NIAAA

Alcohol Alert

Number 80

Alcohol and HIV/AIDS: Intertwining Stories

Human immunodeficiency virus (HIV)—the pathogen responsible for the current pandemic of acquired immune deficiency syndrome (AIDS)—targets the body's immune system. HIV infection puts a person at risk for a multitude of diseases that someone with a healthy immune system generally would fight off. When HIV was recognized in the 1980s, testing positive for HIV infection was, in fact, a death sentence. Now, however, the availability of anti-HIV medications has made living with the virus a reality. Patients who stick to a careful medication regimen (i.e., taking several medicines at specific times throughout the day) may live from 20 and 40 years with HIV and do not always die of AIDS-related illnesses.

People with HIV are now living longer and healthier lives. Nevertheless, many challenges remain in preventing both infection with the virus and progression of the disease. One of the many factors that thwarts efforts to prevent the spread of the infection and the treatment of infected patients is the use and abuse of alcohol by those who are at risk for infection or who already are infected. Scientists are gaining a better understanding of the complex relationship between alcohol consumption and HIV infection. Abusing alcohol or other drugs can impair judgment, leading a person to engage in risky sexual behaviors. People who drink also tend to delay getting tested for HIV and, if they do test positive, tend to postpone seeking treatment. When receiving treatment, they may have difficulty following the complex medications regimen. All of these factors increase the likelihood that an infected person will infect others or will go on to develop AIDS.[1]

Alcohol, then, occupies a prominent place in the HIV/AIDS landscape. This *Alcohol Alert* outlines the role that alcohol has in HIV/AIDS prevention, transmission, and disease progression and touches on recent efforts to reduce these strong, yet preventable, effects.

Defining the Population

Each year in the United States, between 55,000 and 60,000 people become infected with HIV, for a total of more than 1.1 million now infected. The population that once was primarily made up

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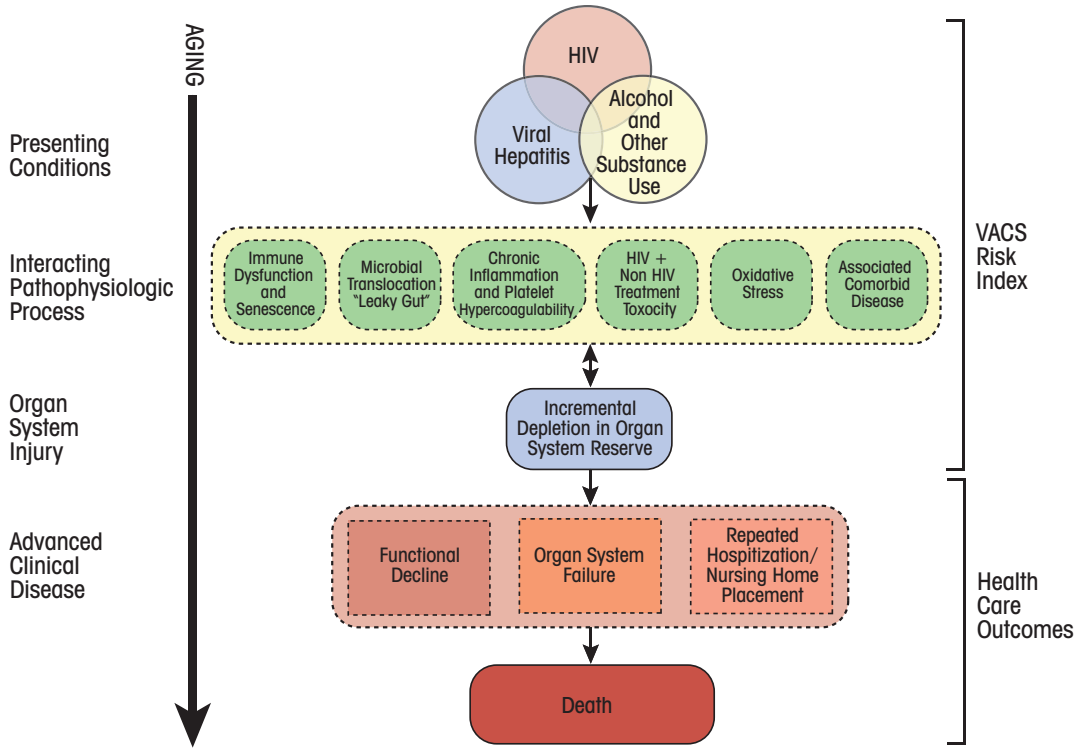
of homosexual White men is now composed increasingly of people of color, women, and young people. Of these new HIV cases, the proportion of women rose from 7 percent in 1985 to 25 percent in 2000. In that group, African American and Hispanic women were disproportionately represented compared with White women. Also, HIV/AIDS is now a leading cause of death among women in the United States, especially those of childbearing ages (i.e., between 25 and 44 years).[1] As more young women are becoming infected, there is growing concern that the virus will be transmitted to their children, either during pregnancy or after birth.

