

Managing Increasing Aging Inmate Populations  
Oklahoma Department of Corrections—April 2009

Using Substances to Treat Alcoholism  
Oklahoma Department of Corrections—April 2009  
A DOC “White Paper”

**Abstract**

**Despite years of continuing research and development of pharmaceutical approaches to reduce, control, and perhaps eliminate alcoholism and its impact on criminal justice, a gap remains between the science and the implementation. This paper reviews the highly positive cost-benefit of the approaches, some of the more recent advances and findings in pharmaceuticals and genetics, new ideas on supplying, monitoring, and delivering the remedies, and the ethical considerations that must be weighed in their application.**

The Problem

A recent report by the National Institute on Drug Abuse notes that “It is estimated that 70 percent of individuals in state prisons and local jails have abused drugs regularly, compared with approximately 9 percent of the general population. Studies show that treatment cuts drug abuse in half, reduces criminal activity up to 80 percent, and reduces arrests up to 64 percent. However, less than one-fifth of these offenders receive treatment. Treatment not only lowers recidivism rates, it is also cost-effective. It is estimated that for every dollar spent on addiction treatment programs, there is a \$4 to \$7 reduction in the cost of drug-related crimes. With some outpatient programs, total savings can exceed costs by a ratio of 12 to 1.

“The failure to treat addicts in the criminal justice system contributes to a continuous cycle of substance abuse and crime. In 1999, 1.5 million minor children—most under the age of 10—had a parent in prison. Fifty-eight percent of these imprisoned parents used drugs in the month before their offense. Children of addicted parents are four times more likely to become addicted if they choose to use drugs or alcohol, and many will also enter the criminal justice system.” (Principles of Drug Abuse Treatment for Criminal Justice Populations, <http://www.drugabuse.gov>)

The Role of Science

*Scientific American* runs a long and detailed lead story, “Seeking the Connections: Alcoholism and Our Genes.” The authors state plainly, “With rapid advances over the past 10 years in technologies for discovering and analyzing the functions of genes, researchers are now increasingly able to get at the biological roots of complex disorders such as substance abuse and addiction. The power to examine patterns of inheritance in large populations, and to survey hundreds of thousands of tiny variations in the genomes of each of those individuals, enables investigators to pinpoint specific genes that exert strong or subtle influences on a person’s physiology and his or her resulting risk for disease. . . . Revealing the biological processes that can build and reinforce alcohol addiction will most certainly help to better target existing treatments and devise new ones to break alcohol’s hold.” (March 18, 2007)

*Newsweek* declares addiction an illness, “a chronic, relapsing brain disorder to be managed with all the tools at medicine’s disposal,” and details genetic research into its biological base in production and reception of dopamine and other neurochemicals as well as vaccines and new drugs to treat it. It quotes the head of the National Institute on Drug Abuse saying “In 10 years we will be treating addiction as a disease, and that means with medicine.” That is, of course, if

## Managing Increasing Aging Inmate Populations Oklahoma Department of Corrections—April 2009

pharmaceutical companies can be convinced of profits and limited in liability and if traditional therapy groups can give up parts of their turf. Specific drugs are cited for their impact, such as Vigabatrin and Camparal for their effect on neurotransmitters; D-cycloserine for its ability to disassociate context with drug use, a common problem in relapse; Provigil for its positive impact on reassertion of “free will” in drug choice; and Naltrexone, which can block drug effects and its injectable form, Vivitrol, which can get around the problem of addicts deciding not to take the drug. (February 22, 2008)

*MSN Health & Fitness* provides an overview of the biochemical nature of addictions and the pharmaceutical strategies of their treatment, either through blocking receptors with antagonists, fitting receptors with less addictive drugs such as agonists, or partially fitting with “partial agonists,” reproducing a reduced and less dramatic impact. It also details specific drugs, including an anti-drinking drug called disulfiram now used for nicotine addiction and suboxone which has been effective against oxycodone addiction. The article outlines some implementation problems, such as side effects and tailoring dosages and who is allowed to prescribe or administer the treatments, and the concerns that some of the remedies may prove as bad as the addictions. It notes that “The problem is that, while these drugs are statistically successful, they aren’t necessarily instant sobriety in a pill. Some patients still need counseling and group therapy to stay sober. Others won’t find certain pills useful at all. ‘One thing that’s clear is that some of these medications don’t work in everyone,’ says Dr. Frank Vocci, director of the Division of Pharmacotherapies at the National Institute on Drug Abuse. ‘Doctors have to work with each patient on an individual basis and see what works for them.’” (March 26, 2008)

