



Management of Patients with Psychostimulant Toxicity:

Guidelines for Emergency Departments



*National
Drug Strategy*

**Management of Patients with
Psychostimulant Toxicity:**
Guidelines for Emergency Departments

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The opinions expressed in this document are those of the authors and are not necessarily those of the Australian Government.

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Executive Summary

1. The use and availability of psychostimulants is increasing.
2. Adverse effects of psychostimulants fall along a continuum with mild symptoms at one end of the spectrum and life-threatening toxicity at the other [p. 8].
3. Psychostimulant toxicity has been identified among both naïve and regular users.
4. A thorough assessment should be undertaken [p. 5-6] which includes drug use history and presence of psychostimulant toxicity.
5. Calming communication to de-escalate potentially dangerous situations is recommended. Security or the police should always be called to any high-risk situation [p. 9-11].
6. Urgent sedation should be administered to patients exhibiting acute behavioural disturbance secondary to psychostimulant intoxication or toxicity (see below and p. 11-15). Initially with normal dose benzodiazepines followed by higher doses if ineffective.
7. Oral sedation should be offered in the first instance, but if the patient refuses then intravenous (IV) sedation (or intramuscular sedation if a secure IV site cannot be obtained) should be administered promptly in an effort to rapidly and safely manage behavioural disturbance and medical complications of toxicity if present [p. 13].
8. Medical complications are often serious and include hyperthermia, cerebrovascular accidents, seizures, myocardial ischaemia and infarction, serotonin toxicity, rhabdomyolysis, hypoglycaemia, hyponatremia, hyperkalemia and others. Some peculiarities of medical management are specific to psychostimulant use being identified (see outlines below and p. 17-19).
9. Patients should be referred to specialist alcohol and drug services for ongoing support and counselling following treatment in the emergency department [p. 20].
10. For those who decline follow-up care, provision of information about psychostimulant use or other educational material is recommended.

Sedation Protocol Summary

Oral benzodiazepine (diazepam) sedation*

10-20mgs of diazepam orally. If no clinical response at 30 minutes, an additional 10 mgs of diazepam should be administered. Repeat this regime until the patient is in a state of rousable drowsiness or a total dose of **60mgs** of diazepam has been administered.

Intravenous benzodiazepine (diazepam) sedation*

2.5-5mgs of diazepam initially as standard sedation dose intravenously to assess patients sensitivity to benzodiazepine agents. Some patients will respond to this low dose. If no clinical response at 10 minutes, an additional higher dose of 5-10 mgs of diazepam should be administered. Repeat this diazepam higher dose of 5-10mg every 10 minutes to a maximum dose of 60mg if the patient is not sedated adequately. Consider alternate agent droperidol 2.5mg intravenously or olanzapine 10mg intramuscular (IM) if no response.

Intramuscular benzodiazepine(midazolam) sedation*

Sedation is preferably titrated by intravenous (IV) route but in absence of IV access a suitable IM agent is midazolam. An initial dose of 5mgs of midazolam should be administered IM. If there is no clinical response at 10 minutes, an additional 10 mgs of midazolam should be administered IM. Repeat this dose once more after 10 minutes at 10mg IM if the patient is not in a state of rousable drowsiness. Consider droperidol 2.5mg or olanzapine 10mg if no response.

*Benzodiazepine choice is controversial and variable availability and preferences exist in Australian Institutions

Medical Treatment Summaries

Hyperthermia Temp 39.5°C

Rapid external cooling, paralysis, intubation and deep intravenous sedation. Assess for rhabdomyolysis and electrolyte problems, hydrate adequately.

Hyponatremia

Assess total body water, fluid restrict if mild. Hypertonic saline if severe. Check blood sugar and potassium. Supportive care.

Serotonin Syndrome

Control muscle rigidity. Monitor temperature for hyperthermia. Attend respiration, fluid and electrolyte status. Benzodiazepine first line therapy in mild cases.

Cerebrovascular Management

Airway management, adequate oxygen, IV fluids, control seizures initially with benzodiazepines, avoid aspirin if cerebral haemorrhage is suspected, head CT early and attention to general supportive care, corticosteroids may be harmful.

Cardiovascular Management

ECG, electrolytes, glucose, renal function, creatinine, avoid beta-blockers, sublingual nitroglycerine for chest pain in combination with benzodiazepines. Avoid aspirin if uncontrolled hypertension.

Background

Purpose and Scope of the Draft Guidelines

The purpose of this document is to provide draft guidelines for emergency departments throughout Australia to effectively and safely manage individuals who are experiencing, or suspected of experiencing psychostimulant toxicity and associated severe behavioural disturbance.

The aim of these draft guidelines is to assist clinicians in emergency departments to:

1. Identify patients who present with suspected psychostimulant toxicity
2. Rapidly and safely manage suspected or confirmed psychostimulant toxicity utilising a standardised sedation protocol
3. Recognise and safely manage medical complications.

These draft guidelines are not intended to replace any existing guidelines currently in use in each state or individual emergency department. Rather, the draft guidelines have been developed to assist clinical decision making, and can be used to inform the adaptation of existing practices related to the management of patients presenting with suspected or confirmed psychostimulant toxicity. The draft guidelines are designed to be easily adapted to ensure consistency with available resources (i.e. adoption of the guidelines should be cost-neutral) and state legislation including the relevant state Mental Health Act.

These draft guidelines are intended to be used in conjunction with the publication *Models of Intervention and Care for Psychostimulant Users*, 2nd Edition, Commonwealth Monograph Series Number 51, Baker, A., Lee, N.K., & Jenner, L. (eds) (2004). The Monograph can be obtained by contacting the Australian Government Department of Health and Ageing, or is available to be downloaded from the department website <http://www.health.gov.au/pubhlth/publicat/mono.htm>. As a thorough review of the literature is presented in the monograph these draft guidelines provide a synopsis of the evidence only.