One of the main reasons for this shift in the HIV population is that heterosexual sex is now a primary route for HIV transmission. Alcohol use is one of the factors that increases the risk of HIV transmission among heterosexuals. Particularly among women, a strong association has been seen between alcohol and other drug abuse, infection with HIV, and progression to AIDS.[2] Although additional studies are needed to further define alcohol use patterns among infected and at-risk people, it is clear that alcohol use is closely intertwined with the spread of HIV.

ART as a Prevention Tool

In hospital settings, health care workers accidentally exposed to HIV (e.g., through needle sticks) receive temporary ART regimens to prevent infection. This has led scientists to examine whether ART could be used to prevent as well as treat HIV. According to that research, HIV patients who take ART regimens do have a reduced rate of transmitting HIV to their sex partners. Other studies are looking at whether oral ART regimens used for treatment could protect against infection when taken either before or after exposure to HIV. In real-world settings, alcohol use may interfere with the effectiveness of these approaches. Alcohol consumption is associated with missing doses of medication, and HIV patients' ART is less effective at keeping the virus in check if they do not adhere to their regimens. Also, drinking would likely interfere with people's ability to stick to the ART regimens taken for prevention just as it does in treatment.[25]

Conceptual Model for Living With HIV Infection



This figure is based on findings from the Veteran Aging Cohort Study, a large (approximately 7,000 participants) and lengthy (currently 7 to 8 years) study exploring the effects of alcohol on HIV outcomes within the broader context of aging. The study has helped to define a VACS Risk Index to identify those individuals most at risk. The researchers hope to use the VACS Risk Index to design better interventions for helping people with HIV to live longer and healthier lives.

SOURCE: Justice, A.; Sullivan, L.; and Fiellin, D. HIV/AIDS, comorbidity, and alcohol. *Alcohol Research & Health*. 33(3):258–266, 2010.

Alcohol and HIV: A Complex Relationship

People infected with HIV are nearly twice as likely to use alcohol than people in the general population. Moreover, up to 50 percent of adults with HIV infection have a history of alcohol problems.[3,4] Understanding how alcohol influences HIV is vital, both in treating those infected with HIV and in stopping the spread of this disease.

The link between alcohol use and HIV is complex. Research shows that alcohol has numerous effects, both direct and indirect, on how this virus develops and how quickly it causes disease. Alcohol can increase how fast the virus grows, leading to higher amounts of virus (i.e., the viral load) in the body. Those high concentrations, in turn, can increase the spread of the disease. In one study, women receiving antiretroviral therapy (ART)* who drank moderately or heavily were more likely to have higher levels of the HIV virus, making it easier for them to spread the virus to others.[2]

ART itself can be problematic in people who drink. A major cause of illness and death among HIV-infected patients that has emerged since the advent of ART is liver disease. Antiretroviral medications not only are processed in the liver, they also have toxic effects on the organ, and some drug combinations can lead to severe toxicity in up to 30 percent of patients who use them. These patients are left with the grim choice of continuing ART to prevent the progression of the virus to AIDS—thereby risking further liver damage—or stopping ART to prevent liver damage and progressing to AIDS. Further, a large proportion of people with HIV also are infected with hepatitis C (HCV). Alcohol abuse and dependence significantly increase the risk of liver damage both in people with HIV alone and with HCV co-infection.[5]

