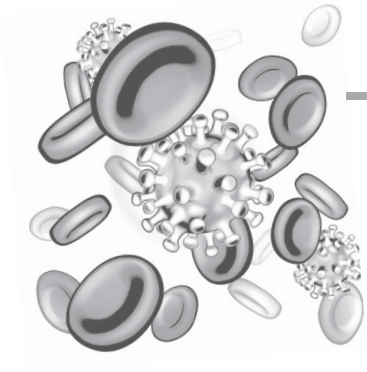

6

Preventing HIV Transmission with Antiretroviral Therapy

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INTRODUCTION

There are approximately 50,000 new diagnoses of human immunodeficiency virus (HIV) in the United States annually,[1] a number that has not seen appreciable decreases despite the use of combination antiretroviral therapy (cART) in those living with HIV. Additionally, the Centers for Disease Control and Prevention (CDC) estimates up to 1 in 8 HIV-infected individuals does not know his or her status.[1] This can, in turn, lead to high rates of transmission, primarily through sexual contact and/or injection drug use (IDU). A study published in 2015 found the overwhelming majority (91.5%) of new infections were attributed to two groups: individuals unaware they were HIV positive and individuals with a known diagnosis yet not in care.[2] The incidence is particularly high among young, nonwhite men who have sex with men (MSM). The lifetime risk of HIV infection is 1 in 6 within the MSM population and 1 in 2 in the African American MSM population (Figure 6-1).[3] In an era of imperfect safe sex practices and needle sharing, it is imperative individuals at high risk of HIV infection are properly empowered to protect themselves. There are four prevention categories of which the pharmacist should be knowledgeable:

1. treatment as prevention (TasP)
2. preventing mother-to-child transmission (PMTCT)
3. pre-exposure prophylaxis (PrEP)
4. post-exposure prophylaxis (PEP)

HIV TREATMENT AS PREVENTION

Since HIV was first identified as causing the acquired immunodeficiency syndrome (AIDS) epidemic, a significant amount of research has focused on how to treat infected individuals. Previous treatment guidelines placed less emphasis on starting cART early in infection for various reasons (including significant side effects and fear of developing drug resistance), so many individuals delayed treatment and had high amounts of circulating virus in their blood. Until recently, observational studies had only inferred the link between plasma viral load and degree of infectiousness. To address this, a large, randomized controlled trial, HIV Prevention

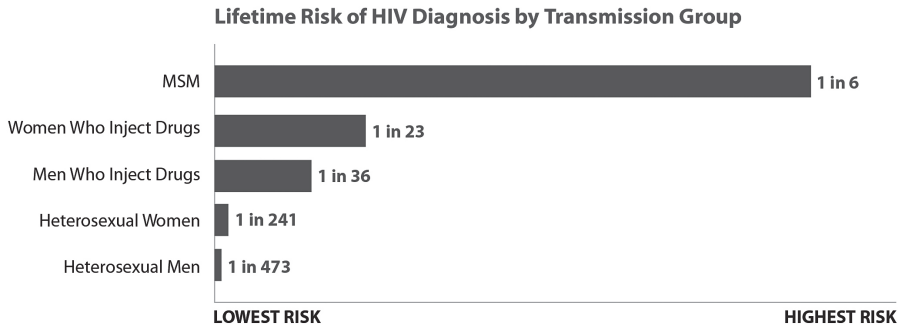

FIGURE 6–1. Diagnosis risk by transmission group.

MSM: men who have sex with men

(*Source:* Centers for Disease Control and Prevention.)

(*Source:* Hess K, Hu X, Lansky A, et al. Estimating the Lifetime Risk of a Diagnosis of HIV Infection in the United States. Abstract 52. Conference on Retroviruses and Opportunistic Infections; February 22–25, 2016; Boston, MA.)

Trials Network (HPTN) study 052, sought to determine if patients on cART were less likely to transmit HIV to an uninfected partner. The study enrolled 1,763 serodiscordant couples (one partner is HIV-infected and the other is HIV-noninfected) and found a 93% reduction in transmission rate when the HIV-infected partner was on cART and the concentration of viral RNA in their blood was <400 copies/mL.[4] There were eight transmissions linked to a partner who was taking cART; however, all of these transmissions occurred when the individual had detectable plasma HIV RNA because they were not yet suppressed with cART or they were failing therapy due to nonadherence or drug resistance. To date, there have been no reports of linked transmission by anyone with a suppressed viral load. This established, effectively, the treatment as prevention (TasP) protocol recommended by the U.S. Department of Health and Human Services (DHSS) and the World Health Organization (WHO). Both DHHS and WHO guidelines now recommend *all* HIV-infected persons be on cART to prevent HIV transmission.[5,6] The cART regimen is chosen to best address the individual patient's needs and is selected based on adverse effects, drug interactions, and HIV resistance, among others. More information on cART selection can be found in Chapter 4.

The results from HPTN 052 revolutionized the way HIV is treated: from a purely individual standpoint to one that also incorporates prevention and global public health. One such impact is the United Nations Programme on HIV/AIDS (UNAIDS) 90-90-90 campaign.[7] The goals sets by 90-90-90 are to have 90% of HIV-infected individuals diagnosed, 90% of those taking cART, and 90% of those virally suppressed by 2020. If this is accomplished, effectively, 73% of the HIV population will have undetectable viral loads and the AIDS epidemic is predicted to end by 2030. Results from HPTN 052 combined with data from the START trial,[8] which clearly demonstrated patient benefit from early HIV treatment, have