

When the New York City Department of Health and Mental Hygiene announced in January 2005 that a gay man in his forties had become infected with a multidrug-resistant “superstrain” of HIV and had progressed to AIDS within a few months, much was made of the man’s use of methamphetamine. The case highlighted two important aspects of the intersection of methamphetamine use and HIV. First is the fairly well-established role the drug can play in facilitating new infections by lowering users’ inhibitions and encouraging sexual practices that increase the risk of HIV transmission. The second aspect is the idea that methamphetamine somehow speeds up the HIV disease process. There is little evidence of a direct interaction between meth and HIV that accelerates immune decline, but meth use can undermine the general health of the user. There is also a growing body of evidence that meth’s harmful effects on the brain may be exacerbated in people with HIV, and that any HIV-related neurological impairments may be worsened by meth use.

METHAMPHETAMINE

and HIV

METH IN AMERICA

There are an estimated 35 million methamphetamine users worldwide and approximately 1.5 million users in the United States. The demographics of American meth users are remarkably diverse in terms of race, gender, and geography, although the drug tends to be favored by individuals with fewer economic resources and opportunities, and it is often produced in rural homes, or “meth houses.” In a recent U.S. Department of Health and Human Services analysis of hospital emergency room admissions in which meth was a factor, approximately 40% of patients were female, 65% were white, and 56% were between the ages of 18 and 34.

At the First National Conference on Methamphetamine, HIV, and Hepatitis, held in Salt Lake City in August 2005, Patricia Case, ScD, MPH, a professor of social medicine at Harvard University, spoke about “America’s love affair” with stimulants, which have tended to follow waxing and waning cycles of popularity since World War II. There is nothing so American as stimulant use, Case says, because stimulants make people feel like they are able to “accomplish things, to go faster, and do more.”

Despite the decades-long history of speed use in the United States, the recent wave of meth abuse has set off alarms. Meth use among urban gay

men has come under particular scrutiny in recent news articles. Two of the most urgent concerns with the current meth wave in America are the appearance of the drug in both urban and rural areas and the association between meth use and HIV, hepatitis C virus (HCV), and other sexually transmitted diseases (STDs).

Nationally, the current outbreak of meth use has some novel features, including local production, the coast-to-coast scale of the outbreak, and the use of meth in combination with other drugs. Also new is the increase in smoking as a route of administration; about half of the individuals in the emergency room analysis reported smoking meth.

One particularly potent, crystalline form of methamphetamine now found on the street resembles rock candy or ice crystals—in fact, “ice” is one street name for the drug, as is “crystal,” which then becomes “Christina” and “Tina.” Recent prices for crystal meth are said to run from about \$20 per quarter gram in San Francisco to \$60 to \$80 in New York City. Crystal meth and other forms of methamphetamine can be eaten, smoked, snorted, injected, or inserted into the rectum (a practice called “booty bumping”). Smoking produces its effects within three minutes, while swallowing may take 15 to 20 minutes to produce a “high.” A single dose lasts from eight to 12 hours.

WHAT DOES METH DO?

Meth releases a chemical messenger molecule (neurotransmitter), called dopamine, in the brain. Dopamine is particularly active in the brain’s pleasure and reward centers. Whereas cocaine use stimulates dopamine concentrations to about 400% of normal levels, methamphetamine can boost dopamine levels by up to 1500%—giving the user an intensely pleasurable high.

Meth also inhibits the reuptake of dopamine at the synapses of the brain’s nerve cells. After the initial release and the accompanying wave of pleasure, dopamine is depleted, and the neurons require significant recovery time before normal dopamine signalling—and the normal experience of pleasure—can resume.

Richard Rawson, PhD, of the University of California at Los Angeles (UCLA) has essentially taken before and after pictures of the effects of meth on the human brain. Using magnetic resonance imaging (MRI) scans of dopamine uptake in the brain’s pleasure centers, Rawson has shown that methamphetamine damages the terminals of dopamine-activated neurons, which can show a reduction of up to 60% in neurotransmitter levels even one month after the drug was last used.