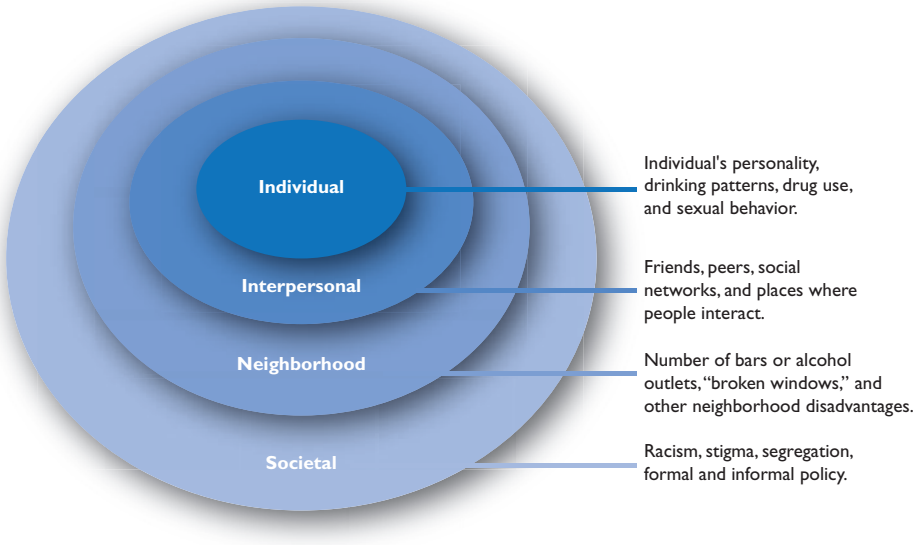
Research suggests too that alcohol may interfere directly with ART medications used for HIV, essentially blocking their effectiveness.[6] Moreover, patients who drink are nine times more likely to fail to comply with their medication regimens compared with sober patients.[7,8] When HIV-infected drinkers fail to take their medications or do not take them correctly, it can lead to a higher viral load and an increasing likelihood that the virus will become resistant to the therapy.

ART, alcohol consumption, and HIV infection can be harmful in other ways as well. HIV patients typically experience declines in organ function earlier in life than do uninfected people. And because people with HIV tend to drink heavily well into their middle and older years, these organs are even more at risk for injury. For example, both HIV infection and certain types of ART medications increase a person's risk for heart disease, because they change the balance of different fats—such as cholesterols—in blood, induce inflammation, and affect the blood-clotting process. Both excessive alcohol use and infection with hepatitis C virus further enhance the risk. Also, the medicines used to treat cholesterol problems can be particularly harmful when taken by patients with liver damage from alcohol abuse or hepatitis C virus. Heavy alcohol consumption (more than six drinks per day) has been linked to heart disease in HIV-infected people; thus, stopping or cutting down on their drinking may help to reduce the risk of heart disease.[9]

Another organ impacted by alcohol use and by HIV infection is the lung. Patients who drink or who have HIV infection are more likely to suffer from pneumonia and to have chronic conditions such as emphysema. Scientists do not yet know if alcohol and HIV together raise the risk for

* Antiretroviral therapy (ART) is the use of medications for the treatment of infection by a specific type of virus, retrovirus, primarily HIV. Standard ART consists of at least three drugs for maximum suppression of the HIV virus and for stopping the progression of HIV to AIDS. http://www.who.int/hiv/topics/treatment/en/index.html.

Framework for HIV/AIDS Risk



The socioecological framework for HIV/AIDS risk shows the factors that affect risk on a number of different levels. Risks range from "broken windows" (or the number of abandoned or vacant buildings in a neighborhood) to the individual's use of alcohol and his or her sexual behavior.

