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# EVIDENCE-BASED PRACTICES FOR TREATMENT OF METHAMPHETAMINE DEPENDENCY: A REVIEW

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Evidence-Based Practices for Treatment of Methamphetamine Dependency:  
A Review

The author would like to thank both Adrienne Crowder and Kerry Manthenga for their guidance. Through these individuals, the project received a strong starting point and overall direction.



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## SUMMARY

Prepared for the Wellington Guelph Drug Strategy, this document explores the history of Methamphetamine (MA), while also outlining its effects on the body and mind. It documents clinical approaches in treating dependency to this powerful stimulant: motivational interviewing, cognitive-behavioural therapy, contingency management, and the Matrix model. It also considers other topics relevant to methamphetamine dependency that may be helpful for service providers.

In considering treatment options, it is recommended that addiction and mental health workers become knowledgeable of methamphetamine's effects on the body, and what clients should expect when discontinuing use of the drug. If a client is not abstaining completely from using MA, knowledge on how to minimize the harms associated with long-term use may be beneficial for the individual's overall health. A summary of essential information can be found in this document, as well as links to methamphetamine-specific resources related to these topics.

Recommended in most treatment manuals for methamphetamine is a nonjudgmental attitude towards the client. When designing a program for MA treatment, using the drug should not be condemned. A more beneficial approach is to focus on the harms that are associated with its use.

Empowering clients in their recovery process is essential in most treatment approaches. Empowerment is essential in motivational interviewing and cognitive-behavioural approaches, ensuring the client's inclusion in the recovery process. However, clients do benefit from assistance in creating a structured schedule, especially in the early days of recovery. Furthermore, service providers would benefit by trusting their instincts if they observe that a client is externally motivated; in cases like these, relying on contingency management principles may be necessary.

The research reviewed suggests programs that are longer in duration are associated with better long-term outcomes. The Matrix Model, a popular strategy to treat MA dependency, prides itself on being a 16-week program which engages its clients throughout the withdrawal process and beyond. Intensive Motivational Interviewing involves more sessions with clients with a mind towards treating more powerful stimulants. This report explores research that indicates treatment duration is associated with better outcomes for the patient.

Service providers may also benefit if provided with manualized treatment models, standardized so that administrative considerations such as staff turnover are accounted





for, yet flexible enough to ensure successful client and staff engagement. Some treatment manuals are available online at no charge whereas others, such as the Matrix Model, must be purchased. Where possible, links to these documents are provided

This report does not intend to provide a comprehensive overview of treatments for MA use, but does note key findings from the research, as well as any evaluations of treatment approaches. While MA dependency does have its unique challenges, patient outcomes are similar to those who use other stimulants. It is hoped that this research can offer a strong starting point for service providers who wish to learn more about methamphetamine and successful treatment approaches.



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## INTRODUCTION

This review explores practice options that are used to treat methamphetamine use. This research is primarily intended for use by frontline service providers and outlines suggested strategies to address dependency to the drug at various stages of the treatment process. The first section covers short-term treatment options: assessing a patient, and includes information on working with intoxicated users or users experiencing overdose. The review moves on to discuss long-term treatment options, such as Cognitive-Behavioural Therapy, Contingency Management, and the Matrix Model. The final section is dedicated to exploring research on current topics in treatment, including comparing inpatient versus outpatient care, harm reduction strategies, the stepped care model, and a discussion of research around pharmacological treatments. Easy-to-access resources will be provided as an appendix for service providers looking for more information.

## METHODS

This report began with an extensive review of currently available treatment manuals that target MA use. Academic articles assessing the efficacy of treatment programs were also targeted to ensure up-to-date evidence supporting these strategies. Additional resources are provided for service providers in the appendix



## BACKGROUND

Methamphetamine (MA) is a stimulant produced through a similar chemical process used to produce amphetamine, although is much more potent (Jenner & Lee, 2008). Amphetamine was first used to treat asthma, as one of its effects is the expanding of the bronchial passage. It was later used to treat narcolepsy, schizophrenia, smoking addiction, low blood pressure, radiation sickness, and even hiccups (Anglin, Burke, Perrochet, Stamper, & Dawud-Noursi, 2000).

MA was not widely used until World War II by Japanese, German, and American soldiers to increase endurance. At a time, it was sold over the counter in Japan to treat fatigue, and also to enhance vitality. After the war, surpluses trickled from military based out into the streets, and Japan began to see high levels of abuse, with some research indicating 10% of abusers experienced MA-induced psychotic symptoms (Anglin, Burke, Perrochet, Stamper, & Dawud-Noursi, 2000).

Following World War Two, legal and functional use of MA and other stimulants persisted. In the mid-20th century, MA was used to treat depression and obesity in the US. The drug was even used to treat heroin addiction, unaware that a new abuse pattern was being created. By the 1970s, dangers of amphetamine use were better understood. (Anglin, Burke, Perrochet, Stamper, & Dawud-Noursi, 2000). Today, MA is second only to cannabis as the most commonly consumed 'illicit' drug (Longo, Wickes, Smout, Harrison, Cahill, & White, 2010). MA was outlawed as a Schedule I drug in Canada in 2005 (Glenda Clarke and Associates, 2009)