Definition of Psychostimulants

These guidelines refer to the range of substances collectively known as psychostimulants, which commonly include:

1. methylenedioxymethamphetamine(MDMA), 'ecstasy'
2. cocaine
3. amphetamine sulphate or hydrochloride, 'speed'
4. methamphetamine
 - a. crystal methamphetamine, 'ice', 'crystal meth'
 - b. methamphetamine tablets, 'pills'
 - c. methamphetamine 'base', which is a moist, oily substance
 - d. methamphetamine powder
5. paramethoxyamphetamine (PMA)
6. paramethoxymethamphetamine (PMMA)

Target Groups

These draft guidelines have been designed for use by all emergency departments and apply to all psychostimulant-affected individuals including Indigenous peoples, women and those with suspected co-existing mental health problems. The sedation protocol is recommended for those over 16 years of age, who have no known sensitivity to benzodiazepines.

No harm will come from the use of these protocols in other drug induced psychoses which might be mistaken for psychostimulant toxicity (e.g. LSD, PCP, Psilocybin, Mescaline, Convulvulus, Datura), some of which also have stimulant effects.

Collaborative Response

A collaborative approach between police, ambulance and emergency departments is essential to ensure prompt and timely management of individuals who are experiencing, or suspected of experiencing, psychostimulant toxicity. Companion guidelines have been produced for ambulance services and police services to ensure consistency of approach.

Effective partnerships might be achieved in local areas by undertaking collaborative training in appropriate responses to amphetamine users; undertaking a formal service agreement or a memorandum of understanding; and collaboratively adapting these guidelines to meet local legislative conditions and to ensure consistency with available resources.

Introduction to the Guidelines

Key points

- The use of psychostimulants in Australia is increasing.
- Ambulance responses and transfer to emergency departments following overdose of psychostimulants is reportedly increasing.
- Psychostimulant toxicity has been recognised among both naïve and regular users and represents a medical emergency when severe.
- Medical management of some common medical conditions often differs in the presence of psychostimulants.

Patterns of Psychostimulant Use

Psychostimulants are a group of drugs that stimulate the activity of the central nervous system, causing individuals to feel falsely or overly confident, euphoric, alert and energetic. The use and availability of psychostimulants, in particular methamphetamines ('meth', 'crystal meth', 'ice', 'base'), and amphetamine sulphate or hydrochloride ('speed') are increasing throughout Australia (1, 2). Population studies estimate that more than half a million Australians had used an illicit stimulant during the year 2000 (2).

Users of amphetamines can be categorised as:

- a) experimental (naïve users)
- b) recreational (those who use irregularly, generally in a social setting)
- c) binge users (an 'on again – off again' pattern of moderate to large quantities of use)
- d) regular daily users.

Intranasal 'snorting' or oral ingestion 'bombing' are common routes of administration by experimental and recreational users. However, a significant proportion of users (particularly regular users) do choose to inject. Injection, while becoming increasingly common in Australia, is typically associated with greater potential for toxicity, higher levels of dependence and other physical, psychological and social problems as is smoking of some forms of psychostimulant drugs, such as the potent crystalline methamphetamine also known as 'ice' (1).

Acute Psychostimulant Toxicity

According to Dean and Whyte (3) “adverse effects (of psychostimulants) can exist on a spectrum of severity from minor symptoms to life threatening toxicity.” The definition of ‘acute psychostimulant toxicity’ utilised by these draft guidelines describes an individual who has administered psychostimulants and subsequently experiences acute symptoms of toxicity although it is recognised that intoxication with other drug classes such as alcohol, cannabis or opioid may also be evident, as patterns of use of psychostimulants suggest that co-administration of other drugs is extremely common (1).

Common consequences of significance from psychostimulant toxicity can include (3):

1. agitation, panic states and acute behavioural disturbances
2. psychosis (particularly paranoid hallucinations and delusions)
3. hyperthermia
4. cerebrovascular and neurological complications (e.g. CVA, cerebral vasculitis, disseminated intravascular coagulation, seizures, coma)
5. cardiovascular complications (eg myocardial infarction and ischaemia, hypertension, tachycardia, arrhythmia)
6. delirium
7. electrolyte disturbances (e.g. hyponatremia, hyperkalemia)
8. hypoglycaemia
9. rhabdomyolysis
10. serotonin toxicity of varying severity.

It is important to recognise that psychostimulant toxicity can occur among both experimental (naïve) and regular users of psychostimulants (3).

Draft Guidelines

The current draft guidelines for the management of persons with suspected or known psychostimulant toxicity in the emergency department address the following areas:

1. Assessment
2. Recommendations for management
 - a. Severe behavioural disturbance
 - b. Medical problems of psychostimulant toxicity
3. Recommendations for implementation of the draft guidelines.

The Role of the Emergency Department

The role of the emergency department in responding to patients with known or suspected psychostimulant toxicity includes:

1. Prompt assessment and diagnosis
2. Rapid and safe management of symptoms of toxicity, including acute behavioural disturbance and medical complications.

Assessment and Diagnosis

Most commonly, initial management to rapidly control behavioural disturbance is the early priority and should occur concurrently with assessment. Failure to control the behaviour often prevents or delays assessment. Prudent consideration of the wide differential diagnosis for behavioural disturbance is required. For simplicity these guidelines focus on assessment and management of psychostimulant misuse and its common medical complications.

