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Meth or Madness

"Speed seems as natural as mom and apple pie – maybe even more so, since today mom is on a diet and the only apple pie in town is made by machines."

-Jim Parker

Meth or Madness

- Prevalence
- Effect of MA use on patient
- Methodology
- Key Points:
 - Clinical Effects of MA
 - Biological Detection and Clinical Implications
 - MA Psychosis vs. Primary Psychosis

Methamphetamine Preparations









Scope of the Methamphetamine Problem Worldwide

- According to surveys and estimates by WHO and UNDCP, methamphetamine is the most widely used illicit drug in the world except for cannabis.
- World wide it is estimated there are over 35 million regular users of methamphetamine, as compared to approximately 15 million heroin users and 10 million cocaine users

Groups with High Rates of Meth Use

Women

- Residents in Western/Midwestern Rural Areas and Small/Medium Cities
- Predominantly Caucasian, Increasing Numbers of Hispanics
- Men Who Have Sex With Men

However...

- Meth is among least commonly used drugs
 - 0.2% Americans *regular* Meth users
 - 4x as many *regular* Cocaine users and 30x as many *regular* Cannabis
- Rates of Meth use have remained stable since 1999
 - Regular users between 0.2-0.3% between 1999 and 2004
- Rates of Meth use by HS Students have declined since 1999
 - 45% decline in lifetime prevalence from 8.2% to 4.5%

However...

- Meth use is rare overall but high in selected areas
 - 5% of adult male arrestees positive for meth vs.
 30% for cocaine and 44% for cannabis
- Media reports of Meth "epidemic" have hindered rational response
 - Media accounts anecdotal, unsupported by facts
 - i.e. "Fear it will turn into next Crack Cocaine"
 - Potential for "boomerang effect"

Methamphetamine Use in Past Year among Persons Aged 12 or Older, by State: 2002-04





Salt Lake City Police Department



Smaller labs can be set up with basic lab equipment and household appliances.

Salt Lake City Police Department



A variety of chemicals such as red phosphorous, seen here on the left, can be used to produce the methamphetamine, seen here on the right.

Manufacture



Posters and billboards with specific contact information can encourage residents to report suspected clandestine labs.







Methamphetamine

- Street Names
 - meth, speed, crystal, glass, crank, tweak, yaba
- Pharmacology
 - Promotes release of Biogenic Amines
 - Dopamine, Norepinephrine release and reuptake inhibition
 - Serotonin release (at higher doses)
- Route of Administration
 - Typical Progression: Oral \rightarrow Nasal \rightarrow Smoke/IV
 - Binge vs. Constant Use

(Meth)Amphetamines

Pharmacology





Detection

- 1/2 Life 10-12 hours
- Detection Period
 - Urine
 - Amphetamine 1-3 days (500 ng/ml cutoff for GC-MS)
 - Methamphetamine 3-6 days (250-500 ng/ml cutoff for GC-MS)
 - Blood
 - Methamphetamine 1-3 days
 - >100ng/ml consistent with Abuse
 - Blood Therapeutic Levels <50ng/ml
- Psychosis and Violence 150-1000ng/ml range ^{1,2}
- Freq. false positives

^{1.} Anggard, E., L. M. Gunne, et al. (1970). "Relationships between pharmacokinetic and clinical parameters in chronic amphetamine abuse." <u>Acta Pharmacol</u> <u>Toxicol (Copenh)</u> 28(1): 92.

^{2.} Angrist, B. Schweitzer, et al. (1969). "The clinical Symptomology of Amphetamine Psychosis and its relationship to Amphetamine Levels in Urine." Int. Pharmacopsychiat. 2: 125-39.

Methamphetamine Effects

CLINICAL ASSESSMENT

- Spectrum of Symptoms
- Variability
 - Tolerance
 - Dosage
 - Premorbid Personality
 - Family History
- Clinical History is Best Guide
- Urine Toxicology not well correlated with psychosis

Angrist, B. Schweitzer, et al. (1969). "The Clinical Symptomology of Amphetamine Psychosis and its relationship to Amphetamine Levels in Urine." Int. Pharmacopsychiat. **2**: 125-39.

The "Meth Run"



Source: Logan BK (1998) "Pharmacology of Methamphetamine and its Relationship to Behavior Impairment" AAFS Meeting, Aug 1998

How Much Does it Cost?