## USEFUL KNOWLEDGE FOR SERVICE PROVIDERS

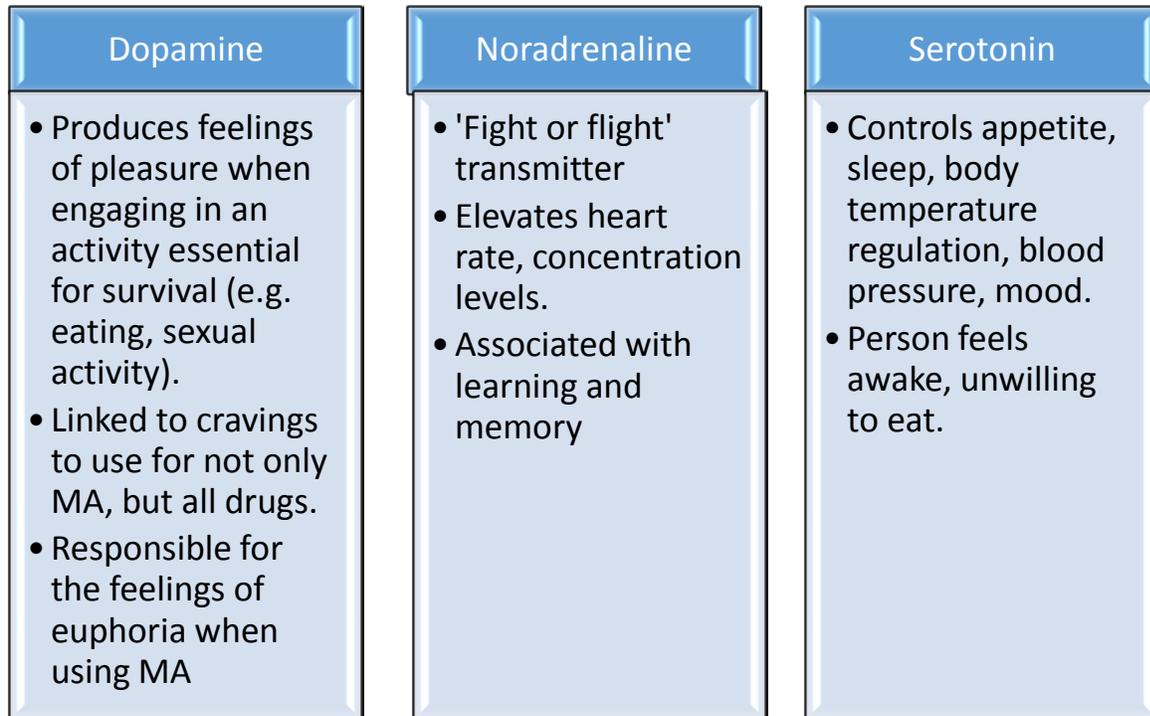
### How Methamphetamine Works

Knowledge of how MA affects the body is important when working with clients, as a knowledgeable clinician may influence positive choices for the client's health, or provide them advance notice of what symptoms they might experience while using or coming off of MA use.

MA works by altering levels of three neurotransmitters in the brain: dopamine, noradrenaline, and serotonin. A summary of their effects on the body can be found in figure one on the next page.



**Figure 1:** Neurotransmitters affected by Methamphetamine



(produced through information found in Jenner & Lee, 2008, p. 15)

MA elevates the levels of these neurotransmitters in the brain, where they remain high for an unnatural length of time (8-24 hours), manifesting in feelings of euphoria, wakefulness, and alertness. After this period, the person may feel somewhat opposite symptoms to the ones they experienced while 'high'. They feel irritable and out of sync, but may still experience difficulty sleeping. Withdrawal can last from a few days to a week (2008, p. 16).

With chronic use, MA starts to injure the brain. Parts of the brain become more tolerant to the drug, requiring more MA to achieve the client's preferable high. Other parts of the brain become over sensitized, which could produce undesirable effects for the individual, including delusions and hallucinations (California Department of Alcohol and Drug Problems, 2007, p. 1). When attempting to abstain from use, the damage begins to reveal itself, as individuals show problems with memory, have mood swings, and "a

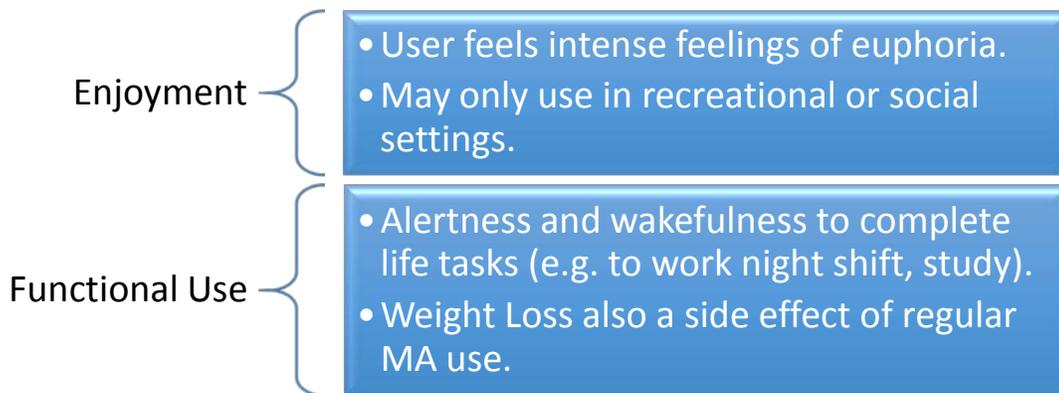


profound loss of ability to experience pleasure” (2007, p. 5). However, through abstinence from MA, clients are able to reverse this process (Jenner & Lee, 2008).

### Understanding and Normalizing Methamphetamine Use

A nonjudgmental attitude is important when working with a user of MA. One way to form an accepting opinion is to understand the reasons why individuals might choose to use. Primary use generally arises out of a combination of curiosity and access to MA (Glenda Clarke and Associates, 2009). If one chooses to sustain their use, they could do so regularly (every day), or binge use, in which there are periods of abstinence between periods of moderate to heavy use (Jenner & Lee, 2008, p. 14). Reasons to sustain use vary, and can be organized into two broad categories:

**Figure 2:** Reasons to Use Methamphetamine



Use can also be context specific. Hunger suppression has been noted through interviews (Glenda Clarke and Associates, 2009). Street-entrenched youth in Vancouver and Victoria substitute MA dependency in place of crack cocaine or heroin addiction, perhaps preferring the sense of alert the drug provides, one claiming that “It holds me together” (Fast, Kerr, Wood, & Small, 2014, p. 44). Often, it is only after prolonged use that the effects on physical and mental health become apparent, and the person understands that the drug is not a healthy substitution (2014, p. 45). One interviewee even suggests that he loves committing crimes while under the influence of MA. While not all MA users may come into contact with police, health, or addictions



service providers, complications arise from sustained MA use that could lead to contact with any of these.

