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Bugs, Microbes and Parasites: Just a Few of the Hazards Associated with Intravenous Drug Use (IDU)

"Shooting up" is a descriptive term used for drug abusers who ingest their drugs intravenously. The United Nations Office on Drugs and Crime (UNODC) has suggested that between 11 and 21 million substance abusers worldwide are actively and regularly injecting their drugs. The consequences of intravenous drug use (IDU) are significant and well established. In the United States, the public has become familiar with needle marks and other blemishes associated with IDU. Public service announcements, educational materials, even scripts of popular movies have rather direct descriptions and depictions of I.V. drug use. But apart from the noxious looking scabs and scars, there are a variety of long-term consequences of I.V. drug use that can destroy a user's health. Often times this destruction affects friends, spouses, and sexual partners who are in close contact with a user. Contamination comes silently and microscopically. Those at risk include law enforcement officers, emergency medical personnel, and rehabilitation specialists. A recently published essay in the Journal of Medical Microbiology did an excellent job in summarizing the nature of IDU and identifying the specific pathologies that lie at the heart of I.V. drug use[1]. The DARS Journal scanned this well-researched review and has summarized the results of the authors' research.
Americans are unfortunately quite familiar with the sites and sounds of methamphetamine abuse. In particular, the intravenous injection sites associated with “crank” use are now infamous. Large red, raised lesions in the ditch of the elbow or on top of the hand are classic signs of methamphetamine abuse. These bumps frequently become infected and may become larger, oozing sores. Methamphetamine intravenous drug users will often pick at these sites and further irritate the lesions. Oftentimes methamphetamine users will come to believe that raised injection sites are actually subcutaneous deposits of spiders or bugs; they will then feverishly scratch and dig in an effort to try and remove them. Microbes, bacteria, and funguses often take refuge in these areas of irritation. Depending on the identity of the bug present, these injection sites may become super-infected by bacteria, such as methicillin-resistant staphylococcus aureus (MRSA). These infections are complicated by the fact they are resistant to nearly all known antibiotics and can only be saved through surgical excision. These infections can be quickly spread through close contact with others who may exhibit some susceptible characteristics of contamination and spread of disease. When drug paraphernalia is shared between I.V. drug users, the potential for rapid and tragic spread of infection is almost certain. HIV and hepatitis are additional hazards for the IDU community; they are at significantly greater risk for acquired infections than non-I.V. drug users.

The risk of infection and disease from microbes that inhabit drug use paraphernalia is obvious. But overlooked is the roll that drug contaminants play in the cause of disease and chronic illness. In America, methamphetamine and heroin are widely known to contain myriad additives and "cutting agents" that are harmful to users. Additives are bulk items typically tossed into larger batches of a drug in order to dilute the contents and increase the yield. Most drug deals are priced according to weight. Baking soda, baby laxative, and starch are all potential cut components for mixing with large amounts of powdered drug. Flax seed and psyllium powder have found their way into cocaine and heroin products, but it's unlikely that they were intended to add dietary fiber to the equation. It gets worse though. Tar heroin is an entirely different animal.

Tar heroin is a unique narcotic, unique in the sense that it is an unrefined drug when it is brought to market. The crude nature of tar heroin is what makes it attractive to a large segment of the narcotic abusing population. Tar heroin is an opioid; it is a semi-synthetic product that originates from opium and morphine. It is produced in Mexico, oftentimes at very rural labs and production facilities. These operations are co-inhabited by farm personnel and farm animals. A good number of these processing laboratories are located in underground bunkers or in areas where animals have access. Because of the crude environments where these labs and production facilities are located, they are subject to contamination by Clostridia spores. These spores are hardy and resistant to heat and cold. Clostridia spores are responsible for wound botulism and tetanus. They can easily end up in tar heroin. In England and Germany, 11 deaths caused by anthrax poisoning have been attributed to contamination of a batch of heroin. Further outbreaks of clostridia infections have been linked to intranasal ingestion of cocaine. There are real-life consequences to contamination of drugs, especially with drugs not subject of legitimate quality control systems. Contamination can occur with drugs in their powder or liquid forms; they are slightly less contaminated in their smoked forms.