Drug Use History

A thorough drug history should be taken at the time of triage if possible. The following points may serve as a guide (4), although if the patient is obviously intoxicated or exhibiting signs of agitation or acute behavioural disturbance, an emphasis on rapidly controlling the behaviour and reassuring the patient take priority. Collateral information can be gained from friends, family members if in attendance, or from police and ambulance officers (paramedics) if they have transported the patient.

If the Patient is Cooperative with Assessment, Record:

1. Psychostimulant use ('speed', 'go-ee', 'base', 'ice', 'meth', 'whiz' etc)
 - type of psychostimulant used (e.g. methamphetamine, amphetamine, cocaine, MDMA, prescription drug)
 - amount of psychostimulant used¹
 - time of administration
 - route of administration (intranasal, intravenous, oral, inhalation)
 - frequency of use (e.g. regular daily use, binge pattern, recreational, experimental, etc)
 - potency of psychostimulant used ("How long did the effect last", "Was it strong?")
 - duration of current use and age of first use
 - obtain a urine sample for a drug screen if possible.
2. Other drug use
 - concurrent use of other drugs (particularly alcohol, benzodiazepines, opiates, party drugs), including criteria above
 - concurrent use of antidepressant medication (e.g. TCAs, MAOIs, SSRIs, bupropion, venlafaxine) which may increase the serotonergic or catecholamine mediated effects of psychostimulants.

Medical History

1. Other conditions that might impact on management
 - presence of concomitant physical illness including blood borne viruses, heart disease etc
 - presence of any physical injury (particularly head injury) that might have been recently sustained
 - presence of concomitant psychiatric illness or psychiatric symptoms (psychosis, paranoia, depression, suicidal ideation etc).

¹ Amount can be measured in local dollar value, grams, or numbers of 'pills' taken.

If the Patient is not Cooperative with Assessment or Denies Psychostimulant Use

The following signs might indicate the patient has recently used psychostimulants or is moderately to severely intoxicated (although some signs might be indicative of other medical conditions or intoxication with other drugs):

- dilated pupils that react sluggishly to light
- clenched jaw or muscle rigidity
- restlessness, agitation, tremor or repetitive movements
- rapid speech
- motor agitation or pacing
- hypertension
- tachycardia
- sweaty palms, flushed diaphoretic facial skin
- hypervigilance, paranoia.

The following signs might indicate long-standing or regular psychostimulant use:

- obvious signs of poor- or under-nutrition
- sores on face, arms or legs
- evidence of needle marks or thrombophlebitis.

Physical Observations and Key Investigations Relevant to Assessing for Psychostimulant Toxicity (3)

1. Vital signs including temperature
 - a. severe hyperthermia may develop (hyperthermia above 39.5°C indicates severe, potentially life threatening toxicity and mandates immediate cooling and sedation)
2. Bedside blood sugar level (BSL)
3. Ward urine test (+ve blood if myoglobin present)
4. Serum electrolytes and BSL
5. Renal and hepatic function and creatine phosphokinase
6. An ECG should be obtained and continuous cardiac monitoring instituted in symptomatic patients
7. CT brain in cases of severe headache or altered states of consciousness in the context of psychostimulant use
8. Cerebral angiography by CTA or MRA should be part of the evaluation of most young patients with non-traumatic intracerebral haemorrhage
9. Assess for signs of serotonin toxicity, a common area omitted in assessment. (see Appendix 1 – Assessment for Serotonin Toxicity).

Management

Acute Behavioural Disturbance

Individuals suffering from psychostimulant toxicity can become extremely agitated, irrational, impulsive, paranoid and psychotic, which may lead the person to behave in an uncontrolled, aggressive and/or violent manner. The number of ambulance attendances to patients presenting with putative psychostimulant intoxication or toxicity has risen in some Australian locations, and paramedics and emergency department staff are increasingly required to manage the acute behavioural disturbances associated with psychostimulant misuse (5).

The primary aim of management of behavioural disturbance is to reduce the risk of harm to the patient, emergency department staff and other people. It is necessary to utilise the established hospital protocols for the management of behavioural disturbances in the event of such of an incident. Presence of hospital security or police presence is mandatory until behaviour is controlled.

Reliance on physical restraint alone is often not adequate for psychostimulant users experiencing acute behavioural disturbance, and may actually cause harm if agitation increases. Stimulant use has been suggested as a possible risk factor for sudden death of individuals being physically restrained (3).

Behavioural Management Strategy

Verbal de-escalation should be attempted in the first instance, if possible. Respond to the patient in a calm and confident manner. Be aware that if the person is acutely intoxicated with psychostimulants and experiencing great fear or paranoid symptoms, unexpected stimuli such as loud noises or sudden movements may worsen the situation. So at all times use calming, de-escalating communication strategies. Individuals affected by psychostimulants are more likely to respond in a positive way to communication strategies that are not perceived to be aggressive, threatening or confrontational. Recommended communication techniques include:

1. Listening to the patient
2. Using the patient's name to personalise the interaction
3. Calm, open-ended questioning to ascertain the cause of the behaviour
4. A consistently even tone of voice, even if the person's communication style becomes hostile or aggressive

5. Avoidance of the use of “no” language, which may prompt an aggressive outburst. Statements like “*I’m sorry, our hospital policy doesn’t allow me to do that but I can offer you other help.....*” often has a calming effect on the patient
6. Allow the individual as much personal space as is possible in the ED while still maintaining control of the situation
7. Avoid too much eye contact if possible as this can increase fear or promote aggressive outbursts in some hostile or paranoid individuals.

These techniques will assist staff to determine the individual’s level of responsiveness to de-escalation strategies and to further assess the degree of risk to all involved. This will allow clinicians to determine if administration of sedation is required and if the patient will voluntarily accept medication. If the patient requires sedation and will accept oral sedation this is preferred, see *Oral Benzodiazepine Sedation Protocol* below for a suggested regime.

