Clinical Treatment for Methamphetamines

Obert JL. London ED. Rawson RA. **Incorporating brain research findings into standard treatment: an example using the Matrix Model.** *Journal of Substance Abuse Treatment. 23(2):107-13, 2002 Sep.*

One way to promote the goal of broadening the application of research to applied **treatment** is through the development and dissemination of empirically supported **clinical treatment** manuals. NIDA and NIAAA have published a series of manuals that delineate specific psychotherapies and/or behavioral approaches designed for the **treatment** of drug and alcohol abuse. This article describes a manualized **treatment** approach, the Matrix Model, which incorporates several of these psychosocial interventions with some basic explanations of recent brain research to form a comprehensive, multi-component model of outpatient stimulant abuse **treatment**. A large multi-site trial sponsored by CSAT compares the Matrix Model of outpatient **treatment** with **treatment** as usual in 7 sites where **methamphetamine** is a significant problem. The translation and adaptation of the Matrix manual for cocaine users in Mexico and **methamphetamine** users in Thailand will offer opportunities to evaluate this approach with very diverse populations of stimulant users.

Volkow, N D 1,2,3,5; Fowler, J S 4; Wang, G-J 3; Swanson, J M 6 **Dopamine in drug abuse and addiction: results from imaging studies and treatment implications.** *Molecular Psychiatry. 9(6):557-569, June 2004.*

The involvement of dopamine in drug reinforcement is well recognized but its role in drug addiction is much less clear. Imaging studies have shown that the reinforcing effects of drugs of abuse in humans are contingent upon large and fast increases in dopamine that mimic but exceed in the intensity and duration those induced by dopamine cell firing to environmental events. In addition, imaging studies have also documented a role of dopamine in motivation, which appears to be encoded both by fast as well as smooth DA increases. Since dopamine cells fire in response to salient stimuli, the supraphysiological activation by drugs is likely to be experienced as highly salient (driving attention, arousal conditioned learning and motivation) and may also reset the thresholds required for environmental events to activate dopamine cells. Indeed, imaging studies have shown that in drug-addicted subjects, dopamine function is markedly disrupted (decreases in dopamine release and in dopamine D2 receptors in striatum) and this is associated with reduced activity of the orbitofrontal cortex (neuroanatomical region involved with salience attribution and motivation and implicated in compulsive behaviors) and the cingulate gyrus (neuroanatomical region involved with inhibitory control and attention and implicated in impulsivity). However, when addicted subjects are exposed to drug-related stimuli, these hypoactive regions become hyperactive in proportion to the expressed desire for the drug. We postulate that decreased dopamine function in addicted subjects results in decreased sensitivity to nondrug-related stimuli (including natural reinforcers) and disrupts frontal inhibition, both of which contribute to compulsive drug intake and impaired inhibitory control. These findings suggest new strategies for pharmacological and behavioral **treatment**s, which focus on enhancing DA function and restoring brain circuits disrupted by chronic drug use to help motivate the addicted subject in activities that provide alternative sources of reinforcement, counteract conditioned responses, enhance their ability to control their drive to take drugs and interfere with their compulsive administration.

Rawson, Richard A. 1; Marinelli-Casey, Patricia 1; Anglin, M. Douglas 1; Dickow, Alice 2; Frazier, Yvonne 3; Gallagher, Cheryl 4; Galloway, Gantt P. 5; Herrell, James 4; Huber, Alice 1; McCann, Michael J. 6; Obert, Jeanne 7; Pennell, Susan 8; Reiber, Chris 1; Vandersloot, Denna 9; Zweben, Joan 10; the **Methamphetamine Treatment** Project Corporate Authors * **A multi-site comparison of psychosocial approaches for the treatment of methamphetamine dependence.** *Addiction. 99(6):708-717, June 2004.*

Aims The Center for Substance Abuse Treatment (CSAT) Methamphetamine Treatment Project (MTP) is the largest randomized clinical trial of treatments for methamphetamine (MA) dependence to

date. The objective of the study was to compare the Matrix Model, a manualized treatment method, with treatment-as-usual (TAU) in eight community out-patient settings in the Western United States.

Design Over an 18-month period between 1999 and 2001, 978 treatment-seeking, MA-dependent people were randomly assigned to receive either TAU at each site or a manualized 16-week treatment (Matrix Model).

Setting The study was conducted as an eight-site out-patient trial, with six sites located in California and one each in Montana and Hawaii.