Before considering which treatment option is feasible (and pertinent to your role in the addictions field), there are some essential points to consider. A non-judgmental approach to the client is essential; “there is strong evidence to suggest that one of the most important ingredients of a successful intervention is in building rapport and therapeutic alliance” (Kay-Lambkin, 2008, p. 320). Time will need to be spent engaging the client; reminding of appointments through phone calls or even text messages can improve engagement. With MA dependency, it is thought that the longer a treatment program lasts, the better the outcomes (Kay-Lambkin, 2008, p. 319). Finally, treatment models should be holistic, considering biological, psychological, and social processes (Halkitis, 2009).

Frontline service providers may experience a client with a wide range of emotions, as well as the possibility of intoxication at intake (Obert, et al., 2000, p. 158). The worker must be cognizant of this and not take any undesirable action personally. Rapport building is essential. One way to do this is to normalize the use behaviour:

*For example, instead of "Do you use any drugs, such as methamphetamine?" the medical provider should rephrase the question to "Do you find it difficult to not use drugs when you go out?" or "Have you relied on drugs to help you cope with work or a relationship or to finish job assignments or chores around the house?" By normalizing the behavior, individuals are more likely to feel comfortable about disclosing substance-abuse related issues. (Urbina, 2009, p. 151)*

The Australian Government Department of Health and Ageing provide an assessment template for service providers on page 55 of their MA Treatment Manual. This template can be found [here](#).

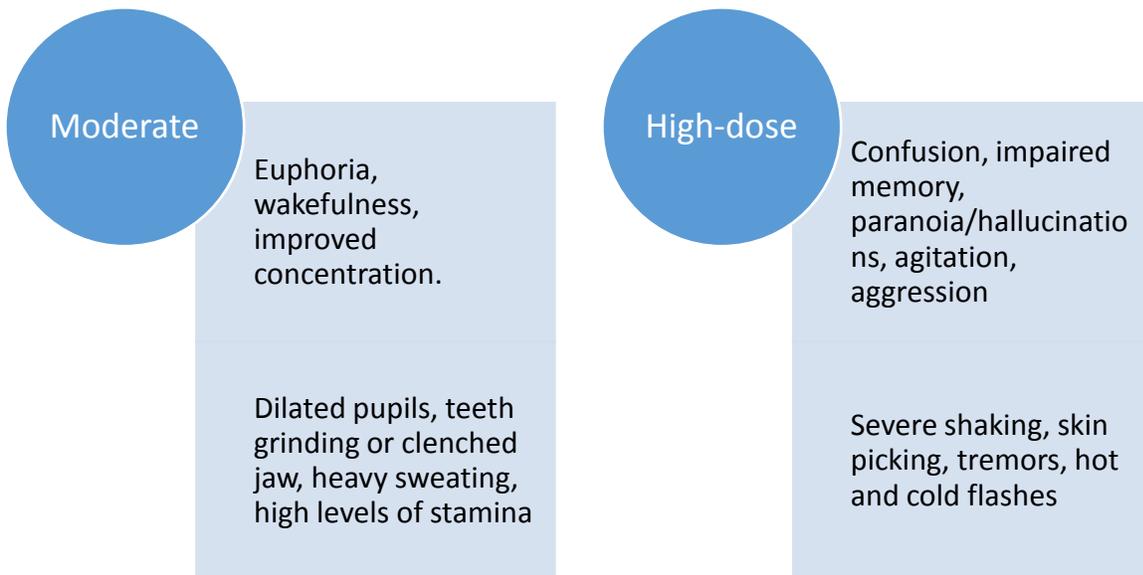
Because of the tendency to engage in risky sexual behaviours, STI testing is recommended if the opportunity is available (Urbina, 2009, p. 153). If injection is the primary mode of consumption, hepatitis A, B, and C testing are also recommended. If the person is intoxicated, hydration with intravenous fluids is often enough to prevent any serious medical complications with the user. (Urbina, 2009, pp. 156-157).



### Managing Intoxication/Overdose

Here are some of the symptoms you might observe in an individual while under the influence in Methamphetamine, in both moderate and high-dose intoxication:

**Figure 3:** Mental and Physical Symptoms of Intoxication



(adapted using information in Koning & Caldwell, 2010, p. 8; and Jenner & Lee, 2008, p. 19).

In situations where a person is in overdose, the client may experience paranoia, delusions, and hallucinations. They may experience tremors, hot and cold flashes, spasms, heart attack, or dangerous adjustments in body temperature (Jenner & Lee, 2008, p. 19). The following situations indicate that emergency medical care is required: the individual experiences chest pain, seizures, or sudden decrease in body temperature, as well as high or low blood pressure. Emergency medical care should also be sought if the person displays psychotic symptoms (Koning & Caldwell, 2010, p. 9).



See [Jenner & Lee](#) (2008, p. 28) for a detailed breakdown on what a service provider could do while waiting for emergency responders.

### Managing Methamphetamine Withdrawal

Thankfully, unlike severe withdrawal from alcohol, withdrawal from MA use is not considered to be life threatening (Koning & Caldwell, 2010; Jenner & Lee, 2008; California Department of Alcohol and Drug Problems, 2007). The severity of withdrawal symptoms experienced by an individual can vary. The quantity ingested, how long the person has been using, and the mode of consumption all impact the severity of symptoms. Injection and smoking of the drug appears to be associated with greater severity of withdrawal symptoms (Koning & Caldwell, 2010, p. 11).

The withdrawal process can be organized into stages:

**Figure 4:** The Withdrawal Process



(using information in Koning & Caldwell, 2010, p. 12; 18).



1. **Crash:** The person may experience exhaustion, low mood, swings in mood, lethargy or irritability, anxiety, agitation, and cravings to use.
2. **Withdrawal:** May experience diarrhea, aches and pains, poor concentration, sleep problems, and a strong urge to use. Mood swings and irritability are common psychiatric symptoms; paranoia and hallucinations are possible but rare.
3. **Recovery:** lasts about 3 weeks; the individual is recovering. While there may be mood swings, depressive symptoms, and problems with sleep, the energy levels begin to return. The urge to use becomes less persistent.