These neurons can recover within a few days to several weeks, but during that time the user may experience a prolonged period of anhedonia, a state in which nothing feels pleasurable. It is this “low” following meth use that may drive people to use again.

Methamphetamine also has persistent effects on the judgment centers of the brain, which affect impulse control, and can inappropriately stimulate the “fight or flight” response. Meth can also impact the limbic system, where pleasurable memories are stored, resulting in cravings for more of the drug.

Coming down from a meth high can be extremely uncomfortable and even dangerous. The features of methamphetamine post-acute withdrawal syndrome include depression, excessive sleep, and psychotic or paranoid behavior. Because of the long-acting stimulant effects of methamphetamine, users are generally unable to sleep while high and may sleep for excessively long periods after “crashing.” Many meth users turn to sedative drugs, such as sleeping pills or opiates, to help manage the crash. Users who combine meth with sleeping pills, such as the prescription drug zolpidem (Ambien), may experience bouts of amnesia if they remain awake despite taking the sedative.

WHO USES METH AND WHY?

Patterns of methamphetamine use are varied, and the notion of addiction after a single episode may largely be a myth. Some people have tried meth only experimentally, while others use the drug as part of a social ritual or on special party occasions. Some users may ingest only a single dose during a weekend, while others will go on five-day binges. Thus, the “set and setting” of meth use, like that of all drugs, is critical.

Rafael Diaz, PhD, of San Francisco State University’s Cesar E. Chavez Institute has reported on the subjective experiences of gay male

stimulant users in the Latino community. His 300-participant study, with roughly half meth users and half cocaine users, found different motives for users of the two stimulants. Methamphetamine use was most often associated with sexual performance, while cocaine use was associated with making social connections.

Despite problems with sexual dysfunction, meth users reported that they could have sex without guilt or the mental distractions of shame or embarrassment. Those using the Internet to find partners said that the loss of inhibition allowed them to have sex with “whoever showed up” at the door at 3:00 in the morning. Meth users said they felt more passionate and found a sense of unity with their partners—finding an “oasis” in the sexual moment.

Users also reported feeling more willing to explore new behaviors and erogenous zones. Thus, a committed “top” (insertive partner) might become a “bottom” (receptive partner) during a meth session. But the study also found that consistent meth users tended to become increasingly socially isolated, and that this effect was correlated with frequency of meth use.

Despite the recent attention garnered by urban gay men using meth as a party drug, most American meth users are people living in poverty, for whom the drug serves as “the best antidepressant on the street.” Case sees motivation for the current wave of substance use in our times and culture, with the current Iraq occupation and economic uncertainty helping to make escape into drugs more attractive. For gay men, the accumulated losses of two and a half decades of AIDS is an important contributor, she thinks, but poverty, class, and social marginalization are also likely to be major factors in meth use.

In recent focus groups sponsored by the San Francisco AIDS Foundation, gay men described using meth to fight depression or overcome feelings of shyness or inadequacy in social

settings—and simply to have fun. For many HIV positive men on disability, meth use also offers a way to “fill time” in the absence of work and other activities.

METH AND SEX: INCREASED RISK FOR HIV TRANSMISSION

Crystal meth dramatically increases sexual drive in both men and women. Sexual desires and behavior patterns may also be altered by methamphetamine, with individuals changing accustomed sex roles due to loss of inhibitions. One survey also noted forays into same-sex intercourse by men with only prior heterosexual experience. Law enforcement personnel are said to be increasingly finding sex toys and pornography during raids on rural meth houses, furthering arguments for a strong association between meth use and increased sexual activity.

Neil Flynn, MD, of the University of California at Davis, is a physician who sees many meth users in his HIV-medicine practice. Flynn points to the drug’s disinhibiting effects and the bravado that users display as a source of risk for them and for their partners. Users often feel invincible and believe that they cannot become infected with HIV, or that they do not need to keep taking their antiretroviral medications.