Findings In the overall sample, and in the majority of sites, those who were assigned to Matrix treatment attended more clinical sessions, stayed in treatment longer, provided more MA-free urine samples during the treatment period and had longer periods of MA abstinence than those assigned to receive TAU. Measures of drug use and functioning collected at treatment discharge and 6 months post-admission indicate significant improvement by participants in all sites and conditions when compared to baseline levels, but the superiority of the Matrix approach did not persist at these two timepoints.

Conclusions Study results demonstrate a significant initial step in documenting the efficacy of the Matrix approach. Although the superiority of the Matrix approach over TAU was not maintained at the post-treatment timepoints, the in-treatment benefit is an important demonstration of empirical support for this psychosocial treatment approach.

Richard A. Rawson, Patricia J. Marinelli-Casey, Alice Huber. **A multisite evaluation of treatment of methamphetamine dependence in adults.** *New Directions for Evaluation* Volume 2002, Issue 94 **,** Pages 73 - 88

Kantak, Kathleen M. **Vaccines Against Drugs of Abuse: A Viable Treatment Option?** *Drugs. 63(4):341-352, 2003.*

Drug addiction is a chronically relapsing brain disorder. There is an urgent need for new **treatment** options for this disease because the relapse rate among drug abusers seeking **treatment** is quite high. During the past decade, many groups have explored the feasibility of using vaccines directed against drugs of abuse as a means of eliminating illicit drug use as well as drug overdose and neurotoxicity.

Vaccines work by inducing drug-specific antibodies in the bloodstream that bind to the drug of abuse and prevent its entry into the brain. The majority of work in this area has been conducted with vaccines and antibodies directed against cocaine and nicotine. On the basis of pre**clinical** work, vaccines for cocaine and nicotine are now in **clinical** trials because they can offer long-term protection with minimal **treatment** compliance. In addition, vaccines and antibodies for phencyclidine, **methamphetamine** and heroin abuse are currently under development. An underlying theme in this research is the need for high concentrations of circulating drug-specific antibodies to reduce drug-seeking and drug-taking behaviour when the drug is repeatedly available, especially in high doses.

Although vaccines against drugs of abuse may become a viable **treatment** option, there are several drawbacks that need to be considered. These include:

I. a lack of protection against a structurally dissimilar drug that produces the same effects as the drug of choice;

II. a lack of an effect on drug craving that predisposes an addict to relapse; and

III. tremendous individual variability in antibody formation.

Forced or coerced vaccination is not likely to work from a scientific perspective, and also carries serious legal and ethical concerns.

All things considered, vaccination against a drug of abuse is likely to work best with individuals who are highly motivated to quit using drugs altogether and as part of a comprehensive **treatment** programme. As such, the medical **treatment** of drug abuse will not be radically different from **treatment** of other chronic diseases.

Galloway GP, Marinelli-Casey P, Stalcup J, Lord R, Christian D, Cohen J, Reiber C, Vandersloot D. **Treatment-as-usual in the methamphetamine treatment project.** *J Psychoactive Drugs*. 2000 Apr-Jun;32(2):165-75.

The Methamphetamine Treatment Project is a multisite trial that compares the effectiveness of eight models of outpatient treatment for methamphetamine dependence to that of the Matrix model. These eight "treatment-as-usual" models represent diverse approaches developed in a variety of settings to serve markedly different populations. The theoretical foundations of these treatments are described as well as the settings in which they are delivered. To facilitate comparisons, details are presented with respect to frequency of group and individual sessions, duration of treatment, therapist qualifications, and access to ancillary services. The populations served by these programs vary with respect to race and ethnicity. Most programs serve primarily non-Hispanic Caucasians, but some programs serve significant proportions of Hispanics, Asians, Pacific Islanders, and Native Americans. Usual route of administration of methamphetamine also varies by site, with snorting, smoking, and injecting each reported as the most common route of administration at one or more sites. The Minnesota model and cognitive-behavioral approaches are most commonly used in these programs, although contingency management and psychodynamic approaches are also represented. The intensive phase of treatment ranges between four and 24 weeks; the number of hours per week of client contact varies between one and 13. This trial will provide the opportunity to test the effectiveness of a wide range of treatments currently in use in community settings.

Anglin MD, Burke C, Perrochet B, Stamper E, Dawud-Noursi S. **History of the methamphetamine problem.** *J Psychoactive Drugs.* 2000 Apr-Jun;32(2):137-41.

