A Snapshot of Methamphetamine and Drug-Facilitated Crimes

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SOFT-DFC Snapshots are short reports of critical information about the more common drugs associated with drug-facilitated crimes (DFC). They do not have complete literature reviews about the drug or drug class. One key aspect is their focus on the ability to detect a drug after a single-dose administration, as is often the situation in DFC investigations. As such, these summaries also highlight instances in which available data is limited, hoping this will encourage further research studies. Finally, SOFT-DFC Snapshots point to the use of these drugs in actual DFC cases, as cited in the medical and open literature.

Methamphetamine is a sympathomimetic amine and psychostimulant that is used for the treatment of attention-deficit hyperactivity disorder (ADHD) and a second line treatment for narcolepsy, and exogenous obesity. It is also highly addictive and comes with a boxed warning for its potential for overdose, misuse, and poisoning. [1.] It is a Schedule II controlled substance.[2]

Central nervous system stimulants, such as methamphetamine, aren't commonly associated with DFC due to the lack of amnesia and sedation associated with their use. The commonality lies in their negative impact on the user's cognition and their ability to adequately provide consent. Users can experience lowered inhibitions and increased libido. [3]

Drug Class:[4]	Stimulant
Generic Name:	Methamphetamine hydrochloride
Brand Name(s):	Desoxyn, Vicks® Inhaler
Dosage Forms:	Oral tablet (5 mg)
FDA Approval:	Methamphetamine exists as two stereoisomers: l-methamphetamine and d-methamphetamine.[5] D-more commonly associated with prescription use and misuse, as well as illicit exposure. Vicks® Inhaler only contains l-methamphetamine.[6] Methamphetamine alters the release and re-uptake of neurotransmitters: norepinephrine, dopamine and serotonin.[1] To a lesser extent, monoamine oxidase inhibition occurs.[1,7–9]
General Effect Profile:	Methamphetamine has a two-part effect profile: an initial stimulatory phase followed by a secondary withdrawal phase. The initial stimulatory phase effects include improvements in focus and mental alertness, increased energy, decrease in appetite, lowered inhibitions, reduced drowsiness and fatigue, and poor impulse control. Dose dependent acute physiological effects can include increased blood pressure, tachycardia and elevated body temperature as well as mydriasis, bruxism, dry mouth, and sweating. The secondary withdrawal phase can present 24 hours after abstinence, and may manifest with CNS depressant type effects, including exhaustion, agitation, fatigue, sleepiness, and disorientation.[10,11.] This state, also known as the crash phase, may last 1-3 days.
Metabolism/Elimination:	Extensive hepatic metabolism occurs producing two main metabolites catalyzed by CYP2D6; N-demethylation to produce amphetamine (active) and aromatic hydroxylation to produce 4-hydroxymethamphetamine.[8,9,12] Other minor inactive metabolites are also produced. According to the manufacturer, the average elimination half-life of methamphetamine ranges between 4 – 5 hours.[13] An estimated elimination half-life range is 6-15 hours.[14,15] Excretion

occurs primarily in the urine and is dependent on the urine ph. Alkaline urine will significantly increase its half-life.[4,9,12,13] Under normal conditions, up to 43% of methamphetamine is excreted as unchanged parent drug in 24-hour urine, with 4-7% as amphetamine. In acidic conditions, up to 76% can be detected.[16] Methamphetamine urinary half lives in one study were measured to be approximately 23 hours.[17]

Single Dose Studies:

Twenty healthy participants (10 men; 10 women) aged between 21 and 32 years (M=25.4 years, SD=3.28 years), with an average male weight of 75.55 kg (SD=11.47) and an average female weight of 62.9 kg (SD=4.48) were administered 0.42 mg/kg d-methamphetamine. The level of d-methamphetamine detected in blood and saliva at 120 min after drug administration was 72 and 285 ng/ml, respectively, and at 170 min after drug administration was 67 and 223 ng/ml, respectively.[18]

DFC Cases:

Methamphetamine is not believed to be a typical DFC drug of choice due to is stimulating properties; however, significant prevalence is observed in DFC cases, necessitating the analysis and reporting.[19,20] It may be a substance of interest in DFSA cases due to its belief in lowering inhibitions and energizing sexuality.[11] Determining whether someone is in the initial stimulatory phase or the secondary withdrawal (crash) phase by drug concentration is not possible. It is imperative to note impairing effects in each phase could contribute to methamphetamine being a choice substance in DFC cases.[20]

Stimulant positivity has been noted across the world in DFC cases, with methamphetamine being the most, if not one of the most, prevalent stimulants recorded. Positivity has not been linked to proactive versus opportunistic administration of the substance.[20-22]

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