SOURCE: Scribner, R.; Theall, K.P.; Simonsen, N.; and Robinson, W. HIV risk and the alcohol environment: advancing an ecological epidemiology for HIV/AIDS. *Alcohol Research & Health* 33(3):179–183, 2010.

injury to the lung. However, studies using animals suggest that this combination does indeed increase the risk for problems. Lung infections remain a major cause of illness and death in those with HIV, and chronic alcohol consumption has been found to increase the rate at which viruses infect lungs and aid in the emergence of opportunistic infections (i.e., rare viruses that infect only people whose immune systems are weakened by a condition like HIV infection).[10,11]

Advances in imaging techniques have revealed another organ at risk for HIV and alcohol injury—the brain. In studies comparing patients with alcoholism, HIV infection, or both, people with alcoholism had more changes in brain structure and abnormalities in brain tissues than those with HIV alone. Patients with HIV infection and alcoholism were especially likely to have difficulty remembering and to experience problems with coordination and attention. Those with alcoholism whose HIV had progressed to AIDS had the greatest changes in brain structure.[12]

Preventing the Spread of HIV

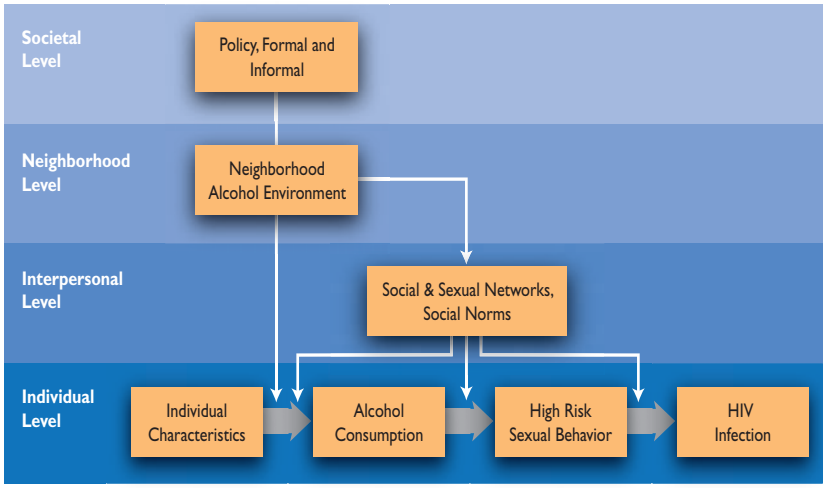
In addition to these direct effects, alcohol also works indirectly to raise the risk for HIV and for the problems associated with this virus. For example, alcohol consumption often occurs in bars and clubs where people meet potential sex partners. These establishments create networks of at-risk people through which HIV can spread rapidly. In addition, alcohol abusers' high-risk sexual behaviors make them more likely to be infected with other sexually transmitted diseases; those, in turn, increase the susceptibility to HIV infection. They also are more likely to abuse illegal substances, which can involve other risky behaviors, such as needle sharing.[6]

Currently, the primary HIV prevention efforts seek to change people's risky sexual behaviors and to promote the use of barriers, such as topical microbicides and condoms, which kill the virus or reduce the spread of disease during sexual contact. Unfortunately alcohol use can interfere with these efforts, impairing people's judgment and making them less likely to use protection during sex.

Although people who abuse alcohol and other drugs can be a difficult population to reach, research shows that individuals in treatment programs are less likely to engage in risky sexual behavior[13] or to inject drugs or share needles[14]—behaviors that greatly increase the spread of the infection. Thus, alcohol treatment itself can help prevent risky behaviors.

Also, some research suggests that looking at the places, where alcohol consumption and risky sexual behaviors take place (such as bars and clubs) can help in the development of social policy tools and successful interventions,[15] including targeting such environments with prevention messages[16,17] and providing HIV testing, condoms, and sexual health services at those establishments.[18]

The Role of Alcohol in HIV/AIDS Risk



Alcohol influences the risk for HIV/AIDS on a variety of levels, from the neighborhood (the number of bars and clubs) to the individual (his or her use of alcohol and other drugs as well as his or her sexual behavior). Policy, both formal and informal, can help to reduce these risks. For example, laws can dictate how many liquor stores can do business in a neighborhood.

