruiting serodiscordant couples with the positive partner having an undetectable viral load on anti-retroviral agents (ARTs), showed ZERO transmission from over 58,000 individual times that people had sex without condoms. TasP works when a HIV-positive person taking ARTs exactly as prescribed and has regular follow-up care, including regular viral load tests to ensure their viral load stays undetectable. Under this concept, distributing effective ARTs to people with HIV infection could possibly end the epidemic globally.

Aside from treating all HIV-infected people, the other concept of HIV prevention strategy emphasizes on people who are not HIV-infected yet but possess substantial risks to get HIV infection. For these people with risks, newer HIV prevention medicines such as post-exposure prophylaxis (PEP) or pre-exposure prophylaxis (PrEP) can be helpful to reduce the HIV incidence. PEP means taking 28-day ARTs within 72 hours after being potentially exposed to HIV to prevent becoming infected. It can be used as occupational and non-occupational purposes. PrEP is when people at very high risk for HIV take HIV medicines daily or event-driven to lower their chances of getting infected. A combination of two HIV medicines (tenofovir and

emtricitabine) is approved to help prevent an HIV-negative person from getting HIV from a sexual or injection-drug-using partner who's positive; PrEP has been well demonstrated in several clinical trials, open-label studies, and real-world demonstration projects all over the world recently. Daily PrEP use is recommended across genders and various subgroups, of sexually transmitted or injecting drug use, while event-driven PrEP is only recommended for men having sex with men (MSM). To our current knowledge, PrEP is highly effective for preventing HIV if it is used as prescribed and is much less effective when it is not taken consistently as schedule.

Various ways of distributing PrEP is also under investigation. Long-acting injection PrEP following long-acting injection ARTs might be a future solution for compliance issue. Local drug-eluting PrEP, for example, dapivirine vaginal ring, is also effective to prevent vulnerable female population from male-to-female transmission of HIV. However, not a single preventive strategy alone is 100% effective; a comprehensive approach to HIV prevention, including risk reduction among HIV-infected individuals to reduce transmission and among at-risk individuals to reduce acquisition, should be executed concurrently and efficiently.