Over the course of the past several years, we have reported on the emergence of several colored strains of methamphetamine. Red, yellow, and orange-tinged methamphetamines have been identified as having been sold and seized in the southwest border with Mexico. The colorizing of the methamphetamine was done to somehow boost the marketing potential of one trafficking group's special brand of methamphetamine, especially as it related to sales to teenagers and young adults. As it turns out, the colorized methamphetamine was much more likely to cause abscesses in users than did plain colored or crystallized methamphetamine.

But aside from contaminants and cutting agents, one of the biggest threats for illness and serious injury in drug use stems from the shared use of drug paraphernalia. This is particularly dangerous for I.V. drug users of heroin, methamphetamine, and cocaine. In fact, the first community outbreak of MRSA occurred with a group of heroin users who shared needles in Michigan. And although MRSA can be communicated through shared instruments (needles and syringes), it can also be spread through communal contacts as well. And MRSA is only one of several very serious infections that can be fostered by the sharing of drug kits or "rigs." Transmission of blood-borne pathogens is also a significant hazard for intravenous drug users. And although the needles and syringes themselves are a significant threat for contamination and the spread of disease, there is also the possibility of cotton balls and cigarette filters as bridges for HIV, HCV and HBV in making the jump from one user to another. Cotton balls and cigarette filters are used to sift and clean a liquid heroin preparation as it is drawn into a syringe. For some users, the cigarette filter can then double as a needle cap on a rig. In 1996, an examination of paraphernalia seized at a Florida "shooting gallery" identified the DNA from HIV in cotton filters used to prep drugs for intravenous injection. Sterilization and microbiology is not a concept that is grounded in the minds of most intravenous drug users.

For readers who frequently deal with heroin users, the phenomenon of "cotton fever" has meaning. For some, "cotton fever" is a stage in withdrawal where stored cotton balls are reconstituted to squeeze out the last vestiges of heroin for an emergency dose of the drug. For others, it is the direct effect of infection from the cotton used to strain the drug as it is drawn into a syringe. Research of this phenomenon tends to implicate an endotoxin that colonizes cotton plants. Called Enterobacter agglomerans, the bug releases a toxin that is inadvertently picked up from the cotton balls used to prepare heroin for injection; the toxoid is then introduced to the bloodstream where it causes a painful condition of fever, aches and pains. The effects of the toxin could be easily mistaken for a batch of "bad dope" that then led to onset of withdrawal. Many
users do not know that they have been infected by a toxin like Enterobacter agglomerans.

Infection associated with intravenous drug use can become more serious, even bizarre. There are a number of documented cases of parasitic infections in heroin users, malaria in fact. These cases have occurred mainly in the Middle East, where again, needles and rigs were shared with an infected host who then sickened others. And as research has now established, a malaria-afflicted heroin addict will convey much more Plasmodium vivax to an unsuspecting, unaffected person than will a single bite by an infected mosquito. In 1940s America, quinine was added to heroin by dealers to slow the progression of malaria in populations of intravenous drug users. Whether the tactic worked, we do not know.

Acquisition of sexually transmitted disease is an all too common occurrence in I.V. drug using populations. I.V. drug users acquire sexually transmitted disease (STD) at rates that are significantly higher than non-injecting users, syphilis in particular. The exchange of sex for drugs is common in populations of cocaine and methamphetamine users. Gonorrhea, chancroid, and candidiasis are associated with the use of stimulant drugs. The stimulant drugs (cocaine and methamphetamine) cause exaggerated feelings of sexual prowess and motivations for mating behavior. An underlying presence of STDs in any given community can be rapidly grown following the introduction of a stimulant drug. This situation is more volatile due to the prevalence of sex workers in areas inhabited by I.V. drug users.