It is important to tell the person what to expect during the withdrawal stage. If possible, ask the client to share their experiences with withdrawal in the past, and determine what strategies were effective and/or ineffective (Jenner & Lee, 2008, p. 47). Recommend plenty of rest, fluids, and nutritious food (Jenner & Lee, 2008, p. 48). They are likely to have heightened emotions during the first weeks or sometimes months of recovery. Physical exercise, proper rest and nutrition appear to reduce the severity of these emotions (California Department of Alcohol and Drug Problems, 2007, p. 6).

### **MA Use and Pregnancy**

MA users who are pregnant are very reluctant to disclose their use, as it could lead to the child being taken away by child services. Developing a professional relationship of trust is essential. It is beneficial to stress the importance of pre- and during pregnancy care for those who are planning to conceive or who have become pregnant (Jenner & Lee, 2008, p. 22). Pregnancy can be a strong motivator for abstinence. If the person is calm, and not intoxicated, try and offer the following findings on MA and pregnancy:

- MA use during pregnancy can cause heart defects or cleft pallet if MA is used in early weeks of pregnancy.
- Risk of premature birth, low birth weight, or possible changes to the brain because proper oxygen and nutrients are not getting to the fetus due to habits associated with MA use.
- Toxicity in third trimester could place baby at significant risk for MA withdrawal immediately after birth (Jenner & Lee, 2008, pp. 22-23).



## EVIDENCE-BASED PRACTICES REVIEW

What does effective methamphetamine (MA) treatment look like? One current treatment manual believes that it “involves a clear, mutually acceptable treatment plan that is designed to meet the needs of the individual” (Jenner & Lee, 2008, p. 2). While MA is addictive, the treatment outcomes associated with it are similar to other drugs of abuse, such as cocaine (Otero, Boles, Young, & Dennis, 2006, p. 12). This being said, MA dependence treatment is still challenging. Clients who abuse MA have high rates of treatment incompleteness, severe cravings, and the presence of depressive symptoms during withdrawal (Buxton & Dove, 2008; Kay-Lambkin, 2008).

Some current treatment approaches are designed to change the way a client thinks while subsequently attempting to alter their behaviour through this thinking. Other approaches take a more classical conditioning approach to changing behaviour (Lee & Rawson, 2008). Some prefer a more comprehensive approach through the use of the Matrix model, which was developed in the early 1980s in response to the perceived ineffectiveness of cocaine abuse treatments at the time (Obert, et al., 2000). The outcome goal for most of these treatment options is MA abstinence. This report is divided into three main sections. First, immediate and short term practice recommendations, for initial assessment and managing short-term withdrawal symptoms, will be discussed. Long-term treatment options will then be analyzed. Finally, current topics being discussed that involve MA treatment will be detailed.

### Intensive Motivational Interviewing

Motivational interviewing is perhaps the most widely embraced approach by clinicians (Carroll, 2014). It is an intervention strategy that is designed to increase the willingness to change behaviour within the client (Korcha, Polcin, Evans, Bond, & Galloway, 2014). By interviewing the client, you can build upon the information they provide to convince them to discontinue use. It focuses especially on the initial resistance and inability to properly assess one’s situation while in the early stages of recovery. However, it is a tactic that can be used throughout the recovery process (Halkitis, 2009, p. 112).

Through using MI, it is thought that you are able to both measure and improve a person’s willingness to discontinue use (Martin, Christopher, Houck, & Moyers, 2011). Proponents of MI argue that a client’s motivation to change is central to the treatment of addiction. One significant finding pertaining to the use of MI is evidence that if clients show low motivation for change at intake, MI may be more suitable than other treatment



options. This was most notably observed in Project MATCH (Matching Alcoholism Treatments to Client Heterogeneity) (Project MATCH Research Group, 1993).

Researchers for Project MATCH found limited support for clients with low motivation at intake having better odds at long-term abstinence from alcohol if MI was used in treatment as opposed to Cognitive Behavioural Therapy and traditional 12-Step therapy (Carbonari, Zweben, Morrel, & Lee, 2001, p. 211). Recent secondary analyses of the original project match data have found similar results (Witkiewitz, Hartzler, & Donovan, 2010).

While Project MATCH assessed the efficacy of treatment programs for alcohol dependency, the use of MI to improve treatment outcomes for MA dependence has also been assessed, and has shown to be effective in increasing the willingness to change in MA users (Huang, Tang, Lin, & Yen, 2011). Moreover, it has been adapted from its original format to accommodate for the unique challenges of MA dependency. Researchers adapted MI from a 1-3 session therapy strategy into an intensive 9 session intervention, calling it Intensive Motivational Interviewing (IMI) (Galloway, Polcin, Kielstein, Brown, & Mendelson, 2007)

It was adapted “as a way to assist clients with illicit drug disorders who might benefit from a larger dose of MI” (Korcha, Polcin, Evans, Bond, & Galloway, 2014, p. 114). Research on IMI has found that, while it is effective in treating MA dependency, it does not improve outcomes significantly over traditional MI (Polcin, Bond, Korcha, Nayak, Galloway, & Evans, 2014). Most of the same researchers testing the efficacy of IMI in another study treating clients with co-occurring MA and alcohol dependency found that the program was only effective for women (p. 117).

While the efficacy of MI or IMI to treat MA dependency has not been conclusively proven, there is evidence to suggest it is a legitimate treatment option.

## **Cognitive Behavioural Therapy**

Cognitive Behavioural Therapy (CBT) is based on social learning theory, and views substance use as an adapted behaviour that coexists with distorted beliefs about the need to use (Halkitis, 2009, p. 110). This approach was first adapted to treat addiction by Marlatt and Gordon (1985). Practitioners who use CBT believe that as addiction progresses, the client experiences diminished ability to control their behaviour. In this context, CBT is based in a school of thought that underlying learning processes factor in



to substance addiction (DeVito, Worhunsky, Carroll, Rounsaville, Kober, & Potenza, 2012, p. 228). It asks the client to understand the role that substance abuse plays in the individual's life, and teaches them relapse coping skills (Buxton & Dove, 2008, p. 1538).