If however, the patient

- a. has a severe behavioural disturbance such that they pose a risk to themselves or others, and
- b. will not voluntarily take oral medication as required.

Intravenous sedation (or intramuscular sedation if no secure IV access can be achieved) should be administered as soon as possible to control the behaviour and to ensure physical observations and investigations can be safely undertaken (see *Intravenous Benzodiazepine Sedation Protocol*, and *Intramuscular Midazolam Sedation Protocol* below). **Security presence and assistance is essential until behavioural control is obtained.** *Therapeutic Guidelines Version 5: Psychotropic* (6) recommend that: protocols for intervention by a well-drilled team in behavioural emergencies be developed that are suitable for the particular characteristics of the setting in which emergencies will be managed; if the police have brought someone in mechanical restraints (e.g. handcuffs), police officers and restraints should remain in place until decisions have been made regarding management; restraints can be removed once the individual has been assessed and it has been determined that it is safe to do so; and that the patient may need sedating medication before the restraints are removed.

In emergency situations it is often difficult to differentiate between a severe behavioural disturbance secondary to acute drug intoxication, drug-induced psychosis, or an exacerbation of a pre-existing psychotic disorder (3).

Suspected drug-induced psychosis (or exacerbation of existing psychotic disorder) should not be considered a contraindication to urgent sedation. Rather, a period of sedation and behavioural control will allow clinicians to re-assess the patient after the acute effects of the drug have worn off, allowing for a more accurate differential diagnosis. In general, treatment of

patients with psychostimulant-induced psychosis is similar to treatment of acute mania or schizophrenia and establishing a 'safe' environment should be the first priority (3). *Therapeutic Guidelines Version 5 (6)* will assist with prescribing decisions.

Sedation Protocols

Sedation using sedative drugs is acceptable to patients with severe behavioural disturbances, provides a humane alternative to mechanical restraint, and ensures simpler and safer essential physiological monitoring than other types of restraint (3). The aim of sedation is to control dangerous behaviour sufficiently to facilitate accurate assessment and appropriate management. **No sedation protocol is 100% safe and is indicated only when all other simpler safer measures fail and the patient is deemed a significant risk to self or others. It is a crisis management tool.**

Clinical response to sedation falls along a continuum with controlled and acceptable behaviour at one end and rousable drowsiness (not unconsciousness) at the other. **Health care providers who administer sedation, regardless of practice setting, should have access to advanced airway assessment and management skills so that successful 'rescue' of patients can be made should an adverse sedation event occur (3).** The most common adverse events of sedation include (7):

1. airway obstruction
2. respiratory depression including apnoea
3. aspiration
4. significant hypotension
5. laryngospasm (particularly in the context of antipsychotic medication administration).

Benzodiazepines have been recommended as the agent of choice when there is unlikely to be an ongoing need for antipsychotic medication after acute treatment as benzodiazepines influence fewer neurotransmitter systems than antipsychotic agents, and are thus considered a safer choice of drug (3). In addition, most agitated patients are more willing to accept treatment with a benzodiazepine than with an antipsychotic, and following sedation with benzodiazepines patients tend to be calmer and better organised (3). Nationally there is considerable variation in preferred benzodiazepine agent between institutions and individual physicians. Due to its universal availability in Australia and longer half-life than midazolam, **diazepam is considered by the expert panel the most appropriate widely available oral or intravenous benzodiazepine to manage psychostimulant-induced acute behavioural disturbances** in the emergency department setting.

Secondary benefits of selecting a benzodiazepine are that they are also part of first line treatment for cardiac toxicity associated with psychostimulant use and may exert some benefit in the agitation associated with serotonin toxicity (3). In addition, they are the first line treatment for psychostimulant induced seizures. In cases of rare adverse events, such as over sedation from benzodiazepines, management of the airway and breathing by standard supportive emergency department measures is the critical and recommended step. As a last resort, a pharmacological antagonist (flumazenil) is available to reverse benzodiazepine effects (3). However, flumazenil should be used with extreme caution, as it may precipitate withdrawal in benzodiazepine dependent patients (8, 9) or worsen an established benzodiazepine withdrawal (10). Flumazenil should only be given if there is no evidence of proconvulsant or proarrhythmic (including tricyclic antidepressants) drug ingestion as the removal of the effects of benzodiazepines that have been co-ingested or previously administered may lead to seizures, cardiac arrest or death (10-19).

Researchers have also recommended use of parenteral midazolam to control agitated or aggressive patients due to its rapid onset (20), shorter duration of action, the ability to use intramuscular dosing and its reduced potential to cause hypotension (3). In addition, prolonged administration of midazolam results in more rapid awakening after administration has ceased (3, 20). A pilot study examining the safety and effectiveness of a high dose midazolam sedation protocol for individuals suspected of experiencing acute psychostimulant toxicity with associated behavioural disturbance has recently been completed in a busy emergency department in Queensland. An analysis of the data reveals that high doses of benzodiazepines are a safety concern so an initial first dose at standard sedation doses is preferred. Safety risk from high and rapid dosing protocol of midazolam intravenously was also shown by another recent published study (21).

If benzodiazepines prove ineffective then the antipsychotic **droperidol** can be used in the emergency department setting preferably after the absence of prolonged QTc is assured following ECG. Note previous safety concerns for this drug reflect different use as chronic oral dosing (22). A dose of 2.5-5mg can be given Q20mins until a maximum dose of 20mg in 24 hours is reached. Adverse effects include sudden hypotension and laryngeal dystonia. Droperidol should not be administered to antipsychotic naïve patients unless an adequate benzodiazepine regimen exhausted (7). A further alternate is olanzapine 10mg IM after failed benzodiazepine regimen.