Making matters worse is the discovery that many drugs of abuse can cause suppression of the immune system. In some cases, the impact on the immune system can be critical. Methadone, for instance, has proven itself capable of enhancing the replication of HIV in some patients. And methadone is a drug that is frequently used in narcotic replacement therapy in I.V. drug using populations where the rate of HIV infection is already elevated. Marijuana use may also suppress immune function, ironically it is a drug advocated by cannabis collectives as an appropriate treatment for those who are immunocompromised by HIV and AIDS.

Increased awareness of these issues could lead to earlier intervention and better treatment for those seeking rehabilitation and psychiatric treatment. Primary care physicians, substance abuse counselors, even probation and parole officers should become more sensitive to the signs and symptoms of infectious disease in populations of illicit drug users, especially when I.V. drug users are encountered in hospitals or clinical settings.


DAR Corner: Drugged Driver Exhibits Unusual Symptoms of Intoxication-Caused by a Drug That She Did Not Take

The MEDTOX DAR Program is staffed by a team of in-service and retired police officers who are uniquely trained and experienced in the evaluation of drunk or drugged drivers. The DAR team frequently reports to the Journal on unusual situations that they encounter while working in the field. This report is submitted by Mr. Rich Ulrich, a 28-year veteran police officer who is trained and certified as a Drug Recognition Expert (DRE); he is also trained and certified as an instructor in Drug Abuse Recognition (DAR). Mr. Ulrich reported on a recently adjudicated DUI arrest. Here is his report:

The term drugged driving took on new meaning this past holiday season. Police responded to a complaint of a reckless driver weaving in and out of traffic; at times the reckless driver nearly collided with oncoming traffic. The driver narrowly missed hitting a pedestrian.

Police finally caught up to the driver. During the impaired driving investigation, the female driver admitted an addiction to opiates. She told police she had just recently been discharged from a treatment facility for opiate dependency. During the psycho-physical portion of a DAR-DUI exam ("walk and turn," "one leg stand," and "finger to nose" tests), the driver's movements and gestures were similar to that of a rubber band being stretched back slowly and then released quickly. Her movements were alternately fast, then slow, exaggerated, then controlled.

The following signs were observed and documented during the DAR exam:

- HGN present (lack of smooth pursuit, distinct and sustained nystagmus @ maximum deviation, angle of onset of 40 degrees); no apparent alcohol impairment.
- Vertical nystagmus not present
- Non-convergence present
- Romberg fast at 12 seconds; 2-3" front to back sway with bouts of "on the nod."
- Pulse ranged from 98-100 BPM (Up)
- Blood pressure 93/67 mmHg (Low)
The driver said her drug of choice was Oxycontin (sustained release oxycodone); she took the drug by crushing the tablets and injecting them intravenously. The treatment facility had prescribed her medication to ease the discomfort of opiate withdrawal. However, rather than continue with the regimented course of that medicine, she decided to quit the drug without tapering her dose. The wild card in this case was the driver's discontinuance of the drug, Clonidine (Catapres). The rebound effects from Clonidine occurred here because the driver failed to taper from the drug when she departed her residential treatment program. The effects of Clonidine were the cause of the cyclic emotions and behaviors she exhibited at curbside; these symptoms added to the impairment caused by her benzodiazepine and opiate abuse.

The drug involved here has a variety of medical applications. When used for opiate, alcohol, and nicotine detoxification, the dose of the drug ranges from about 0.5 mg to 1.4 mg daily. The actual dosage is determined based on the strength of the withdrawal symptoms that a patient may be experiencing. This drug is also used to treat the discomfort of some forms of neuropathic pain. The drug is sometimes prescribed as a sleep aid. It is often prescribed to treat hyperhidrosis (excessive sweating), insomnia, and post-traumatic stress. Its original FDA approval was to treat high blood pressure. Contemporary uses for this drug are mostly associated with off-label applications. Clonidine is classified as an alpha-agonist hypotensive agent. This drug will not show up on a traditional panel drug screen. The half-life of this drug is 12-33 hours. This drug is administered; it is also available in the form of a transdermal patch.