- Experts estimate that one ounce of meth equals about 110 meth "hits."
- Cost Sept. 2005
 Per Patient information
 - 1/4 gram \$25
 - 1/2 gram \$50
 - 1 gram \$100
 - 8-Ball \$300 (3 1/2 grams)

Methamphetamine Effects

- Acute Usual Effects
- Acute Adverse Effects
- Mood Disturbance
- Withdrawal Syndrome
- Acute Toxic Confusion
- Acute Psychosis
- Chronic Psychosis
- Other Long Term Effects



Acute Usual Effects

- Flash of Euphoria, elevated mood
- Insomnia, alertness, increased energy
- Lack of appetite, thirst, diaphoresis
- Loquaciousness, "crystal clear thinking"
- Hyperacute Memory relevant and extraneous stimuli
- Hypersexuality

Ellinwood, E. H., Jr. (1967). "Amphetamine psychosis. I. Description of the Individuals and Process." J. Nervous and Mental Dis. **144**(4): 273-84

Acute Adverse Effects

- Anxiety
- Progressive Stereotyped Behavior
- Fear, Suspiciousness
- Awareness of Being Watched
- Peripheral Field Visual Hallucinations

Ellinwood, E. H., Jr. (1967). "Amphetamine psychosis. I. Description of the Individuals and Process." J. Nervous and Mental Dis. **144**(4): 273-84
Connell, P H (1958). "Amphetamine psychosis." London: Oxford University Press

Mood Disturbances

- Depression
 - 68% Female, 50% Male
- Suicide Attempt
 - 28% Female, 13% Male
- Pathology Greater in IDU, More frequent users¹
- Anhedonia^{2,3}
- 1. Zweben, J. E., J. B. Cohen, et al. (2004). "Psychiatric symptoms in methamphetamine users." <u>Am J Addict</u> **13**(2): 181-90.
- Angrist, B. M. and S. Gershon (1970). "The phenomenology of experimentally induced amphetamine psychosis—preliminary observations." <u>Biol Psychiatry</u> 2(2): 95-107.
- 3. Yeh, H. S., Y. C. Lee, et al. (2001). "Six months follow-up of patients with methamphetamine psychosis." <u>Zhonghua Yi Xue Za Zhi</u> (<u>Taipei</u>) **64**(7): 388-94.

The cycle of abuse



10 Years of Meth Use



Withdrawal Syndrome

- Anergia, Anhedonia, Waves of intense craving "Twosking" w24 hours
- "Tweaking" ~24 hours
 - Dysphoria, Scattered, disorganized thought
 - Paranoia/Anxiety/Irritability
 - Hypervigilence
 - Auditory, tactile hallucinations, Delusions
 - Normal Pupils
- "Crashing" ~ 24-72 hours
 - Intense Fatigue, Catnapping, Uncontrollable sleepiness
 - Continuing stimulation

Logan, BK (1998) "Pharmacology of Methamphetamine and its Relationship to Behavior Impairment" AAFS/CAT Conference

Acute Toxic Confusion

- Uncommon
- Clouding of consciousness subtle¹
- In one ED study 13/127 unresponsive²
 - 9/13 significant co-ingestion
 - 4/13 MA without seizures
 - 8/127 Confused, disoriented
- Most Experimental reproductions do not note Acute Toxic Confusion ³⁻⁵
- 1. Beamish, P. and L. G. Kiloh (1960). "Psychoses due to amphetamine consumption." <u>J Ment Sci</u> **106**: 337-43.
- 2. Derlet, R. W., P. Rice, et al. (1989). "Amphetamine toxicity: experience with 127 cases." J Emerg Med **7**(2): 157-61.
- 3. Griffith, J.D. (1970). "Experimental psychoses induced by the administration of d-amphetmine." Int. Symposium on Amph and Related Compounds. New York: Raven Press: 897-904
- 4. Bell, D. S. (1973). "The experimental reproduction of amphetamine psychosis." <u>Arch Gen Psychiatry</u> **29**(1): 35-40.
- Angrist, B. M. and S. Gershon (1970). "The phenomenology of experimentally induced amphetamine psychosis-preliminary observations." <u>Biol Psychiatry</u> 2(2): 95-107.