Three protocols are outlined below. Even though these patients are behaviourally disturbed many will accept oral sedation if offered, and this is preferred. If this fails IV route is preferred as it is more likely to give rapid control and more reliable absorption than IM.

Protocol 1: Oral Benzodiazepine (Diazepam) Sedation Protocol

An initial dose of 10-20mgs of diazepam should be administered orally (po). If behavioural control or a state of rousable drowsiness² is achieved within 30 minutes of the first dose, no more sedation should be administered.

If there is no clinical response or insufficient clinical response at 30 minutes, an additional 10 mgs of diazepam should be administered. Repeat this regime until the patient is in a state of rousable drowsiness, or a total dose of **60mgs** of diazepam has been administered (only exceed 60mg if no obvious signs of respiratory depression are evident. Do not exceed **120 mgs in a 24-hour period**).

Caution: Respiratory Depression

	Dose	Time given (Q 30mins)	Response
Dose 1	10-20 mg diazepam po		Aim for rousable drowsiness
Dose 2	10 mg diazepam po		
Dose 3	10 mg diazepam po		
Dose 4	10 mg diazepam po		
Dose 5	10 mg diazepam po		
Dose 6	10 mg diazepam po		
TOTAL DOSE 60 mg (Do not exceed 120 mg in 24 hrs)	Failure consider alternate agent or parenteral regime		

Figure 1: Oral diazepam sedation protocol

² Rousable drowsiness is defined ideally as sleepy if undisturbed, rouses and cooperates to voice or pain.

Protocol 2: Intravenous Benzodiazepine (Diazepam) Sedation Protocol

An initial dose of 2.5-5mg of diazepam* should be administered intravenously (IV). If behavioural control or a state of rousable drowsiness² is achieved within 10 minutes of the first dose, no more sedation should be administered. If there is no clinical response at 10 minutes, additional higher 5-10mg boluses of diazepam should be administered. Repeat this regime until the patient is in a state of rousable drowsiness, or 60mg of diazepam has been administered (Do not exceed **120 mgs in a 24-hour period**). If no response consider alternate class agent.

Caution: Respiratory Depression or Airway Compromise

	Dose	Time given (Q 10 mins)	Response
Dose 1	2.5-5 mg diazepam IV		Aim for rousable drowsiness
Dose 2	5-10 mg diazepam IV		
Dose 3	5-10mg diazepam IV		
Dose 4	5-10mg diazepam IV		
Dose 5	5-10mg diazepam IV		
Dose 6	5-10mg diazepam IV		
TOTAL DOSE 60mg (Do not exceed 120 mg in 24 hrs)	Failure consider alternate agent (eg droperidol 2.5-5mg IV or olanzapine 10mg IM)		

Figure 2: Intravenous diazepam sedation protocol

*Note diazepam is the preferred agent for IV sedation. If no secure IV access can be gained, see Protocol 3.

² Rousable drowsiness is defined ideally as sleepy if undisturbed, rouses and cooperates to voice or pain.

Protocol 3: Intramuscular Midazolam Sedation Protocol

An initial dose of 5mgs of midazolam should be administered intramuscularly (IM) if no secure IV access is present (diazepam is the preferred agent for IV sedation but is not suitable for use IM). If behavioural control or a state of rousable drowsiness² is achieved within 10 minutes of the first dose, no more sedation should be administered.

If there is no clinical response or insufficient clinical response at 10 minutes, a 10 mg dose of midazolam can be administered either IM or if a secure IV site is now available cautiously titrate doses of 2.5mg – 5mg IV as IM absorption is unreliable and the previous IV dose may not have reached maximal effect. Repeat 1 more IM or IV dose after 10 minutes until the patient is in a state of rousable drowsiness, or if no response consider an alternate class agent.

Caution: Respiratory Depression

	Dose	Time given (Q 10min)	Response
Dose 1	5 mg midazolam IM		Aim for rousable drowsiness
Dose 2	10 mg midazolam IM or 2.5-5mg IV		
Dose 3	10 mg midazolam IM or 2.5-5mg IV		
Dose 4	Failure consider alternate agent (eg droperidol 2.5-5mg IV or IM or olanzaopine 10mg IM)		
TOTAL DOSE (Do not exceed 25mg)			

Figure 3: Intramuscular midazolam sedation protocol

² Rousable drowsiness is defined ideally as sleepy if undisturbed, rouses and cooperates to voice or pain.

Post-Sedation Management

It is critical in the initial period of physical restraint and parenteral sedation for direct visual observation of the patient's cardio-respiratory status to occur. Great care should be given to ensuring physical or chemical restraint does not compromise airway or respiration. Electronic monitoring is not always possible in the early stages due to the acute behavioural disturbance and frequent presence of support personnel is required. However, **supplemental oxygen, vital sign and electronic monitoring should be initiated as soon as reasonably possible to ensure patient safety.** A medical officer with advanced airway skills should stay with the patient and be immediately available for an adequate period of time following parenteral sedation to ensure no adverse events have occurred. Careful ongoing nursing and vital sign monitoring should occur. This time must be tailored to individual patient response.

The following physical observations should be routinely monitored.

Observations

Initial continuous direct physical and visual observation of the patient should occur during the first 10 minutes following administration of parenteral sedation. Patients should then be monitored for four hours, when possible, following the administration of a sedation protocol. Observations should be undertaken every 10 minutes for 30 minutes, then every 15 minutes for 30 minutes, then every 30 minutes for 60 minutes, and then hourly for four hours or until awake.

Observations should include:

- airway
- patient colour
- continuous oxygen saturation
- end tidal CO₂ if available
- respiration rate
- blood pressure
- pulse
- temperature
- Glasgow Coma Scale score
- bedside BSL.