Craving control is also central to CBT. Clients are taught to recognize the thoughts that are likely directed by substance abuse. It teaches that small decisions, like the decision to avoid certain social networks or environments, could have big implications. Clients are provided with tools to develop problem solving skills, and are taught ways to assertively say no to substances (Carroll, 2014, p. 100)

This approach has been found effective in increasing abstinence rates, as well as the self-efficacy of the client to discontinue use (Lee & Rawson, 2008, p. 315). One report assessing the neurological changes in clients of CBT found decreases in fMRI brain activity after treatment, in regions that are associated with response impulsivity and other "processes widely proposed to contribute to addiction" (DeVito, Worhunsky, Carroll, Rounsaville, Kober, & Potenza, 2012, p. 233).

Despite research on CBT finding that it can be effective, it is not always adopted into clinical practice. This is thought to be the case for three reasons. First, there are not many high-quality training programs available. Second, the cost of training clinicians and the relative complexity of the treatment program is quite high when properly implemented. Lastly, high rates of turnover in the field make the training-cost implications more severe, leading to a lack of a CBT-trained workforce (Olmstead, Ostrow, & Carroll, 2010, p. 200).

### **Computer-Assisted Cognitive-Behavioural Therapy (CACBT)**

More recently, due to scarce resource allocation to addiction services, there has been an attempt to make treatment more affordable through computer-based CBT. It is software that runs much like online training modules we occasionally encounter, organizing information into modules, displaying material through text, graphic illustration, videotaped lessons, audio voiceovers, and practice questions. At the end of each module, the client takes an assessment test (Olmstead, Ostrow, & Carroll, 2010, p. 201)

One trial comparing treatment groups, one receiving treatment as usual, and the other receiving treatment plus CACBT, found the computer-assisted group reported significantly more drug-free urine samples during treatment. However, in this case, it is



difficult to argue that the treatment was cost-effective, as it was used in addition to treatment available (Olmstead, Ostrow, & Carroll, 2010). However, these authors used 'robustness checks' to determine that the costs associated with setting up a treatment centre, complete with computer lab, will eventually be more cost-effective than classic counselling treatment (Olmstead, Ostrow, & Carroll, 2010, p. 203). More research is required to test its effectiveness as a replacement, rather than a supplement.

While other modes of counselling, such as group therapy, are cost effective, CBT is a complex exercise if implemented correctly. It is possible that group settings "dilute the dose of treatments" (Carroll, 2014, p. 101). This makes the potential for computer-assisted CBT even more exciting. While the treatment is less personal, it is individualized, ensuring that none of the participants miss any exercises or opportunities to speak.

### **Contingency Management**

One reason MA is thought to be addictive because of the initial intense reinforcing that accompanies using (DeVito, Worhunsky, Carroll, Rounsaville, Kober, & Potenza, 2012). Use makes the client feel good, which leads to further desire to use. It is the hallmark of classical conditioning. Contingency Management (CM) is based on this classical conditioning, where positive reinforcement is used to reward desired behaviour (Buxton & Dove, 2008; Carroll, 2014). It was first used in addiction services as a complement to the methadone maintenance problems (Carroll, 2014, p. 96).

Within the addiction services context, CM is thought to have four core principles (Higgins, et al., 1991):

1. Monitoring of drug use to quickly identify an abstinent or substance-use period. In the case of methamphetamine use, drug screening should be planned in accordance with the half-life of the drug (Carroll, 2014, p. 97).
2. Use positive reinforcement when abstinence is identified.
3. At the very least, substance use should result in loss of reinforcement.
4. Emphasis on developing reinforcement.



In many cases, CM programs will incorporate mandatory attendance of 12-step meetings and use of a sponsor system into the program, rewarding for attendance (Halkitis, 2009, p. 114).

One of the criticisms of CM is the potentially high costs associated with the incentives, (e.g. gift cards), as well as the urine screen tests used to prove sobriety (Carroll, 2014). Petry and Martin (2002) offer a solution: provide access to large (and likely expensive) reinforcers, but create a low-probability way to secure them. However, CM has also been criticized on ideological grounds, in that it rewards the user for behaviour that they should be discontinuing for their own good (Carroll, 2014, p. 98). In other words, judgmental attitudes toward addiction tend to be incongruent with this therapy method. Furthermore, as with any treatment mode, training will be an ongoing issue.

Research on CM finds evidence it is effective for other substances of abuse (Carroll, 2014). It has been found to produce benefits in MA treatment, but its ability to sustain abstinence after treatment has been completed has been called into question (Lee & Rawson, 2008, p. 316). Honesty on the part of treatment programs, and a more standardized version of what qualifies as success is also needed (Carroll, 2014, pp. 103-104). Is it enough to remain abstinent, or absent from illegal activity? Or must social functioning improve as well? With standardization and honest outcome reporting, the current treatment modes can be better analyzed.

## Harm Reduction

“Harm reduction is a pragmatic public health approach to reducing the negative consequences of risky behaviours” (Canadian Nurses Association, 2011, p. 13). Within the stepped care model approach, it could be a first step in engaging some individuals in a treatment program. In some cases, clients cannot be convinced to discontinue use. Harm reduction strategies are thought to maximize engagement in both cases, whether as a first step to longer-term treatment or as a treatment outcome in itself (Kay-Lambkin, 2008, p. 320).

The following are some recommendations that are based on the philosophy of harm reduction: MA users have a tendency to not eat or drink enough. To reduce harms associated with use, consistent water consumption, even while intoxicated, is recommended. When not using, a balanced diet helps to reduce long-term harm. If solid foods cannot be tolerated while intoxicated or going through withdrawal, suggest to the client that high protein drinks or smoothies could operate as a meal replacement



(Jenner & Lee, 2008, p. 21). MA users also experience wakefulness, which can lead to a lack of sleep when clients binge use.

In addition to these basic recommendations, it is recommended that users mitigate social harms as well through strategic planning. One recommendation is that the client make a weekly schedule, and to have at least some days in the week where they abstain from MA use. Avoid using before work or important social engagements (Jenner & Lee, 2008, p. 22).