Researchers using MRIs identify “brain sites that fire up more when people make impulsive decisions. In a study comparing brain activity of sober alcoholics and non-addicted people making financial decisions, the group of sober alcoholics showed significantly more ‘impulsive’ neural activity. The researchers also discovered that a specific gene mutation boosted activity in these brain regions when people made impulsive choices. The mutation was already known to reduce brain levels of the neurotransmitter dopamine. The newly found link involving the gene, impulsive behavior and brain activity suggests that raising dopamine levels may be an effective treatment for addiction . . . .” One of the researchers noted that “Our data suggest there may be a cognitive difference in people with addictions. Their brains may not fully process the long-term consequences of their choices. They may compute information less efficiently. What’s exciting about this study is that it suggests a new approach to therapy. We might prescribe medications, such as those used to treat Parkinson’s or early Alzheimer’s disease, or tailor cognitive therapy to improve executive function. . . . The data takes a significant step toward being able to identify subtypes of alcoholics, which could help their treatments, and may provide earlier intervention for people who are at risk for developing addictions. . . . It wasn’t that long ago that we believed schizophrenia was caused by bad mothers and depression wasn’t a disease. Hopefully, in 10 years, we’ll look back and it will seem silly that we didn’t think addiction was a disease, too.” (<http://www.sciencedaily.com/releases/2007/12/071226003608.htm>)

### Pharmaceutical Approaches

According to researchers at the Boston University School of Medicine, “An extended-release version of the anti-addiction medicine naltrexone reduces drinking in alcohol-dependent patients within two days of being injected.” They conclude that “Potential clinical implications of the

## Managing Increasing Aging Inmate Populations Oklahoma Department of Corrections—April 2009

rapid, early onset of effect of this medication's delivery system for patients who are depended on alcohol include facilitation of early engagement in treatment, motivation to continue treatment, and focus on the goals established in counseling." (<http://www.reutershealth.com/en/index.html>)

Aripiprazole, a drug used to treat schizophrenia and bipolar disorder, has potential use for alcoholics, according to scientists at the University of Connecticut Health Center. They conclude that "Because aripiprazole decreases alcohol's euphoric effects and increases its sedative effects, this drug could be useful in the treatment of heavy drinking. . . . Overall, the findings suggest that 'additional research on the effects of aripiprazole on the subjective effects of alcohol is warranted.'" (<http://www.sciam.com/article.cfm?id=aripiprazole-may-be-effec>)

The Baylor College of Medicine announces the successful trials of "vaccines that spur the body's immune system to help even when the pleasure centers clamor for another hit" of abused substances. As one commentary said, "There are many people who have the desire and strength to make the initial step towards abstinence, but then relapse once and get sucked back into the drug's thrall. Vaccines, along with therapy, may protect former addicts from long-term cravings and spontaneous mistakes." (<http://www.treatmentonline.com/treatments.php?id=1983>)

A Boston University School of Public Health study indicates that "[p]eople who begin to drink alcohol before the age of 14 years are not only more likely to become alcohol dependent than those who stay away from alcohol until they're 21; they also develop dependency faster and have a longer struggle with alcohol throughout their lives . . . ." This research will likely impact how eventual vaccines against substance abuse will be implemented and who will be most likely to receive them. (<http://www.medicineonline.com/news/12/5099/Early-drinking-may-speed-alcohol-dependence.html>)

Pharmaceutical control of anxiety may allow greater control of alcohol withdrawal symptoms, according to work at the University of Illinois-Chicago's College of Medicine, as well as preventing the anxiety that can lead to alcohol abuse. Says one of the researchers, "These observations . . . provide an insight into the link between alcohol and anxiety and could be used to identify new targets for developing medications that alleviate withdrawals-induced anxiety and potentially modify a motivation for drinking." (<http://www.sciencedaily.com/releases/2008/03/080304173356.htm>)