Management of Other Symptoms of Psychostimulant Toxicity

Cardiovascular Complications

The pharmacologic treatment of patients with cocaine-related (and to some degree amphetamine-related) ischaemic chest pain differs to conventional management in several important aspects.

Patients with uncontrolled hypertension might be at risk for subarachnoid and intracerebral haemorrhage and therefore aspirin must be avoided (3).

Sublingual nitroglycerine, in a dose sufficient to reduce the mean arterial pressure by 10 to 15 percent, reverses cocaine-induced coronary-artery vasoconstriction and relieves symptomatic chest pain. Therefore, nitroglycerine is recommended as a primary therapy for cocaine-associated myocardial ischaemia (3). Adjunctive benzodiazepines should also be considered for patients with cocaine-associated myocardial ischaemia who are anxious, have tachycardia, or are hypertensive as they reduce blood pressure and heart rate, thereby decreasing myocardial oxygen demand in addition to their anxiolytic effects (3).

Hypertension is often transient and as such may not require pharmacological intervention unless severe. Hypertension requiring treatment often responds to sedation with IV benzodiazepines.

Beta-blockers, one of the mainstays of treatment of acute myocardial ischaemia **should be avoided** in patients who have recently used psychostimulants as these drugs enhance stimulant-induced vasoconstriction and increase blood pressure and may exacerbate adverse effects (3).

Cerebrovascular Emergencies

The use of cocaine or amphetamine derivatives is considered a strong risk factor for stroke or other forms of acute cerebrovascular emergencies (3). Mechanistic processes might involve vasospasm of smooth muscles lining the cerebral artery and thrombus formation in the vasculature. Vasculitis is sometimes observed. Whilst a variety of abnormalities in cerebral vasculature may occur secondary to cocaine use including cerebral haemorrhage, the most common complications are haemorrhagic or thromboembolic strokes. Additionally, symptoms of cerebrovascular complications have been reported to appear within six hours of methamphetamine use and include (3):

1. Localising neurological signs
2. Hypertension
3. Respiratory difficulties
4. Speech difficulties
5. Sudden severe headache
6. Atypical seizures (e.g. focal, recurrent).

Management of cerebrovascular emergencies where psychostimulants are implicated in the aetiology should be managed using standard cerebrovascular emergency procedures (except when subarachnoid or intracerebral haemorrhage is suspected and aspirin should be avoided).

Immediate management involves (3):

1. Airway management
2. Adequate oxygen
3. IV fluids to maintain adequate nutritional and fluid intake
4. Attention to bladder and bowel function.

Corticosteroids may be harmful. If present, fever, hyperglycaemia, heart failure, arrhythmias, or severe hypotension must be treated (3).

Serotonin Toxicity (including Hyperthermia)

The neurotransmitter, serotonin (5-hydroxytryptamine or 5-HT) is thought to be involved in a range of functions including: mood, appetite and sleep regulation; cognition; perception; motor activity; temperature regulation; pain control; sexual behaviour and hormone secretion (23).

An excess of serotonin in the synaptic cleft leads to a range of symptoms that are intensified as serotonin levels increase (23). Hence, clinical researchers argue that the concept of a spectrum of serotonin toxicity is more clinically relevant than the notion of a discrete serotonin syndrome per se (24). Therefore, serotonin toxicity may be a mild, self-limiting condition or be potentially fatal with symptoms such as muscle rigidity, coma, seizures, hypertension or hypotension evident. When serotonin toxicity is severe, rhabdomyolysis with hyperkalaemia, acidosis and frank renal failure may subsequently result (3).

Serotonin toxicity has typically been associated with the use of antidepressant medication, particularly the SSRIs. However there is a growing recognition of the incidence of serotonin toxicity in relation to the use of psychostimulants particularly the potent serotonergic agent MDMA (ecstasy). The presence of serotonin toxicity is determined by clinical

diagnosis, and a diagnostic logarithm based on a set of criteria exists for this purpose (24), which is included as Appendix 1 in these guidelines.

The treatment of serious serotonin toxicity involves early recognition, prompt supportive care and judicious use of specific agents. Supportive measures for severe toxicity include (3):

1. hyperthermia above 39.5°C requires rapid external cooling, paralysis and intubation with deep intravenous sedation
2. IV fluids/volume resuscitation for dehydration, hypotension or rhabdomyolysis (ensure adequate urine output in 1.5-2mls/kg/hr)
3. mechanical ventilation for respiratory compromise and sedation with IV benzodiazepines might be indicated (see sedation protocol below for details)
4. 5-HT₂ antagonists such as olanzapine (24), chlorpromazine or cyproheptadine (3) may be indicated (these specific antagonists should only be used if the diagnosis of serotonin toxicity has been established and anticholinergic agents have not been co-ingested)
5. paralysis and intubation may have a role in cases of severe intractable rigidity
6. management of secondary cardiac arrhythmias or seizures involves standard measures.

In all patients with suspected serious serotonin toxicity, serum electrolytes, glucose, renal function, creatine kinase levels and ECG should be monitored. Hepatic function and arterial blood gases should also be monitored in more severe cases. Muscle rigidity should be controlled – if unchecked, it can lead to hyperthermia, rhabdomyolysis and respiratory compromise. Patients who develop coma, cardiac arrhythmia, disseminated intravascular coagulation or respiratory insufficiency require more specific measures (3).

Hyponatremia

This can be life threatening and presents with confusion or reduced consciousness or seizures. It can occur due to water intoxication from excessive water intake at rave parties, from drug effects of MDMA and PMA particularly. The combination of hypoglycaemia and or hyperkalaemia in association with hyponatremia suggests PMA which is not detected on many routine drug screens (25).