Meth Mouth



- "Model Psychosis"
- Single Dose vs. Repeated High Dose
- English Model Direct Psychotogenesis
 - Young and Scoville 1938
 - Connell 1958
- Japanese Model –Psychosis from Brain Damage
 - Sato, Yui, Wada

- Risk Factors:
 - Premorbid Personality Disorder^{1,2,4}
 - MA and other substance Abuse/ Dependence^{1,2,3,4}
 - Mode of Administration⁵
 - Social Withdrawal¹
 - Previous Psychosis^{1,2,3,4,5}
 - Brain Injury³
- 1. Ellinwood, E. H. and S. Cohen (1971). "Amphetamine abuse." <u>Science</u> **171**(969): 420-1.
- 2. Farrell, M., A. Boys, et al. (2002). "Psychosis and drug dependence: results from a national survey of prisoners." <u>Br J Psychiatry</u> **181**: 393-8.
- 3. Fujii, D. (2002). "Risk factors for treatment-resistive methamphetamine psychosis." J Neuropsychiatry Clin Neurosci 14(2): 239-40.
- 4. Iwanami, A., A. Sugiyama, et al. (1994). "Patients with methamphetamine psychosis admitted to a psychiatric hospital in Japan. A preliminary report." <u>Acta Psychiatr Scand</u> **89**(6): 428-32.
- 5. Matsumoto, T., A. Kamijo, et al. (2002). "Methamphetamine in Japan: the consequences of methamphetamine abuse as a function of route of administration." Addiction **97**(7): 809-17.

- Experimentally Produced with Single Large Dose^{1,3,4}
- More common with escalating MA intake²
- Ellinwood:
 - Delusions of Persecution, Ideas of Reference, Visual and Auditory hallucinations, Changes in Body Image and Hyperactivity and Excitation without disorientation or clouding in consciousness.
 - Visual Hallucinations predominate
 - Little Thought Disorder
 - Delusions sometimes persistent, reality based

^{1.} Connell, P H (1958). "Amphetamine psychosis." London: Oxford University Press

^{2.} Ellinwood, E H (1972). "Amphetamine Psychosis: Individuals, Settings, and Sequences" Current Concepts in Amphetamine Abuse, Rockville, M.D. NIMH

^{3.} Anderson, E.W. and Scott, W.C (1936): "Cardiovascular Effects of Benzadrine." Lancet 2:1461

A Anfalhera R (1028) "A case of Rezadrine Sulfate Doisoning" 1AMA 110, 575 1028

- Bell 12/14 Patients ^{1,2}
 - Dosed to raise BP 50%
 - Euphoriant Effects of drug replaced by anxiety accompanying ideas of reference and paranoid delusions.
 - Psychosis Onset 5-90 hours
 - AVH occur in setting of clear consiousness
 - Restlessness, agitation and excitement
 - No Thought Disorder

1. Bell, D. S. (1965). "Comparison of Amphetamine Psychosis and Schizophrenia." <u>Br J</u> <u>Psychiatry</u> **111**: 701-7.

2. Bell, D. S. (1973). "The experimental reproduction of amphetamine psychosis." <u>Arch Gen</u> <u>Psychiatry</u> **29**(1): 35-40.

- Angrist 20 Patients
 - Inpatient Admissions, No added amphetamine
 - Hallucinations come on suddenly, first symptoms to clear (2-3 days)
 - Subjects reluctant to disclose hallucinations
 - ½ cleared, ½ Residual affective blunting, thought disorder, chronic delusions
 - Residual patients higher alcohol, developmental problems, more hospitalizations

Angrist, B. Schweitzer, et al. (1969). "The Clinical Symptomology of Amphetamine Psychosis and its relationship to Amphetamine Levels in Urine." <u>Int.</u> <u>Pharmacopsychiat.</u> **2**: 125-39.

- Harris and Batki Observational Study
 - 19 patients PANSS
 - Psych Emergency Services
 - Last use avg. 41 hours prior to interview
 - Homogenous group, small sample, various stages of intoxication/withdrawal
 - 26% negative scale scores, 95% bizarre delusions, 63% Schneiderian hallucinations

Harris, D. and S. L. Batki (2000). "Stimulant psychosis: symptom profile and acute clinical course." <u>Am J Addict</u> **9**(1): 28-37.

The Jenny Crank Diet





Chronic Psychosis

- Not Recognized by DSM-IV-TR
- Japanese Experience
 - Large "clean populations" 1950's, 70', 90's
 - Brain Damage/Sensitization DA release in Striatum, Nucleus Accumbens
 - Acute recurrence of previous psychosis in response to psychosocial stress, low dose MA
 - "Settled Psychosis"

Chronic Psychosis

Yeh – 21 pts. 6 mo follow-up¹ 17 interviewed, 8 relapsed Improvement in SADS and SANS over six months

1. Yeh, H. S., Y. C. Lee, et al. (2001). "Six months follow-up of patients with methamphetamine psychosis." <u>Zhonghua Yi Xue Za Zhi (Taipei)</u> **64**(7): 388-94.