Users also often experience negative sexual side effects, including “crystal dick,” in which the penis becomes erect but remains much smaller than usual. This can cause condoms to slip off during sex, which increases the risk of HIV transmission. Many of the users in Flynn’s practice are also taking testosterone, which increases sexual drive, and users frequently take sildenafil (Viagra) or a similar erectile-dysfunction medication to counteract the negative sexual side effects of meth. The long periods of sexual activity and delayed orgasms that users typically report may increase the likelihood of rectal or vaginal injury (and thus HIV transmission) due to drying and chafing of the rectal or

vaginal mucosa. Hence the mantra of prevention educators who work with meth users: “Lube, lube, and more lube.”

EPIDEMIOLOGY OF HIV AND METH

Grant Colfax, MD, of the San Francisco Department of Health studies HIV epidemiology and prevention efforts in the Bay Area. He reports that the prevalence of meth use is about 17% among San Francisco gay men in general, but rises to 42% among attendees of gay “circuit parties.” A recent study of 3000 gay men, conducted at anonymous HIV testing sites in San Francisco, found that HIV infection is three times as prevalent among meth users compared with non-meth users; 6.3% of users tested positive for HIV, compared with 2.1% of non-users. The EXPLORE study, with research cohorts in San Francisco, New York City, and other major U.S. cities, found a similar 5.7% HIV prevalence among meth users, compared with 2.5% among non-meth users.

It is possible that the higher risk of HIV infection among urban gay methamphetamine users results from selecting sex partners from a pool with a higher HIV prevalence, coupled with the increased risks of engaging in longer periods of sex and a greater frequency of condom breakage or slippage. While these risks are clear, the increasing association between meth use and HIV in this population may also be due, in part, to use of meth as an escape from the emotional and physical struggles associated with HIV and the side effects of anti-HIV medications.

Substance abuse counselor and educator Yves-Michel Fontaine observes that “a lot of meth use begins or escalates after HIV seroconversion...as a coping mechanism. I think some of the studies that find associations between meth use and HIV and presume causality are missing that point.” HIV positive users in Diaz’s

study particularly enjoyed the drug-induced energy and feelings of invincibility (which especially appealed to men living with AIDS), and the negation of both emotional and physical pain. Meth relieves depression and feelings of self-doubt; in fact, increased sexual activity while on meth is often a byproduct of reduced feelings of shame about the user’s body or desires.

METH AND HIV IN THE BRAIN

While some *in vitro* animal research suggests that methamphetamine can accelerate HIV replication, this effect has not been observed in human studies. However, a number of recently published studies of the HIV positive brain on meth point to an accumulation of neuropsychological deficits that can arise from the combination of HIV and meth use—deficits that can diminish cognitive function and even cause dementia.

Some people begin using methamphetamine hoping to increase their concentration and focus, yet recent research suggests that this effect may be short-lived or even illusory. Andrew Levine, PhD, and colleagues at UCLA studied cognitive performance in HIV positive people who used meth, cocaine, or both. They found that—far from exhibiting improved concentration—drug-using study participants experienced a decrease in sustained attention over time, had slower reaction times, and made more mistakes on standardized performance tests than their non-using HIV positive counterparts.

HIV itself can have profound effects on the brain. Tat and gp41, two viral proteins produced when HIV replicates, have been shown to stimulate the production of chemicals, called cytokines, that can promote an inflammatory immune response in the brain. This response may in turn damage nerve cells and contribute to encephalopathy. Shaji Theodore and colleagues at the University of

Common Side Effects of Meth Use

People with HIV are particularly vulnerable to some side effects of meth use:

- **Poor adherence to antiretroviral medications** may result from drug-induced feelings of invincibility, or from long periods of sleep following a crash, or because the individual simply forgets to take meds during extended episodes of meth use.
- **Dehydration** is a serious risk because users may forget to drink water when using, or may use meth in a setting where filtered or bottled water is unavailable. This risk is especially dangerous for HIV positive people who experience chronic diarrhea, a dehydrating side effect of some antiretroviral medications.
- **“Meth mouth”**—tooth decay caused in part by meth-induced chronic dry mouth and inadequate oral hygiene—can allow bacteria to flourish in the mouth, which increases strain on the immune system.
- **Diminished general health**, common among heavy users, may hasten disease progression and leave the HIV positive meth user open to dangerous opportunistic infections.