SOURCE: Scribner, R.; Theall, K.P.; Simonsen, N.; and Robinson, W. HIV risk and the alcohol environment: advancing an ecological epidemiology for HIV/AIDS. *Alcohol Research & Health* 33(3):179–183, 2010.

Treatment—Targeting HIV and Alcohol

As noted previously, HIV-infected individuals who drink, even those who consume only low levels of alcohol, are less likely to comply with a strict ART regimen, which may increase the risk of AIDS.[19] Drinking fewer than five standard drinks per day, one or more times a week, has been found to reduce survival among patients with HIV by more than 1 year. Binge drinking (defined as five or more drinks per day) produces even more pronounced effects. Binge drinking twice a week was found to reduce survival rates by 4 years, and daily binge drinking reduced survival by 6.4 years, a 40-percent decrease in life expectancy.[20]

When ART fails, the patient progresses to AIDS. The significance of this problem, along with alcohol's other negative effects on the success of ART,

has led some scientists to suggest that one way to improve the care of HIV patients is to provide screening for alcohol use disorders on a regular basis. Those who screen positive could then receive a treatment aimed at reducing alcohol consumption.[19]

Though it is clear that substance abuse treatment among HIV-infected patients can contribute greatly to their care, little research has been done in this area. The use of behavioral interventions in HIV-infected people who have a history of alcohol problems has produced only limited evidence that such interventions work.[21] Some clinical trials have produced promising results, using interventions that combine one-on-one counseling with various forms of peer education, support group sessions, and telephone-based interactive methods to guide participants through stages to change their drinking behavior. In those studies, both drinking levels and risky sexual behavior were reduced in some patients.[22] Interestingly, a review of studies aimed at reducing drinking in HIV-infected people found that no trials have examined the success of the four medications now available to treat alcohol dependence (i.e., disulfram, naltrexone, acamprosate, and topiramate) in HIV patients.

There are significant barriers that exist when addressing alcohol problems among HIV-infected patients, including the additional commitments of time, money, and effort involved in treating alcoholism. Drinkers who do not suffer from severe alcohol problems may not think treatment is worthwhile or may fear the stigma associated with alcoholism treatment. Those patients may be more likely to receive treatment if the interventions are simple, require little effort, and take place in settings in which the patients already are receiving testing or treatment for HIV.[1] Along these lines, studies using telephone-based interactive interventions show that this technology also may help to boost the effectiveness of treatment for alcohol problems.

Clearly, questions remain concerning the treatment of alcoholism in HIV-infected patients. For example, is it better to treat a patient for alcoholism before starting ART therapy or concurrently? If ART regimens were simpler, would alcohol use have a reduced impact on patients' ability to adhere to the treatments?

NIAAA and other Institutes at the National Institutes of Health are sponsoring the Veterans Aging Cohort Study (VACS), which looks at the effects of alcohol on HIV patients as they age.[23] One innovation in this study is the VACS Risk Index, which uses indicators of liver and kidney injury, hepatitis, immune suppression and illnesses—such as certain forms of pneumonia—to predict alcohol's impact on illness and death. Because it relies on biological markers, the index provides an accurate measure of how much alcohol the patients have consumed. VACS study authors hope to use the index to answer these questions and to identify behavioral and medical treatments that can help decrease patients' alcohol use and reduce their risk of illness and death.

Conclusion

Epidemiologic data show that HIV's spread has not slowed in recent years and may be on the rise in certain populations.[24] Alcohol problems promote the spread of HIV, and increase illness and death in people with HIV. Decreasing drinking and the behaviors it encourages is one of the most promising ways to reduce these problems. Understanding the complex interplay between alcohol use and HIV will lead to better care for those already infected. Such knowledge also will play a vital role in developing behavioral, medical, and social policy tools for reducing the spread of the disease.

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- ***Alcohol Research & Health*, 33(3) describes the complex relationship between alcohol consumption and HIV/AIDS. Articles examine the ways in which alcohol influences the risk for infection by HIV, transmission of the virus, and progression to AIDS. Other articles address alcohol's role in the prevention and treatment of HIV/AIDS. The medical aspects of HIV/AIDS and alcohol use also are featured, including the effects on the brain, immune system, and other body systems.**
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