



Australian Government

Department of Health and Ageing

Drug testing kits

Detailed discussion paper on
social, health and legal issues

This document consolidates research undertaken in 2001
and updated in May 2005

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Preface

In 2001, Ms Sue Henry-Edwards (then) of the Drug and Alcohol Services, South Australia, was commissioned to produce a discussion paper on social, health and legal issues in relation to drug testing kits. In 2005, this work was updated by Dr Sophie Pointer and Associate Professor Robert Ali of the Drug and Alcohol Services, South Australia. This paper consolidates the original work and the subsequent update.

There is very little published material on this issue and most of the information which is available is anecdotal and comes from interest groups which are likely to be subject to bias. There are few, if any, rigorous evaluations of the impact of publicly available drug testing kits. Consequently, this paper reflects what can be determined from the currently available information and cannot be regarded as a definitive view regarding the endorsement or non-endorsement of drug testing kits.

Introduction

Discussion of "pill testing" and related issues has become a more frequent and, perhaps, a more forceful topic of conversation in recent years. Proponents of public access pill testing have become more vocal and arguments have been put forward espousing the benefits in terms of harm reduction and prevention of overdose and death.

Drug testing covers a wide range of activities involving two main categories of drug tests. The first group consists of tests to determine whether people have used or been in contact with particular drugs. This type of test has, until recently, been confined to professionals such as prison officers, customs, forensic scientists, and medical laboratories, but there is now a set of test kits available on the market in Australia which are promoted as enabling parents to detect whether their children are using drugs. These tests are said to detect the presence of traces of cannabis, cocaine, heroin or ecstasy on surfaces which may have been used for drug preparation. These testing kits will not be covered in this paper.

The second type consists of tests designed to assess the composition, strength or purity of drugs and includes testing methods ranging from laboratory based procedures such as gas chromatography through to reagent based tests which can be used outside of the laboratory setting. This type of testing may be used for licit or illicit drugs and has generally not been available to the general public. However, uncertainty about what is contained in ecstasy tablets, and concerns about the possibility that they may contain poisonous adulterants or more toxic drugs such as para-methoxy-amphetamine (PMA), have led to the development of drug testing kits which purport to identify the contents of ecstasy tablets. The kits are targeted for use by ecstasy consumers themselves as well as by harm reduction organisations who conduct pill testing at events, such as raves, where ecstasy is likely to be used. A number of groups overseas (eg DanceSafe in the US, Ravesafe in Canada, Release in the UK) have promoted the use of the kits as a harm reduction measure. These kits have recently become available in Australia and are reported to have been used by individual ecstasy consumers and a volunteer harm reduction organisation called 'Enlighten'.

The availability of ecstasy testing kits gave rise to the following questions:

- Social and health aspects relating to the availability and use of drug testing kits;

- Law enforcement implications of possession of illicit drugs by persons conducting tests and those seeking to have their drugs tested;
- Legality of manufacture or sale of these kits in Australia;
- Potential legal liability of manufacturers, marketers, and distributors of testing kits;
- Potential increase in harm if users are given the impression that the drug that has been tested is safe to use; and
- International experience and government positions with respect to availability of ecstasy testing kits.

These questions in relation to ecstasy testing kits provide the major focus of this paper. A test to ascertain the strength of heroin samples has also been proposed. It has been suggested that use of this test would enable users to more accurately measure their dose and reduce the risk of overdose. Implications of this test will also be discussed briefly.

Background¹

What is ecstasy?

Ecstasy is the popular street name for methylene-dioxy-methamphetamine (MDMA) which is a derivative of amphetamine. It is referred to as an 'entactogen' as it makes users feel sensations of empathy, tactility, and has both stimulant and hallucinogenic properties. It is well absorbed from the gastrointestinal tract. Effects become apparent approximately 20 minutes after oral administration and last for about four hours. Recent evidence indicates that the relationship between MDMA dose and blood concentration may not be linear. Hence small increases in dose may produce disproportionate increases in effect, possibly contributing to toxicity.

MDMA acts on the neurotransmitters serotonin and dopamine. Initially MDMA promotes release of serotonin but this eventually leads to depletion of the neurotransmitter and a decrease in serotonin levels. Dopamine levels are also increased. Serotonin is involved in the regulation of aggression, memory, mood, sexual activity, sensitivity to pain, sleep, and temperature, while dopamine is involved in the control of movement, cognition, motivation and reward.