Treatment is guided by severity and warrants careful assessment of total body water status. Mild cases benefit from fluid restriction alone. Severe cases benefit from the use of hypertonic saline. Careful fluid balance is required. Patient weight can guide progress. Monitor the progress of electrolytes at least 4-hourly initially (26).

After Care

When awake following sedation or treatment for other complications, the patient should be thoroughly informed of what made it necessary for emergency department staff to administer urgent sedation or other emergency measures. The process is often distressing for some patients and an adequate explanation might help to alleviate the concern of patients, families and friends (7).

Patients should also be offered the opportunity to access specialist alcohol and drug treatment services. Ideally, this would be best initiated while the person was still in the emergency department, but contact details or even an appointment might also be made prior to discharge. Suitable educational material such as '*A users guide to speed*' (available from the National Drug and Alcohol Research Centre, University of New South Wales) might also be given to the patient prior to discharge from the emergency department, particularly to those who decline follow-up specialist care.

Patients should be informed that if psychotic symptoms have occurred in the context of psychostimulant toxicity and behavioral disturbance, they are much more vulnerable to the effects of even small amounts of stimulants in the future (27).

If psychotic symptoms persist following the administration of the sedation protocol, it is recommended that specialist psychiatric services be called to assess the patient whilst in the emergency department. Transfer into the care of psychiatric services might be indicated for some patients.

Patients with medical complications require appropriate disposition arrangements.

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Appendices

Appendix 1: Assessment for Serotonin Toxicity

Australian toxicologists have recently developed a clinical decision making algorithm to diagnose serotonin toxicity, which is recommended for use in the emergency department. The Hunter Serotonin Toxicity Criteria Decision Rules are shown in Figure 1, and comprise the three domains in which the key clinical features of serotonin toxicity manifest (22):

- a. Autonomic signs
- b. Neuromuscular changes
- c. Altered mental status.

If the recent use of a serotonergic agent is suspected (peak risk time for cocaine is 20-40 minutes after administration, peak risk time for an amphetamine is approximately two to three hours after administration, and peak risk time for MDMA is 1-3 hours after oral ingestion) or confirmed, then the following algorithm is recommended for use in the clinical setting.

In the presence of a serotonergic agent:

1. IF (spontaneous clonus = yes) THEN serotonin toxicity =YES
2. ELSE IF (induced clonus = yes) AND (agitation = yes) OR (diaphoresis = yes) THEN serotonin toxicity =YES
3. ELSE IF (ocular clonus = yes) AND (agitation = yes) OR (diaphoresis = yes) THEN serotonin toxicity =YES
4. ELSE IF (tremor = yes) AND (hyperreflexia = yes) THEN serotonin toxicity =YES
5. ELSE IF (hypertonic = yes) AND (temperature = $>38^{\circ}\text{C}$) AND (ocular clonus = yes) OR (inducible clonus = yes) THEN serotonin toxicity =YES
6. ELSE serotonin toxicity = NO

Figure 1. Hunter Serotonin Toxicity Criteria: Decision Rules (Dunkley, Isbister, Sibbritt et al., 2003).

Appendix 2: Other Resources and Useful Internet Links

A user's guide to speed. National Drug and Alcohol Research Centre (NDARC) <http://ndarc.med.unsw.edu.au/ndarc.nsf/website/Publications.resources>

Alcohol and Other Drugs: A Handbook for Health Professionals. Australian Government Department of Health and Ageing, 2003.

Australian Drug Information Network (ADIN) www.adin.com.au

Centre for Mental Health, *Management of adults with severe behavioural disturbance: guidelines for clinicians in NSW*, (amended May 2002) New South Wales Health Department (2001-2002). www.health.nsw.gov.au

HyperTox guidelines: www.hypertox.com

Management of patients with psychostimulant use problems: guidelines for general practitioners.

Australian Government Department of Health and Ageing
www.nationaldrugstrategy.gov.au/publications/illicit.htm
www.nationaldrugstrategy.gov.au/index.htm

Models of intervention and care for psychostimulant users. (2nd ed). Commonwealth Monograph Series Number 51, Baker, A., Lee, N. K. & Jenner, L. (eds) (2004)

Australian Government Department of Health and Ageing.
<http://www.health.gov.au/pubhlth/publicat/mono.htm>

Psychostimulants - Management of acute behavioural disturbances: guidelines for police services.

Australian Government Department of Health and Ageing
www.nationaldrugstrategy.gov.au/publications/illicit.htm
www.nationaldrugstrategy.gov.au/index.htm

Therapeutic Guidelines: Psychotropic Version 5 (2003). Melbourne: Therapeutic Guidelines Ltd.

Appendix 3: Recommendations for Implementation of the Draft Guidelines

1. Endorsement from relevant professional bodies should be sought for example the Royal Australian College of Emergency Medicine. It is acknowledged that further revision of this draft may take place following this consultation process.
2. The draft guidelines, once ratified, could be promoted through relevant publications.
3. Consideration should be given to training opportunities for emergency department staff in the implementation of these draft guidelines (training may also address the area of psychostimulant use generally):
 - a. training would ideally include the utilisation of a set of educational resources to be used by all emergency department staff to standardise training across jurisdictions;
 - b. resources might include videos demonstrating signs of psychostimulant toxicity and behavioural disturbances prompted by psychotic symptoms, and detailed photographs of the various types of psychostimulants;
 - c. more intensive training could be offered to emergency department staff who have only minimal experience in the alcohol and other drugs field; and
 - d. relevant medical training organisations should be encouraged to familiarise medical students with the guidelines specifically, and drug and alcohol interventions generally.
4. An evaluation strategy should be developed for each state (may include systematic data collection of numbers of patients with psychostimulant toxicity treated in emergency departments nationally, emergency department staff awareness of and satisfaction with the guidelines etc).
5. Regular review of the guidelines should be undertaken to ensure the guidelines are updated and modified when required, in an effort to continue to meet local requirements and remain consistent with local resources and conditions.