### **Poly-Substance Use**

Clients who use other substances in addition to MA benefit from understanding the interactive effects of the drugs. An excellent chart which explains these effects can be found on p. 50 of [this document](#), but here are some examples:

- When used with alcohol, there is a possibility that breathing and heart rate could be depressed.
- When used along with other psychostimulants (cocaine or ecstasy), risk of heart attack or stroke increases.
- Possible dangerous rise in blood pressure found when used while taking antidepressants.

### **The Stepped Care Model**

The Stepped Care model prescribes that the least intrusive treatment options are offered to clients first, and increasing the intensity of treatment if the less intrusive options are ineffective. It begins with an initial assessment, where frequency of use, co-occurring issues, goal establishment and prioritization are discussed (DrugInfo Clearinghouse, 2008). While frequent monitoring is essential, steps should be taken to ensure the client feels comfortable, to increase their chances of staying in treatment (Kay-Lambkin, 2008, p. 322). Treatment options are scaled up or scaled down, depending on the client's agitation level or need.

An example of a Stepped Care model can be found in a MA treatment manual published in New Zealand (Koning & Caldwell, 2010, p. 13). Focusing on withdrawal, they rank type of detoxification based on level of intrusiveness: community, home-based, social/respite based, and hospital based. Hospital-based detox is only considered as a last resort.



### Outpatient Approach: The Matrix Model

The Matrix Model incorporates elements from CBT and CM, as well as additional elements. It is the model that receives the most attention, and is also highly regarded in the professional community for its ability to treat methamphetamine addiction (Halkitis, 2009, p. 109). It is a 16-week program with 48 sessions, designed as an outpatient program that focuses on drug discontinuation through education about the substance, information on relapse, educating support networks, and constant monitoring through urine screen analysis (Halkitis, 2009, p. 111).

These 48 treatment sessions are broken down by methodology and by topic. There are only four full individual treatment sessions (Rawson, et al., 2004, p. 710). In the first phase of the program, there are also Recovery Groups, where clients can have discussions with others going through the early recovery process. These groups are smaller in size than others that appear later in the treatment model. Throughout the program, there are also relapse prevention groups. There are twelve sessions in which the client's social network is invited to learn all about the effects of MA on the brain, theories on addiction, and medical effects. The treatment program should also help establish new social support groups through recreational activities and clubs, so that new social connections can be made outside of circles where substance abuse is common, improving long-term treatment outcomes. Four sessions are dedicated to developing social support groups and 12-step attendance is encouraged (Obert, et al., 2000, pp. 159-161).

The Matrix Model has been found to produce favourable differences during treatment, but not necessarily at discharge or follow-up (Buxton & Dove, 2008). One of the favourable results that have been found is that Matrix model clients stay in treatment longer, and are more likely to complete treatment (Rawson, et al., 2004, pp. 712-713). It is also more likely than CBT or CM alone to produce more negative urine samples, significantly reducing MA use by the end of treatment completion (Rawson, et al., 2004, p. 716). In one in-depth analysis, clients who were offered Matrix model therapy were able to drastically improve their social lives and secure employment. However, it was not shown to help alleviate adverse mental or physical health symptoms (Obert, et al., 2000, p. 163).

The Matrix model is beneficial because of its relative standardization and accessibility: it is manualized, and takes the service provider from start to finish in MA treatment (Galloway, et al., 2000). By providing this structure, supervisors can easily teach and



monitor those that work for them. These manuals also are useful to help train clinicians in remote locations (Obert, et al., 2005). However, reshaping of one's belief system may be required to implement this treatment program. The contents of the program may contradict more traditional beliefs about addiction. Some examples: someone needs to 'bottom out' to want to help themselves, confrontation is inevitable, or strong disincentives are required. (2005, pp. 233-234).

More information about the Matrix model, including information about manual purchase can be found [here](#).

## ADDITIONAL TREATMENT CONSIDERATIONS

### Psychotic Symptoms and Co-Occurring Mental Disorders

Treating co-occurring mental health issues (MHIs) and substance use disorders (SUDs) is a major ongoing topic in both the addiction and mental health literatures (Chan, Huang, Bradley, & Unutzer, 2014; Lichenstein, Spirito, & Zimmerman, 2010; Sacks, Chaple, Sacks, McKendrick, & Cleland, Randomized trial of a re-entry modified therapeutic community for offenders with co-occurring disorders: Crime outcomes, 2012). It is a prominent topic due to the frequent co-occurrence of SUDs and MHIs in those treated for MA use (Perron, Bunker, Bender, Vaughn, & Howard, 2010, p. 1263). Furthermore, there is a troubling trend in the research findings that co-occurring disorders (CODs) are not receiving the unique treatment they require.

For example, in one analysis of publically available treatment guidelines from the National Guideline Clearinghouse in the US, where eleven guidelines addressed CODs, "none of the guidelines making recommendations for treatment of co-occurring disorders included outcomes that clearly targeted both substance use and mental health disorders" (Perron, Bunker, Bender, Vaughn, & Howard, 2010). In another study which interviewed substance use treatment providers as well as community-based mental health providers, Lichtenstein, Spirito, and Zimmerman (2010) found that both groups reported low rates of using formal assessment practices or recommended treatment practices for CODs (p. 252). While interest in the topic arises partially out of the high prevalence rates of CODs within those with addictions, interest is likely also aroused by the current lack of integrative treatment options.

Generally, there is a trend in this literature of calls for integrated treatment of MHIs and SUDs (Sun, 2012; Lichtenstein, Spirito, & Zimmerman, 2010). While integrated



approaches which address both the SUD and MHI are more expensive to run, research suggests that those who receive integrated treatment experience more favourable mental health outcomes than targeting one over the other (Watkins, et al., 2014), or targeting one issue at a time (Chan, Huang, Bradley, & Unutzer, 2014). Based on information currently available, there should be no reluctance to treat suspected underlying MHIs within those suffering from an SUD, and concurrent treatment seems advisable (Chan, Huang, Bradley, & Unutzer, 2014).