The primary positive effects of MDMA are an elevated mood state encompassing feelings of energy, euphoria, intimacy and closeness to other people. Negative psychological effects include paranoia, anxiety, and depression. Common short term physical effects are pupil dilation, increased jaw tension and grinding of teeth, loss of appetite, dry mouth, tachycardia, hot and cold flushes, and sweaty palms. Users also report longer term effects of insomnia, depression, headaches and muscle stiffness.

Tolerance to MDMA appears to develop rapidly and users report a decrease in positive effects and an increase in negative effects with successive doses.

¹ This section relies heavily on information from the following reviews:

Gowing L, Henry-Edwards S, Irvine R, Ali R (2001) *Ecstasy: MDMA and other ring-substituted amphetamines*. Monograph prepared for the World Health Organization.

Henry-Edwards S (2001) *Psychostimulants in Australia*. Prepared on behalf of the National Expert Advisory Committee on Illicit Drugs.

The range of substances marketed as ecstasy

Experience world wide indicates that a wide range of substances is marketed as ecstasy. Forensic analysis of drugs seized as ecstasy have revealed other amphetamine type stimulants such as amphetamine, methamphetamine, MDA, MDEA, PMA and MBDB.

Tablets or capsules have also been found to contain chemically unrelated compounds with little or no psychotropic effect or to contain a range of other drugs such as ketamine or dextromethorphan. Testing undertaken by the Drugs Information and Monitoring System in the Netherlands identified LSD, amphetamine, 4-MTA, DOB, 2CB, and atropine being sold as ecstasy at various times. They also found wide variations in the dose of MDMA in different tablets.

In NSW, recent law enforcement investigations into syndicates producing psychostimulant tablets found that the tablets consisted of low-grade methylamphetamine. The designs of these tablets mimicked known designs of MDMA tablets sourced from Europe. Analysis of ecstasy tablets seized in NSW during 2000, found that the majority consisted of methylamphetamine. Similar trends have been reported in Queensland and Victoria

There is also evidence that some tablets or capsules marketed as ecstasy contain mixtures of substances. One such mixture reported by the Australian Bureau of Criminal Intelligence (ABCI) included methylamphetamine, lignocaine, cocaine, ephedrine and heroin (ABCI 1999). There is also evidence of mixtures of ketamine and amphetamine being marketed as ecstasy in an attempt to imitate the effects of MDMA.

The effects of the non MDMA drugs most commonly found in ecstasy tablets are detailed below.

- Gamma-hydroxy- Butyrate (GHB) also known as “G”, and “Liquid Ecstasy” is an anaesthetic drug with sedative properties. It is a central nervous system depressant. GHB can be produced in clear liquid, white powder, tablet and capsule forms and is often used in combination with alcohol, making it even more dangerous. At lower doses, GHB can relax the user, but, as the dose increases, the sedative effects may result in sleep and eventual coma or death.
- Ketamine also known as “Special K”, “Kit Kat”, “Vitamin K” and “Ket”, is an injectable anaesthetic used by veterinarians. Ketamine is produced in liquid form or as a white powder that is often snorted or smoked with marijuana or tobacco products. In the short term, use of a small amount of ketamine results in loss of attention span, learning ability and memory. At higher doses, ketamine can cause delirium, amnesia, high blood pressure, depression and severe breathing problems.
- Methamphetamine also known as “Speed”, “Ice”, “Chalk” “Meth” is often made in clandestine laboratories from relatively inexpensive over-the-counter ingredients. Methamphetamine can be smoked, snorted, injected or orally ingested. Methamphetamine use can cause serious health concerns, including memory loss, aggression, violence, psychotic behaviour and heart problems.
- Lysergic Acid Diethylamide (LSD) also known as “Acid” is an hallucinogen. It may cause unpredictable behaviour depending on the amount taken. It is typically ingested orally. LSD is sold in tablet, capsule and liquid forms as well as in pieces of blotter paper that have absorbed the drug. After taking LSD the user in the short term may feel:

numbness, weakness, nausea, increased heart rate, sweating, lack of appetite, and in the long term, “flashbacks” and sleeplessness. Some people can react badly to hallucinogens, resulting in ‘bad trips’ especially at higher doses.