The danger in using this medication is the rebound effect that can occur in patients where the drug is abruptly discontinued. The mechanism of this drug suppresses sympathetic outflow resulting in lower blood pressure, but sudden discontinuation can cause rebound hypertension due to a rebound in the sympathetic outflow. The symptoms can swing back and forth over short periods of time. In this investigation, this drug complicated the evaluation, but it did not mask what were obvious symptoms of opiate and depressant intoxication.

It was the opinion of this evaluator that the driver was under the combined influence of a CNS depressant and opiate. Blood test results revealed the presence of benzodiazepine and opiate.

Richard Ulrich
Drug Abuse Recognition Instructor
Drug Recognition Expert Instructor
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Click here for more information on DAR courses

New Public Safety Hazard May Exist in Older Patients Who Take Zolpidem (Ambien) and Other Newer Sleep Aids

In prior editions of this news journal, we have reported on some unusual hypnotic effects associated with use of Ambien (zolpidem). The drug is a popular sleep aid that is available as a brand name drug (Ambien) and as a generic (zolpidem) product. In addition to its "instant release" formula, the drug is available to patients in an extended-release format. The drug is a popular alternative to the use of older, more potent drugs of the benzodiazepine family. Zolpidem is generally viewed as having fewer hangover effects when compared to older, more powerful benzodiazepines. But recent research casts doubts on that assumption[1]. In fact, this research indicates that for older adults, lingering impairing effects may exist with zolpidem use well into the next day. Zolpidem's tardy effects appear to be more noticeable than those symptoms experienced with flunitrazepam (Rohypnol) and zopiclone, a close chemical sibling to the widely prescribed sedative-hypnotic Lunesta.

This research was conducted overseas using medications that are not approved for use by physicians in the United States. Nevertheless, the points of comparison line up accurately with a variety of sleeping medications that are available in the U.S. The study involved an older cohort of drivers (55-65 years old). The mixed group of men and women were provided with either 10 mg of zolpidem, 7.5 mg of zopiclone, or 1 mg of flunitrazepam for nighttime sleep. A third group was provided with placebo. Each participant was evaluated and adjudged to have fallen asleep following their ingestion of their assigned medicine. The participants were all subjected to a battery of driving challenges the following day; each was put through a standardized automobile training course and evaluated for accuracy in movements and decisions. Many of the driving challenges were monotonous. Other tests required some level of divided attention calculation.

The next day, testing revealed that zolpidem users had a difficult time keeping their automobiles in the proper lanes of traffic; they also displayed problems in maintaining a constant and proper rate of speed. A substantial portion of the zolpidem using participants presented for the study with detectable levels of zolpidem still in their bloodstream. Most of the zolpidem users
were aware of their degraded alertness and commented about it during the course of the investigation. Zolpidem “sleepers” also reported noticeably reduced levels of alertness the next day. Those participants who took zopiclone exhibited slightly better skills, but for the most part their performances were similar to the zolpidem users. In an unexpected result, the flunitrazepam (benzodiazepine) using participants exhibited fewer problems with the driving skills challenge.

This study was a relatively small and narrowly constructed experiment. Nevertheless, it did reveal evidence that zolpidem use by older, more mature adults may pose to be a next-day hazard to safe driving due to a lingering hangover effect. This phenomenon is likely connected to users of eszopiclone (Lunesta) as well, a substance related to zopiclone. Older adult drivers who take these drugs or drugs of similar structure and chemistry should be aware of the next-day effects that may degrade driving skills and reaction time.

Zolpidem, Ambien, and Lunesta are popular sedative-hypnotic drugs that are widely prescribed for insomnia and other sleep-related problems. They have a demonstrated safety record and have been an enormous help to millions of problem sleepers. Nevertheless, these drugs must be used with caution and given the room they need between periods of induced sleep and the challenges of operating an automobile or heavy machinery. Special consideration should be given to situations where these drugs are prescribed in extended-release formats. Time-release formulas may result in even longer periods of post-waking driving task impairment.