Kentucky at Lexington have found that, in a mouse model, Tat and meth work in similar ways to increase the loss of dopamine and cause damage to immune cells in the brain. In mice, Tat plus meth caused the release of more potentially harmful cytokines than did either HIV or meth alone.

The neuropsychological damage associated with both HIV and meth appears to be localized in the front of the brain in the frontal basal ganglia, an area associated with planning and

carrying out tasks. Deficits in this domain can affect fluency of thinking and decision making, and in some cases may contribute to dementia. HIV infection and meth use are independently associated with these deficits and the combination may be additive, according to a study of 284 HIV positive men by Catherine Carey, MS, and colleagues at the University of California at San Diego (UCSD). In Carey’s study, HIV positive men with CD4 cell counts below 200 cells/mm³

exhibited greater cognitive impairment than those with higher CD4 counts, meth users showed greater impairment than non-users, and meth users with advanced HIV disease experienced the worst impairment.

TREATING THE HIV POSITIVE METH USER

It is quite plausible that the sequelae of methamphetamine use, such as poor nutrition and lack of sleep, play a role in HIV disease progression, and a drug-related decline in overall health may increase susceptibility to opportunistic infections. Another significant impact of meth use on HIV disease is the risk of diminished adherence to medication—as well as the poorer quality of services that drug users receive from medical professionals.

Sharon Stancliff, MD, with the Harm Reduction Coalition in New York City, says that medical providers may be less willing to prescribe antiretroviral therapy to active drug users because they fear that users will not adhere to complicated treatment regimens and will quickly develop drug resistance. For example, a study of 230 HIV positive men, conducted by Ronald J. Ellis, MD, and colleagues at the UCSD HIV Neurobehavioral Research Center, found that meth users were less likely to receive antiretroviral therapy, and that active users had higher viral loads than non-users or former users.

In addition, drug users and their doctors may fear drug interactions and thus forgo anti-HIV therapy. The potential for such interactions has not been studied, although a few cases of fatal or near-fatal interactions between street drugs and regimens containing ritonavir (Norvir) have been reported. A key factor in maintaining adherence, Stancliff says, is the quality of a patient’s relationship with the provider. Many doctors dislike treating drug users, citing “reduced professional satisfaction.”

Flynn acknowledges that meth users can be difficult patients and can be frustrating to treat. Adherence to antiretroviral therapy is generally poorer among methamphetamine users compared with heroin users, he says, probably because meth induces feelings of power and invincibility—users may believe they simply do not

need medication. Meth users also have a tendency to miss appointments as they careen between flying high while on the drug and crashing into depression when not using.

To better meet the needs of his meth-using patients, Flynn offers special “drop in” privileges so that users know they can be seen whenever they

are ready for treatment. Flynn admits that it can be difficult to spend half an hour with a patient who is high on meth, and he recognizes that providers are often left with a sense of failure and chaos when trying to treat heavy users. He suggests considering the difference in perspective between the provider, who finds his or her patient distractible and flighty, and the patient, who may view the provider as painfully slow or too dense to offer effective help.