Research suggests that treatment considerations should also take into account the client's social situation, while ensuring treatment of both the SUD and MHIs. Consider the following four examples:

An-Pyng Sun (2012) suggests four components of an effective strategy to address COD concerns in the homeless community: a transition plan for these individuals from the institution (e.g. hospital, foster care, residential treatment) to the community, helping these individuals apply for available government funding, linking them to affordable housing, and finally, incorporating treatment strategies that target their addiction and mental health issues. Sun observes a 'chicken-and-egg' dilemma in the homeless literature; a debate as to whether individuals should be treated for their CODs or SUD prior to finding housing, or whether housing should be provided first. Based on her literature review, she found that providing access to housing prior to treatment is associated with better retention rates and treatment outcomes (2012, p. 28). She also recommends harm reduction strategies with this population which often struggles with the goal of total abstinence (2012, p. 31).

Sacks and colleagues (2012) designed a treatment program for offenders with CODs re-integrating into the community, calling it a modified treatment community. It is a program which provides offenders with a great deal of daily structure and attempts to foster self-reliability as they re-integrate into the community, while also providing treatment for SUDs and MHIs and found that their modified treatment community. They found it was able to reduce recidivism rates compared to traditional parole treatment (p. 255). Their program addresses common issues that prisoners face as they re-integrate into the community, so these issues do not exacerbate problems with SUDs or MHIs.

King, Duan and Amaro (2015) provide primary healthcare providers with knowledge about the particular needs of pregnant women with CODs. Comparing pregnant and non-pregnant women who enrolled in their intention-to-treat study 'Women, Co-occurring Disorders and Violence', they found that pregnant women exhibited more social



vulnerability (young, less likely to be employed, less overall income), but a better clinical profile (less severe addiction scores, using Addiction Severity Index) (2015, p. 183). Based on their findings, which suggest pregnant women suffering from COD enter a period of lower behavioural health risk while carrying their child, that it could provide an opportunity for an intervention that targets the behaviours associated with an SUD (2015, p. 185).

Finally, Reedy and Saunders (2013) examined the particular vulnerability experienced by adolescents with CODs, finding that interaction with peers who engage in risky behaviours partially mediates the relationship between the individuals SUD and MHI. Mainly, “adolescents who had more peers who participated in deviant activities had more severe SUDs and MHIs (2013, p. 57). The authors conclude that those working with adolescents should be mindful that SUDs are likely related to problems at school or home, or legal problems (2013, p. 50). Furthermore, encouragement to not associate with these groups should be a primary recommendation with adolescent populations (p. 57).

While much of the research above does not address MA use specifically, Kolodny (2006) investigates the relationship between MA dependency and MHIs, believing that treating CODs will improve MA treatment outcomes. He generally supports the treatment of MA dependency and underlying MHI issues concurrently, as the treatment of the underlying MHI issue affords the patient the opportunity “to cope better with recovery” (2006, p. 70). While acknowledging that it is difficult to determine whether symptoms exhibited are due to the SUD or the MHI, Kolodny suggests that some of the symptoms MA users experience greatly resemble symptoms of other MHIs; for example, withdrawal from MA looks much like a major depressive episode. In this case, the news is good for service providers, as the symptoms should diminish over time (2006, p. 69-70). He recommends that the following psychiatric disorders be checked for when dealing with a client with MA dependency: polysubstance abuse and dependence, depression, bipolar disorders, anxiety disorders, post-traumatic stress disorders, and personality disorder (2006, p. 70).

Furthermore, psychosis, or disconnect from reality, is possible in individuals who use MA. In one instance it was found that 60% of MA abusers report paranoia, delusions, or hallucinations (Salo, Fassbender, Iosif, Ursu, Leamon, & Carter, 2013). However, it is likely too strong to say that drug use causes psychosis. If this were the case, 100% of the sample above would report psychotic symptoms. Some possibilities are that the MA



users may be self-medicating a mental illness, or that some may be pre-disposed to being pushed over the edge by drug use, known as the stress-vulnerability model (2013, p. 530). Convincing evidence has been found that ADHD-relevant childhood behaviours are associated with MA-induced psychotic symptoms (2013, p. 533).

It is very difficult to differentiate between MA-induced psychosis and other mental conditions in which psychotic symptoms are present, such as schizophrenia or anxiety (Jenner & Lee, 2008, p. 31). An accurate mental health history is recommended, once possible. MA-induced psychotic symptoms could manifest for 1-2 weeks after use, but should stop with abstinence and proper nutrition (California Department of Alcohol and Drug Problems, 2007, p. 31). If they persist, a more in depth evaluation of the patient's mental health as well as admission to acute care is required (Koning & Caldwell, 2010, p. 10).

### **Inpatient vs. Outpatient Care**

Before digging into the findings, a quick point should be made on the comparison of inpatient to outpatient addiction treatment in general: comparing the two is challenging, as characteristics of individuals in both types of treatment are different. For example, individuals who are confident in their ability to abstain from use, as well as the employed are less likely to enter residential treatment (Moos & King, 1997, p. 73). Sometimes, the choice is not available to the client, as they are sometimes mandated to attend residential treatment. As long as the client's home environment is deemed a suitable place for recovery, outpatient treatment preferred (Witbrodt, Bond, Kaskutas, & Jaeger, 2007).

Studies that compare treatment completion and long-term abstinence clients in inpatient versus outpatient care have been mixed. Witbrodt and colleagues, investigating clients with alcohol or drug use, found that outcomes for day hospital versus community residential treatment were similar (2007, p. 956), and that it was length of stay in treatment program (in- or outpatient) and commitment to 12-step programs that were associated with longer-term abstinence. Other research suggests that inpatient treatment programs can produce some improvement in a person's social problems and psychiatric symptoms, but the differences were minor (Guydish, Werdegar, Sorensen, Clark, & Acampora, 1998, p. 280).

One common conclusion that has been drawn from these results is that the characteristics of the patient predict outcomes. One study exploring the relationships



between personal characteristics and outcomes in residential treatment found that individuals with more social resources, such as family or abstinent peer networks, and personal resources were more likely to do well in either treatment scenario (Moos & King, 1997, p. 78). A more severe addiction at intake is associated with negative long-term outcomes (Moos & King, 1997), although one study found greater improvement in substance use problems for those displaying more psychiatric symptoms (Laffaye, McKellar, Ilgen, & Moos, 2008, p. 677).