Methamphetamine, called meth, crystal, or speed, is a central nervous system stimulant that can be injected, smoked, snorted, or ingested orally; prolonged use at high levels results in dependence. Methamphetamine (MA) is a derivative of amphetamine, which was widely prescribed in the 1950s and 1960s as a medication for depression and obesity, reaching a peak of 31 million prescriptions in the United States in 1967. Until the late 1980s, illicit use and manufacture of MA was endemic to California, but the MA user population has recently broadened in nature and in regional distribution, with increased use occurring in midwestern states. An estimated 4.7 million Americans (2.1% of the U.S. population) have tried MA at some time in their lives. Short- and long-term health effects of MA use include stroke, cardiac arrhythmia, stomach cramps, shaking, anxiety, insomnia, paranoia, hallucinations, and structural changes to the brain. Children of MA abusers are at risk of neglect and abuse, and the use of MA by pregnant women can cause growth retardation, premature birth, and developmental disorders in neonates and enduring cognitive deficits in children. MA-related deaths and admissions to hospital emergency rooms are increasing. Although inpatient hospitalization may be indicated to treat severe cases of long-term MA dependence, optimum treatment for MA abusers relies on an intensive outpatient setting with three to five visits per week of comprehensive counseling for at least the first three months. The burgeoning problems of increased MA use must be addressed by adequate treatment programs suitable for a variety of user types.

Freese TE, Obert J, Dickow A, Cohen J, Lord RH. **Methamphetamine abuse: issues for special populations.** *J Psychoactive Drugs.* 2000 Apr-Jun;32(2):177-82.

Methamphetamine (MA) abuse has been a problem in the western United States for decades. However, recently the incidence of MA abuse has risen to epidemic levels in some regions and among particular subgroups of the population. Recognizing the need to develop effective treatments for MA dependence, the Center for Substance Abuse Treatment (CSAT) established a multisite Methamphetamine Treatment Program (MTP) that compares the Matrix Model treatment program for MA to the treatments as usual at seven community-based clinics in California, Montana and Hawaii. Examination of the clients receiving services though this project provides an opportunity to explore particular issues of diverse special populations who are impacted by the problem of MA dependence. These groups include rural Americans, Native Americans, Hawaiians, gay and bisexual males and drug court participants. Specifically, this article examines cultural, geographic and situational barriers to accessing and completing treatment and presents strategies that have been used to overcome these barriers.

Herrell JM, Taylor JA, Gallagher C, Dawud-Noursi S. **A multisite study of the effectiveness of methamphetamine treatment: an initiative of the Center for Substance Abuse Treatment.** *J Psychoactive Drugs*. 2000 Apr-Jun;32(2):143-7.

In 1998, responding to national and regional epidemiological data indicating that methamphetamine (MA) abuse was a growing problem in the United States, the Center for Substance Abuse Treatment (CSAT) initiated a multisite MA treatment study. Through a collaborative approach among CSAT, seven treatment sites, and a coordinating center, the study compares the clinical and cost effectiveness of a manualized, cognitive-behavioral outpatient treatment developed by the Matrix Center in Los Angeles to the treatment approaches currently employed by the treatment sites. The study also explores technology transfer issues associated with integrating the Matrix approach within existing treatment settings. CSAT's approach to the initiation and management of this type of study is discussed.

Substance Abuse and Mental Health Services Administration/Center for Substance Abuse Treatment. (1999). **Treatment for Stimulant Use Disorders.** *Treatment Improvement Protocol (TIP) Series 33.* (DHHS Publication No. (SMA) 99-3296). R.A. Rawson (Consensus Panel Chair). Rockville, MD: U.S. Department of Health and Human Services. http://www.ncbi.nlm.nih.gov/books/bv.fcgi?rid=hstat5.chapter.57310

For example, the Matrix Model, a comprehensive behavioral treatment approach that combines behavioral therapy, family education, individual counseling, 12-Step support, drug testing, and encouragement. for nondrug-related activities, has been shown to be effective in reducing methamphetamine abuse.Â Rawson RA, Marinelli-Casey P, Anglin MD, Dickow A, Frazier Y, Gallagher C, Galloway GP, Herrell J, Huber A, McCann MJ, Obert J, Pennell S, Reiber C, Vandersloot D, Zweben J. A multi-site comparison of psychosocial approaches for the treatment of methamphetamine dependence. Addiction 99:708â€“717, 2003.Â National Admissions to Substance Abuse Treatment Services, DASIS Series: S-31, DHHS Publication No. (SMA) 06-4140, Rockville, MD: DHHS, 2006. Treatment engagement is a well-established performance measure for the treatment of substance use disorders. This study examined whether outpatient treatment engagement is associated with a reduced likelihood of subsequent detoxification admissions. This study used administrative data on treatment services received by clients in specialty treatment facilities licensed in Massachusetts.Â The Matrix model of outpatient treatment was developed during the 1980s in response to an overwhelming demand for cocaine abuse treatment services. The model was constructed using components based upon empirically supported findings from the substance abuse research field.