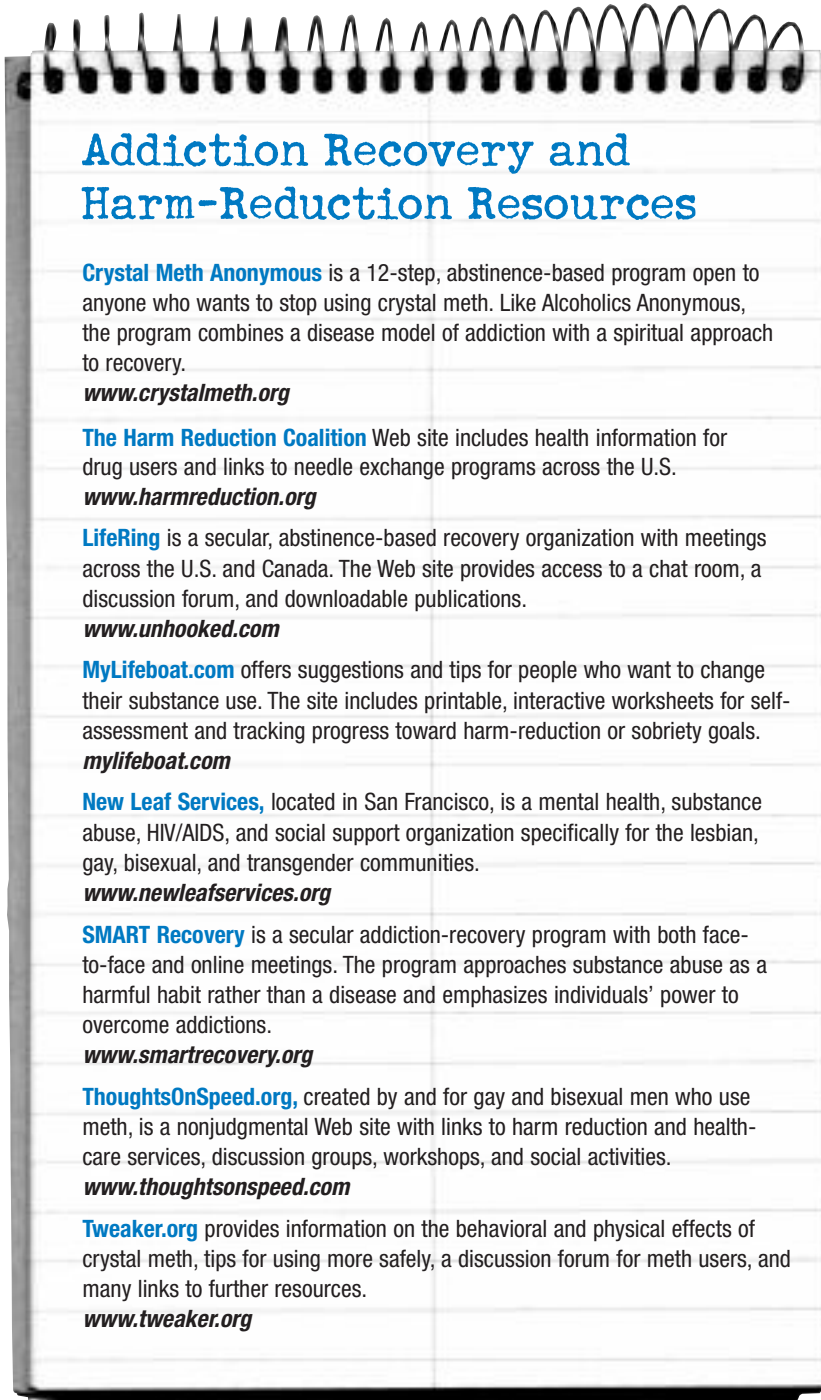
HOW CAN METH ADDICTION BE TREATED?

A number of addiction-recovery programs and resources are available to people who want to cut down or quit using meth altogether (see sidebar at left for more information). These programs have differing goals, from harm reduction to total abstinence, and take a number of distinct approaches.

Crystal Meth Anonymous, for example, is an abstinence-based program that views addiction as a disease, asks addicts to acknowledge their “powerlessness” over the drug, and takes a spiritual approach to attaining sobriety. In contrast, SMART Recovery, a secular recovery program, emphasizes self-reliance and advocates changing the pattern of thoughts, emotions, and behaviors that underlies each user’s addiction.

Flynn believes treatment for meth users must include addressing any underlying psychiatric conditions, such as depression or bipolar disorder, in addition to traditional 12-step addiction therapy. Substitution therapy with another stimulant, such as Adderall (a form of amphetamine), may also benefit some users, says Flynn.