(Authors note: It should be noted that flunitrazepam is “Rohypnol,” a sleeping aid that was implicated in countless instances of date rape and drug facilitated sexual assault in the 1980s and 1990s in the United States. It has never been approved by the FDA for use in the U.S. Most domestic Rohypnol is smuggled into the U.S. from Mexico and points south.)


**April Name That Drug: Experimentation on Wife Helps Discover Drug**

In the last decade, society has witnessed the awful impacts that stimulant drug abuse has had on American communities. In particular, methamphetamine has established itself as perhaps the most insidious of all drugs of abuse. Methamphetamine’s sweeping powers are formidable. The drug is uniquely capable in taking the brain hostage, disabling users, and enslaving them into a long physical and mental decline. This month's mystery drug shares many of methamphetamines more onerous direct effects. In some ways, the drug can be as pernicious as methamphetamine. The drug is present in several different drug markets; it has appeal as both a prescription medication and as an abused drug on the streets. It is manufactured in a variety of forms attached to several well-known brands. This month's drug is a first page feature of most Internet drug sales sites. Its utilization as therapy for narcolepsy has waned in the past decade as more precise and better-tolerated medications have come to market.

This drug was first synthesized as an investigational drug towards the end of World War II. The drug was not a pharmaceutical product of the World War II conflict however. By the mid-1950s, interest in the chemical began to brew. Its first investigational experimentation was a therapy to treat depression and mood disorder. In fact, this drug's developer first tested the tolerability of this drug on his wife. Like Sigmund Freud and his extensive contributions to cocaine research, research chemist Leandro Panizzon engaged his wife Rita in a series of personal tests to judge the effects of efficacy and tolerability of the drug. Panizzon found it not very intriguing. Rita, however, responded to the drug and found that it made her feel energized and adventuresome. Panizzon's wife's name is woven into the product name for this drug. Over time, Panizzon's discovery evolved out of the world of antidepressants and into a new world genre of medications used to treat adolescent behavioral disorders.

This month's drug is available in a wide array of pharmaceutical applications. It is used worldwide. Novel applications for this drug currently revolve around its utility as a substitute drug for cocaine addicts. In some circles, the drug has also been used in an extended release format as a substitute drug for methamphetamine addicts. Pain management programs are inclined to use this drug to help boost the mood and energy of patients who may be weighed down by the depressing effects of opiates and the emotional drag of chronic disease or injury. But in the main, this month’s drug is a go-to therapy for psychiatrists and pediatricians who treat challenging behavioral disorders.

To avoid laying on the final clues that would obviate more storytelling, let us first discuss the signs and symptoms associated with the use and abuse of this drug. This drug is most appropriately classified as a central nervous system (CNS) stimulant. It is a member of the piperazine class of compounds. Its pharmacological properties result in increases in bio-available levels of dopamine and norepinephrine. This drug achieves this effect by blocking the reuptake of the monoamine transporters. With boosted levels of dopamine and norepinephrine in the brain, the net effects of the drug are that of stimulation and increased energy. To those ends, a user may display some of the following physical signs or symptoms:
- Dilated pupils (possibly greater than 8 mm in diameter)
- Slowed papillary reaction to direct light (possible rebound dilation)
- Smooth pursuit; no nystagmus, no lack of convergence.
- Fast internal clock (possibly 15 seconds or less for 30 seconds)
- Fast speech (repetitive speech at excessive doses)
- Hyperactivity (but not in all cases . . . hint, hint)
- Hyperflexia (exaggerated motions and movements, but not in all cases)
- Grimacing and other dystonic reactions (excessive, abusive doses)
- Perspiration and flushed facial appearance

Users feel a substantial boost to their overall sense of energy. They may also experience a reflective sense of great cognitive abilities and intellectual competitiveness. Others may find it capable of stimulating athletic performance. Rita Panizzon did. She cited the drug's efficacy as aiding her prowess on the tennis court. In its base form, the drug exerts its effects for 4-6 hours. In extended release formats, the drug can be pharmacologically active for 12 or more hours.