Some studies contrasted outcomes of outpatient vs. inpatient treatment for MA-dependents specifically. McKetin et al (2012), compared residential treatment to detoxification in Australia, finding that residential treatment is clearly beneficial in the short term. The residential treatment programs selected for study sometimes lasted two weeks, others up to three months, whereas detoxification lasted one to two weeks. A control group of users not seeking treatment was found through a needle exchange program. Abstinence was the goal. In all three groups, a reduction in MA use was found after three years; residential treatment had the largest impact at the three month follow-up. While this study does not target the benefits of inpatient versus outpatient specifically, it shows that residential treatment can have short-term benefits, but does not predict long-term abstinence. Benefitting from longitudinal research, they concluded that other factors must determine whether one relapses once re-entering the community (2012, p. 2004).

One study was found which compares inpatient versus outpatient care for methamphetamine users. While inpatient clients showed a slightly greater likelihood of staying in treatment for over 90 days, this difference was small and the authors deem that other factors (i.e. related to chance) contributed to these results rather than true treatment efficacy (Hser, Evans, & Huang, 2005, p. 83). In the programs studied, both inpatient and outpatient clients were able to reduce the severity of their addiction and its consequences after nine months as well. While residential clients experienced more drastic improvement, the effect was not found to be statistically significant (2005, p. 77).

Overall the evidence suggests that both inpatient and outpatient treatment options contribute to improved outcomes for clients. However, it cannot be concluded that one mode of treatment is clearly more effective than the other. While this information does not provide potential treatment programs with a definitive choice, this means there is room for flexibility in the selection of treatment options. If long-term outcomes are no better in either program, clinicians can take into account other factors when offering a



recommendation to a client. For example, personal characteristics can predict who might be more suitable in one program over the other: “someone with healthy relationships on the outside tend to interact better with peers in residential treatment” (1997, p. 73). Impairment in decision making-processes is suggested as a key qualifier for residential treatment (Passetti, et al., 2011).

Determining whether inpatient or outpatient care is best practice for MA-dependent clients is thus determined on a case-by-case basis. Research indicates that the clinicians are freed from the burden of attempting to determine whether inpatient or outpatient treatment produces better long-term results. If baseline problems are more severe, residential treatment has been shown to produce greater improvement. In most treatment models, residential treatment is considered a last resort, and this would be especially true in a Stepped Care system (Jenner & Lee, 2008).

### **Pharmacological Treatments for MA Dependency on the way?**

All manuals focusing on MA-dependence treatment practices acknowledge that no proven pharmaceutical treatment is available that is equivalent to methadone maintenance programs for opiate users (Jenner & Lee, 2008; California Department of Alcohol and Drug Problems, 2007; Koning & Caldwell, 2010). Recent trials testing medications that have been used to treat other psychiatric conditions to see if they can be used as part of a MA-maintenance program have not produced definitive results.

Modafinil, which promotes wakefulness and is used to treat narcolepsy and shift-work sleep disorder, has so far been seen to have a modest but insignificant effect on MA abstinence (Anderson, et al., 2012; Heinzerling, et al., 2010).

Longo *et al* (2010) surveyed five studies looking at the efficacy of dexamphetamine, finding inconclusive results. In their own test of the orally-administered drug and using their scoring methods, they found that the ‘mean degree of methamphetamine dependence’ was lower in the treatment group, and that treatment retention was higher (p. 147; 151).

More recently, Solhi *et al* (2014) put both methylphenidate (a central nervous system stimulant used to treat ADHD, ADD, and narcolepsy) and resperidone (antipsychotic, used to treat schizophrenia, bipolar disorder), to the test using subjects from Iranian clinics. They found that both treatment options reduced cravings and severity of psychiatric symptoms at the end of the three-week trial, with resperidone showing a



more significant effect. Since many cases of MA withdrawal see a reduction in these symptoms over time, it is difficult to determine if these treatment options have a significant effect.

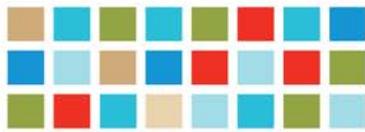
While the development of an effective pharmaceutical treatment option for MA dependency would provide clients with some alleviation from the discomfort that comes with recovery, it is well accepted in the addictions services field that pharmacological treatments are only one part of the addiction recovery process. This is why treatment manuals for MA are heavily focused on motivational interviewing, contingency management, cognitive behavioural therapy, and the Matrix model of treatment (Buxton & Dove, 2008).

## CONCLUSIONS

This report has been designed to educate service providers about current best practices that address MA use. This review attempts to summarize findings in research, as well as treatment manuals already in existence, and is not meant to be comprehensive. However, many strategies have been suggested that could aide a service provider at every step of the MA use process. Resources have been provided to aide at client intake, and to help with intoxication and withdrawal. Current strategies that attempt to help users change behaviour to either drastically reduce or completely eliminate use have also been explored.

It is hoped that the information contained in this manual alleviates any fears service providers might have when treating MA use. While the aggressive behaviour associated with using is a cause for concern, a few strategies have been listed here (with plenty available elsewhere; see appendix) that can help to deescalate these situations. While there are many treatment approaches, a key ingredient appears to be a program long in duration. While many treatment programs are effective in the short term, more strategies and resources may need to be dedicated to long-term maintenance.

Despite these concerns, treatment outcomes for MA dependency are comparable with other stimulants. A well-informed and trained service provider can help improve the odds of better outcomes.



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## APPENDIX: TREATMENT MANUALS

The following treatment manuals (available online) target best practices addressing methamphetamine use:

[Treatment Approaches for Users of Methamphetamine: a practical guide for frontline workers](#) (Australian Government Department of Health and Ageing, 2008)

[Methamphetamine Treatment: A Practitioner's Reference](#), (California Department of Alcohol and Drug Problems, 2007)

[State of the Evidence Review on Best Practices in the Prevention, Treatment and Healing of Methamphetamine Use in Youth](#) (Alberta Research Centre for Child Health Evidence, 2006)

[Interventions and Treatment for Problematic Use of Methamphetamine and Other Amphetamine-Type Stimulants](#) (New Zealand Ministry of Health, 2010)