Chronic Psychosis

- Yui 116 female prisoners with hx of MAP²⁻⁷
 - 36 had flashbacks
 - AH, Comments or threats, IOR, ¹/₂ VH
 - Paranoid-Hallucinatory symptoms
 - 75% Stressful events, 69.4% threatening psychotic symptoms vs 13.8%/18.8%
 - Few Negative Symptoms Noted
 - Significantly elevated plasma NE and lesser 3-MT elevation with Flashbacks
- 2. Yui, K., K. Goto, et al. (2000). "Increased sensitivity to stress in spontaneous recurrence of methamphetamine psychosis: noradrenergic hyperactivity with contribution from dopaminergic hyperactivity." <u>J Clin Psychopharmacol</u> **20**(2): 165-74.

- 5. Yui, K., T. Ishiguro, et al. (1997). "Precipitating factors in spontaneous recurrence of methamphetamine psychosis." Psychopharmacology (Berl) 134(3): 303-8.
- 6. Yui, K., T. Ishiguro, et al. (1998). "Factors affecting the development of spontaneous recurrence of methamphetamine psychosis." Acta Psychiatr Scand **97**(3): 220-7.
- 7. Yui, K., T. Ishiguro, et al. (2000). "Susceptibility to subsequent episodes in spontaneous recurrence of methamphetamine psychosis." Ann N Y Acad Sci **914**: 292-302.

^{3.} Yui, K., S. Ikemoto, et al. (2002). "Factors for susceptibility to episode recurrence in spontaneous recurrence of methamphetamine psychosis." Ann N Y Acad Sci 965: 292-304.

Yui, K., S. Ikemoto, et al. (2002). "Spontaneous recurrence of methamphetamine-induced paranoid-hallucinatory states in female subjects: susceptibility to psychotic states and implications for relapse of schizophrenia." <u>Pharmacopsychiatry</u> 35(2): 62-71.

Meth Addicts Demand Government Address Nation's Growing Spider Menace

to be done and it

soon—these spiders are

Rich Harlowe, event organizer and founder of

Tweakers' Rights

JANUARY 30, 2007 | ISSUE 43-05



WASHINGTON, DC-Following the tragic falling death of 32-year-old methamphetamine addict Phillip Diggs, who was reportedly attacked by spiders while scaling a large construction crane near Palo Alto, CA, thousands of outraged and confused meth addicts marched frenetically on Washington as part of a week of activities urging the federal government to address the nation's growing spider epidemic.





Harlowe pleads with senators to ask the King of America to do something about "all the goddamned spiders."

NowNowNowNowNowNowNowNow!, in testimony before a Senate committee Tuesday. "The government must address this problem before the situation gets out of hand and these poisonous, acid-shooting spiders develop the powers of mind control or -God forbid-flight."

"America cannot afford to ignore this any crisis any longer," Harlowe added.



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Other Long-Term Effects

- Anhedonia
- Co-morbid substance abuse
- Cognitive and Motor Skills Impairment¹
- Aggression, Sexuality²
- Risk Taking³
- 1. Zickler, P. "Methamphetamine Abuse Linked to Impaired Cognitive and Motor Skills Despite Recovery of Dopamine Transporters." <u>NIDA Notes</u> **17**(1): 1,6
- 2. Angrist, B. and S. Gershon (1976). "Clinical effects of amphetamine and L-DOPA on sexuality and aggression." <u>Compr Psychiatry</u> **17**(6): 715-22.
- 3. Hurst, P.M, et al (1967). "The Effects of Amphetamines upon Judgments and Decisions." Psychopharmacologia (11): 397-404



Treatment

- Most studies show treatment as effective as other forms of drug treatment
- Matrix Model
 - CBT / Family Education / Social Support / Individual Counseling
 - Higher retention rates and completion of treatment

MTP (MATRIX) Study Conclusions

- A multisite evaluation of a research-based intervention can be conducted in community sites during a 3 year period.
- Six research-naïve sites and 2 experienced sites successfully were trained and conducted all necessary research activities for a complex clinical trial.
- A complex psychosocial treatment protocol was successfully replicated at 8 sites over a 3 year period.
- Over 1000 MA-Users received free treatment.

MTP (MATRIX) Study Conclusions

- Treatment for MA dependence associated with improvements in many domains including drug use, mj use, mood, Income
- Matrix treatment results in longer retention, more sessions attended, more treatment completers, more MA-negative UAs, longer periods of MA abstinence
- * Except for drug court site

Summary

- MA-induced states best evaluated by clinical interview
- Toxicology helpful but not definative
- MA-induced states follow progression
- Controlled studies of MA limited
- Individual hx and specific situation must be taken into account
- Pure MA states rare