This month's drug is regulated and controlled under the terms and conditions of Federal Schedule II. And like other drugs assigned to Schedule II, this month's drug is the subject of extensive diversion and abuse. This drug is still frontline therapy in the treatment of attention deficit-hyperactivity disorder, a condition widely known by its initials of ADHD. In that role, this month's drug is an alternative therapeutic choice to the use of amphetamine. And although this drug is not approved for use in children under the age of 6, it is immensely popular in older children and adolescent settings. The drug is also a preference of adults who have been diagnosed with later stage forms of ADHD. Newer drugs may be edging this month's drug from the frontlines of ADHD pharmacotherapy.

Rita Panizzon's experience led to early nomenclature as "Ritaline." A subsequent iteration of the drug was coined, "Ritalin." Beyond Ritalin, this month's drug is showcased in preparations, such as Concerta and Methylin. Daytrana is a transdermal patch and delivery system for this drug, although it is struggling to get traction as an alternative to the traditional oral preparations.

This month's drug: methylphenidate; brand names (Ritalin, Concerta, Methylin, Biphenta and Daytrana)

More Bad News for Marijuana Smokers

Another peer-reviewed study has been released that casts more critical attention on the roll of cannabis in the aggravation of psychosis. The research further confirms that chronic marijuana use can lead to classic drug dependency and a prolonged, angst tinged abstinence syndrome. Researchers in the Netherlands led this study that analyzed some 1092 psychotic patients, 1057 of their siblings, and 590 controls that had no personal or family psychiatric history[1].

Siblings who used marijuana were 10 times more likely than their non-using siblings (controls) to exhibit symptoms of psychiatric. In this case, non-psychotic marijuana smokers developed symptoms of psychosis that were similar to family members who were associated with psychiatric histories. The symptoms exhibited by the marijuana smokers did not rise to the level of undisguised psychosis, but they did rise to a level of disorder that fits into the psychotic spectrum. The message here is that people with a family history of psychosis should be warned that marijuana use might exacerbate or trigger latent symptoms of mental illness. It is possible that cannabis tinkers with dopaminergic systems that may be susceptible to dysregulation in families with a history of mental illness. People in such situations should be sensitive to the effects of marijuana on mental health.

This research is interesting because many marijuana users suggest that THC calms or turns down the noise in their brains associated with stress and fatigue. It may be that for some users that cannabis is actually antagonizing and accelerating the destabilization of neurotransmitter systems in the brain. Cannabis may quite clearly be a triggering event to a future sequence of psychotic incidents. Pot smoking is looking less and less like a new world medicine.


Cocaine May Have Gene-Altering Effects in the Brain
Cocaine has been long known as a drug that has significant long-range effects for those who are addicted to it. But a new research from the Mount Sinai School of Medicine in New York City raises a new set of concerns for cocaine addicts and those in recovery. The research, which was reported in the Proceedings of the National Academy of Sciences, indicates that cocaine use may actually silence some areas of DNA expression in the *nucleus accumbens* [1]. The effects of the drug seemed to persist even after experimental mice halted use of the drug. In other mice, formerly silent areas in the brain became active in the *nucleus accumbens*.

The *nucleus accumbens* is an area deep in the brain that is responsible for regulation of feelings of reward, pleasure, fear, and aggression. Cocaine and other sympathomimetic drugs are capable of profound stimulation of neurotransmitter action in that part of the brain. But this research may indicate that the effects of cocaine use over the long haul may bring about significant biological changes to the brain. It could be that the powerfully reinforcing nature of cocaine may be more far reaching than once thought.

Please stick to the MEDTOX DARS Newsletter for updates on this issue, as well as developments related to other drug addiction, drug dependency, and drug treatment. This journal is your source for the best in science and public policy related to substance abuse. Our 18,000-reader circulation guarantees you the best information and professional advice related to substance abuse disorders. MEDTOX and the MEDTOX DAR Hotline are available around the clock to assist our readers with all of their professional needs in dealing with the challenges of drug addiction and dependency. MEDTOX is a full service laboratory that stands by its clients with a full spectrum of programs related to drug detoxification and treatment.


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