UCLA researchers discover how an experimental drug (R015-4513) bound to specific brain cell receptors to stop drunken behavioral symptoms. They hope that their work "may lead to a better understanding of how alcohol works in the brain as well as help develop drugs that prevent alcohol actions, such as a sober-up pill, and alcohol addiction medications and treatments." (<http://research.ucla.edu/tech/ucla05-458.htm>)

In a study of 20 smokers/heavy drinkers, Yale University researchers discover that the anti-smoking drug Chantix (varenicline) could also work to cut alcohol use after only one week. "In general, . . . the Chantix group reported less alcohol craving and less of a 'high' following the initial alcohol dose. And when given the chance to drink more, Chantix users had less than one

## Managing Increasing Aging Inmate Populations Oklahoma Department of Corrections—April 2009

drink, on average, compared with the placebo group's two to three drinks.”  
(<http://www.reutershealth.com/archive/2009/03/18/eline/links/20090318elin002.html>)

A University of Virginia neuroscientist leads a study to see if a combination of two drugs—topiramate (used for seizures and migraines) and ondansetron (used for chemo-related nausea in cancer patients)—could work to control alcohol dependency. Between the two drugs, they could work to control both before and after alcohol abuse symptoms.

Similarly, a Finnish research team notes that escitalopram (used to treat Alzheimer's dementia) and memantine (used to treat depression and anxiety) have proven useful in combination to treat major depressive disorders in alcoholics.

([http://scienceblogs.com/bushwells/22008/12/uva\\_alcoholism\\_researcher\\_they.php](http://scienceblogs.com/bushwells/22008/12/uva_alcoholism_researcher_they.php))

(<http://www.reutershealth.com/archive/2008/11/07/eline/links/20081107elin031.html>)

The Ernest Gallo Clinic and Research Center releases a study indicating that a hormone disorder drug (cabergoline, marketed as Dostinex) decreased alcohol consumption and seeking behavior in rats while leaving those behaviors unchanged regarding water and saccharin, other reward-related fluids. Low doses appear effective, but human clinical trials await.

(<http://www.sciencedaily.com/releases/2009/02/090223221610.htm>)

### The Potential of Genetics

Indiana University School of Medicine researchers find a sequence variation in a specific gene responsible for production of a protein important in regulating dopamine function. That gene sequence “also contributes to whether or not an individual craves or does not crave alcohol.” One of the researchers says, “Understanding the role of [the protein] in sensitivity to craving may enable the future development of drugs to help alleviate the symptoms of craving, improving the chances that the individual might be able to stop drinking.” Other researchers at the university isolate genes associated with severe alcohol dependence and withdrawal compared to those without severe withdrawal, concluding that “While results from this study do not provide a cure for alcoholism, they do show us a potential avenue for future clinical work.”

(<http://www.sciencedaily.com/releases/2007/03/070326181552.htm>)

(<http://www.sciencedaily.com/releases/2008/09/080923164533.htm>)

Work at the University of Illinois-Chicago discovers that “Reshaping of the DNA scaffolding that supports and controls the expression of genes in the brain may play a major role in the alcohol withdrawal symptoms, particularly anxiety, that make it so difficult for alcoholics to stop using alcohol.” The researchers find enzymes that affect this gene expression as well as inhibitors of those enzymes, leading to the possibility of developing “therapeutic agents” to treat alcoholism.

(<http://www.sciencedaily.com/releases/2008/04/080402084340.htm>)

Research at the National Institute on Alcohol Abuse and Alcoholism target a “brain circuit that underlies feelings of stress and anxiety [that] show promise as a new therapeutic target for alcoholism.” They find “a brain molecule . . . [that] appears to be a central actor in stress-related drinking.” Activating neurochemicals and brain regions that depress stress responses and drug

## Managing Increasing Aging Inmate Populations Oklahoma Department of Corrections—April 2009

rewards could positively affect resistance to alcohol craving.  
(<http://www.sciencedaily.com/releases/2008/02/080226155537.htm>)

Researchers at the University of Virginia and the University of Michigan publish an article highlighting the identification and location of specific genes associated with multiple addictions. The implications are that “we’re narrowing the scope to specific genetic targets. Once researchers can pinpoint exact genetic variants and molecular mechanisms, then we can create much more effective, even personalized, treatments for individuals addicted to a variety of substances.” (<http://www.sciencedaily.com/releases/2009/03/090310142912.htm>)