Colfax has reported on the provisional success of contingency management (CM) as a technique for reducing methamphetamine use. CM essentially pays drug users to *not* use and offers vouchers for clean urine



Addiction Recovery and Harm-Reduction Resources

Crystal Meth Anonymous is a 12-step, abstinence-based program open to anyone who wants to stop using crystal meth. Like Alcoholics Anonymous, the program combines a disease model of addiction with a spiritual approach to recovery.
www.crystallmeth.org

The Harm Reduction Coalition Web site includes health information for drug users and links to needle exchange programs across the U.S.
www.harmreduction.org

LifeRing is a secular, abstinence-based recovery organization with meetings across the U.S. and Canada. The Web site provides access to a chat room, a discussion forum, and downloadable publications.
www.unhooked.com

MyLifeboat.com offers suggestions and tips for people who want to change their substance use. The site includes printable, interactive worksheets for self-assessment and tracking progress toward harm-reduction or sobriety goals.
mylifeboat.com

New Leaf Services, located in San Francisco, is a mental health, substance abuse, HIV/AIDS, and social support organization specifically for the lesbian, gay, bisexual, and transgender communities.
www.newleafservices.org

SMART Recovery is a secular addiction-recovery program with both face-to-face and online meetings. The program approaches substance abuse as a harmful habit rather than a disease and emphasizes individuals’ power to overcome addictions.
www.smartrecovery.org

ThoughtsOnSpeed.org, created by and for gay and bisexual men who use meth, is a nonjudgmental Web site with links to harm reduction and health-care services, discussion groups, workshops, and social activities.
www.thoughtsonspeed.com

Tweaker.org provides information on the behavioral and physical effects of crystal meth, tips for using more safely, a discussion forum for meth users, and many links to further resources.
www.tweaker.org

tests. The Friends Research Institute in Los Angeles conducted a study of this method, vs counseling, vs both, and found that a reduction in sexual risk behaviors could be achieved using each approach, although CM alone tended to produce longer-lasting benefits.

According to Fontaine, while “there is no silver bullet for treating meth dependency,” cognitive behavioral therapy and motivational interviewing are powerful tools. These therapeutic approaches help users explore and address the thoughts and feelings that precede substance use—such as the shame and guilt that individuals, gay or straight, negative or positive, may associate with sexual behavior and sexual identity—with the goal of creating healthier responses to the mental and emotional “triggers” for drug use.

It is essential that HIV positive people who use meth be aware of the many health risks associated with the drug—weakened immune function and diminished general health, damage to brain structures and concomitant cognitive impairment, real or perceived lack of adherence to anti-retroviral regimens, and potential interactions with anti-HIV medications—as well as the risk of transmitting the virus to partners via unprotected sex or condom slippage.

As noted, a number of resources are available to help users avoid the most dangerous effects of meth, or to quit using entirely. While the delayed return of normal dopamine levels in the brain and the resulting “low” period can make recovery from heavy meth use extremely challenging, the wide variety of harm-reduction and treatment programs currently available can help HIV positive methamphetamine users maintain their health by using more safely or quitting altogether.

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Smoking is a habit. It is often a stress-related activity. Smoking is also a risk factor for many conditions that affect people with HIV, including cardiovascular disease, bone disease, and anal cancer.

The FDA has approved bupropion (Zyban) as a nicotine-free medicinal quitting aid. Nicotine replacement therapies—in the form of lozenges (Commit), patches (Habitrol, NicoDerm CQ, Nicotrol), inhalers (Nicotrol Inhaler), and gum (Nicorette)—are another means of quitting. Complementary methods include behavior modification, counseling and support, and acupuncture.

The Stop Smoking Center (www.stopsmokingcenter.net) is a unique Web site that offers a Quit Program, online support services, and links to a wide range of smoking cessation resources, including the American Lung Association (212-315-8700) and Nicotine Anonymous (415-750-0328).

The Tobacco Education Center of UCSF/Mt. Zion (415-885-7895) is a quitting resource for San Francisco Bay Area residents.

**Learn more about the art of quitting.
There is no better time than now.**