Appendix 4: Stakeholder Involvement and Thoroughness of Development

The development of these draft guidelines represent one component of the Update of the National Drug Strategy Monograph no. 32: Models of Intervention and Care for Psychostimulant Users project, funded by the Commonwealth Department of Health and Ageing. Draft guidelines for the management and treatment of individuals with psychostimulant-induced behavioural disorders and toxicity were developed for four front-line worker groups: emergency departments, ambulance services, general practitioners, and police services.

Due to the limited available literature or evidence for the specific management of psychostimulant users in the emergency department setting, the development of these draft guidelines have been informed by the opinions of an expert panel of clinical and academic staff. The expert panel have also extrapolated from the general alcohol and other drug and emergency medicine literature where appropriate.

An Expert Reference Group who oversaw the update of the monograph publication, at its inaugural meeting in July 2002, determined the methodology that would be undertaken in developing the draft guidelines. It was agreed that the model would be consistent with the National Health and Medical Research Council (NHMRC, 1998) and AGREE (2001) recommendations for developing guidelines. Specifically:

1. The monograph will describe the natural history of psychostimulant-related presentations for the four key groups, and provide a written resource
2. An expert panel of appropriate police, clinical and academic personnel will be convened to inform the content of the draft
3. Various scenarios will be put to the expert panels to determine if evidence for intervention and management of those conditions exist and are applicable and rate the quality of that evidence
4. The draft guidelines will be comprehensive, flexible and adaptable for various settings across Australia
5. The draft guidelines will be circulated to other relevant experts around the country for comment to ensure varied input and wide acceptance for the dissemination phase.

It was agreed that a full-day meeting of experts would be convened in Brisbane during December 2002. A guest list of experts from the relevant fields (police, ambulance, general practice and emergency department) was generated, and preparations for the meeting were undertaken.

Appendix 5: Agenda and List of Experts Present at Development of Draft Guidelines Meeting, Brisbane, December 2002.

**Management Guidelines Development Meeting
Thursday 12th December 2002
184 St Paul's Terrace, Fortitude Valley 9.30am–3.30pm**

AGENDA

Meeting opens 9.15 am for coffee and informal welcome

Session 1 Whole Group
9.30am–10.30am Introduction, welcome and outline of day.
Dr Amanda Baker

Session 2 Three Key Groups
10.30am–12.30pm Draft guideline development in discipline-specific groups.

Break into three small groups

- 1) Ambulance service staff & ambulance staff (group facilitated by Professor Ian Whyte & Mr Ron Henderson)
- 2) Police Officers (group facilitated by Inspector Peter Mansfield, Ms Megan Smith & Senior Sergeant Damien Hansen)
- 3) General Practitioners (group facilitated by Dr Ed Heffernan)

These groups will utilise case scenarios to generate discussion and a consensus approach to the development of draft guidelines for the 4 key areas.

Lunch: 12.30–1pm

Session 3 Three Key Groups Continue
1pm–2pm Finalise draft guidelines.

2pm–3pm Field trial planning: Who, where, how? Mechanism for feedback and revision, mechanism for circulation for comment from other experts including identification of experts, professional board ratification/approval.

Session 4 Whole Group
3pm–3.30pm Brief feedback from small groups and close.

Close 3.30 pm

Guidelines Development Meeting Participants

Dr Amanda Baker, University of Newcastle (Chair of the Psychostimulant Monograph Group)

Associate Professor Ian Whyte, Senior Staff Specialist Clinical Toxicology & Pharmacology, Newcastle Mater Hospital

Dr Ed Heffernan, Forensic Mental Health Service

Dr Bill Kingswell, Forensic Mental Health Service

Ms Megan Smith, Senior Project Officer, Qld Police Services

Inspector Peter Mansfield, Drug & Alcohol Co-ordinator

Senior Sergeant Damian Hansen, Drug & Alcohol Co-ordination

Senior Sergeant Philippa Woolf, Operations Resource Co-ordinator, NSW Police

Senior Sergeant Ray Knight, Brisbane Watchhouse

Sergeant Don Schouten, Fortitude Valley

Sergeant Shane Turner, Brisbane City

Sergeant Terry Honour, Southport

Sergeant Troy Schmidt, Logan Central

Sergeant Bruce Diamond, Surfers Paradise

Mr Ron Henderson, Intensive Care Paramedic and QLD State Drug Unit Coordinator

Dr Richard Bonham, Queensland Ambulance Service Medical Director and Emergency Specialist

Mr Gavin Leader, Intensive Care Paramedic and Regional Drug Unit Coordinator for Ipswich area

Mr Christian Francois, Intensive Care Paramedic and Regional Drug Unit Coordinator for Greater Brisbane Region

Mr Darrin Hatchman, Intensive Care Paramedic and Regional Drug Unit Coordinator for Gold Coast Region

Dr David Spain, Emergency Department Gold Coast Hospital

Dr David Green, Emergency Department Gold Coast Hospital

Dr David Hunt, General Practitioner, AOD specialist

Dr Wendell Rosevear, General Practitioner, AOD specialist

Ms Kay McInnes, Queensland Health

Ms Tarra Adam, St Vincent's Hospital & NDARC

Mr Michael Arnold, NSW Users and AIDS Association

Mr Anthony Nutting, Queensland Health

Dr Wasana Pattanakumjorn, Visiting Psychiatrist, Thailand

Ms Angela Dean, Queensland Health

Ms Linda Jenner, University of Newcastle