### Overcoming Supply, Monitoring and Delivery Problems

The maker of the drug Vivitrol, which two separate studies found effective along with therapy in reducing days using alcohol, decides to continue making the drug despite the small market for it among possible users. Among the reasons that treatment programs give for not using it and other drugs: a resistance among counseling therapists to drugs to assist abusers, ineffectiveness of the drugs for many abusers, and the expense (\$800/mo. for Vivitrol). Other drugs that have found limited marketing success include Antabuse, Campral, and Naltrexone. Makers of Vivitrol assert that their drug is superior because it is injected and releases slowly into the bloodstream over a month, making constant monitoring of treated offenders less extensive. (Boston Globe, March 23, 2009)

Researchers at the Georgia Institute of Technology develop “a sensor necklace that records the exact time and date when specially-designed pills are swallowed, and reminds the user if any doses are being missed.” One researcher notes that “A patient cannot cheat the system by passing the pill past the necklace sensors on the outside of the neck because the signal processing algorithm is smart enough to only look for the pill’s magnetic signature while it passes through the esophagus” [with a 94% successful detection rate].  
(<http://www.sciencedaily.com/releases/2008/03/080305111857.htm>)

An anklet called SCRAM (Secure Continuous Remote Alcohol Monitor) detects the wearer’s alcohol levels through his/her sweat (and ethanol vapor) and is uploaded by the wearer to a home modem that transmits its data to the anklet company, which reports violations to the judge. It also detects and reports efforts at tampering. Such technology could facilitate monitoring of the remedial drugs and their intake for better supervision of offender adherence to his/her sentence requirements. SCRAM was piloted early in Oklahoma but not continued at that time, although improvements since might again merit consideration, according to the director of the state’s department of corrections. (<http://www.redding.com/news/2007/apr/10/anklets-used-to-detect-alcohol-abuse-in-dui>)

To deal with the persistent problem of actual delivery of drug remedies to offenders, that is, the problem of offenders not taking required drugs as part of their treatment, scientists for a project funded by the European Commission develop a “prosthetic tooth, just two molars in size, containing a reservoir, valve and programmable timing controls. . . . In a later system, the team hopes to use radio-frequency identification (RFID) and later GSM telephony to communicate with the system.” A *Wired* commentary notes that the UK is moving quickly to imbed RFID into

## Managing Increasing Aging Inmate Populations Oklahoma Department of Corrections—April 2009

offenders for better surveillance tracking, which would seem easily combined with the “tooth” to enhance implementation even when faced with recalcitrant offenders.  
(<http://www.sciencedaily.com/releases/2008/01/080116165627.htm>;  
<http://blog.wired.com/sterling/2008/01/arphid-watch-lo.html>)

The Dana Foundation publishes a report on a feasibility study considering the “ethical considerations in using pharmacology to prevent addiction relapse” among parolees. The report looks at the use of extended-release naltrexone, which was approved by the Food and Drug Administration for treatment of alcoholism. The report was instigated in part because “The gap between therapeutic opportunity and actual clinical practice in addiction treatment (not only in criminal justice populations) is about to widen with the introduction of extended-release versions of existing drugs and rapid advances now being made in the development of other anti-craving drugs and, potentially, vaccines targeted at drugs of abuse. In short, we appear to be on the threshold of major advances in the pharmacological management of addiction.” The report focuses on a variety of methods of delivering the drugs to abusers, ranging from most to least voluntary, concluding that conditions do exist even for the proper ethical use of the more mandatory approaches but leans toward the voluntary.  
(<http://www.dana.org/news/cerebrum/detail.aspx?id=13932>)

Researchers at the Massachusetts Institute of Technology report research indicating the “[e]xplanations of psychological phenomena seem to generate more public interest when they contain neuroscientific information.” They warn, however, that “[e]ven irrelevant neuroscience information in an explanation of a psychological phenomenon may interfere with people’s abilities to critically consider the underlying logic of this explanation.”  
(<http://www.mitpressjournals.org/doi/abs/10.1162/jocn.2008.20040?cookieSet=1&journalCode=jocn>)