- 2CB is 4-bromo-2, 5-dimethoxyphenethylamine. Along with other amphetamine type stimulants, it belongs to the chemical class of drugs known as phenethylamines and like MDMA, it is an “entactogen”. 2CB is usually ingested orally. It is extremely dose sensitive – a slight increase in dosage can produce radical increase in effects.
- Para-methoxyamphetamine (4-methoxyamphetamine), commonly known as PMA has highly toxic hallucinogen effects with central nervous system stimulant properties. These effects are more pronounced than MDMA or MDA. The physical effects generally include greatly increased pulse rate and blood pressure, high body temperature and nausea.

Epidemiology of ecstasy use

Ecstasy is primarily used recreationally, mainly at weekends in association with social events, especially raves and dance parties. However, studies, particularly in the UK and Australia, have also identified regular and intensive use. There may also be a trend of increasing use by injection. Most users appear able to regulate their use of ecstasy but some progress to problematic use. Some researchers have suggested that problematic use might constitute dependence but this is an aspect for further debate.

Several indicators of the epidemiology of ecstasy use currently exist and are able to shed some light on the extent of ecstasy use within Australia. For example, the National Drug Household Survey, the Party Drugs Initiative (PDI) of the Illicit Drug Reporting System (IDRS) and the National Coronial Information System (NCIS) all provide relevant information and data.

The National Drug Strategy Household Survey provides data on the use of ecstasy within Australia's general population. In 2004, 7.5% of Australians aged 14 years and over had ever used ecstasy, a significant increase from 2001 (6.1%). Recent use of ecstasy (within the last 12 months) had also significantly risen from 2.9% of Australians aged 14 years and over in 2001 to 3.4% in 2004. Prevalence was highest among those aged 20-29 (22% ever used, 12% recent use).

The PDI has been conducted in three states (NSW, QLD and SA) since 2000 and nationally in 2003 and 2004. Valuable information on trends in ecstasy use among regular ecstasy users is available on a State and National level including information on the price, purity, availability and patterns of use of ecstasy. According to the national results typical use occurs on a fortnightly basis and there are indications of an increase in the proportion of users using more than one ecstasy tablet in typical session (Stafford et al, 2004).

There are significant barriers to identifying ecstasy use and related harms among existing hospital and deaths databases (eg. ABS Mortality Register) as ecstasy is not distinguished from other amphetamine related deaths. Ecstasy related cases are also not routinely or methodically recorded by ambulance crews. However, the NCIS is able to identify deaths in which ecstasy was present. There are limitations to the data and due to the small number of cases generalisation to the wider population is not advisable. In the period 2001 to 2004 the NCIS identified 112 ecstasy-related deaths. Ecstasy was considered to be a primary

contributor to death in only 51 (46%) of these cases and MDMA was the only drug present in 6 of these deaths². Kinner, Fowler, and Fischer (2005) in an analysis of the NCIS data concluded that "death as a direct result of ecstasy consumption seems to be very rare in Australia compared to the extent of use" (p.4).

While National hospital and deaths data collections do not identify ecstasy related cases one State hospital has instigated a pilot program monitoring the types of drug presentations to the Emergency Department of a major metropolitan hospital. The South Australian Designer Drug Early Warning System (D₂EWS) is operated by the Royal Adelaide Hospital with the assistance of Drug and Alcohol Services South Australia. The primary objective of the D₂EWS is to enhance the evidence available to guide health and law enforcement activities in reducing harm arising from psychostimulant and other recreational drug use. This has been done by establishing a clinical toxicology database and monitoring process for drugs of abuse in patients presenting to the Royal Adelaide Hospital Emergency Department (RAH ED). The project covers range of recreational drugs, including alcohol, benzodiazepines and opiates, but originally was to concentrate on amphetamine like substances.

The information collected by D₂EWS will lead to:

- Early identification of new recreational substances as they present to emergency departments;
- Early identification of changing trends in substance abuse;
- Better information on relationship between quantified drug serum levels and clinical features of presentation;
- Increased effectiveness of clinical interventions for specific drugs of abuse; and
- Improved efficiency and recording of relevant information by clinicians, thus improving patient care.

Preliminary results indicated that out of a total of 338 drug-related presentations to the RAH ED over a 6 month period, the overall detection rate for psychostimulants was approximately 3 times that of opioids (108 (32%) vs 38 (11%)). The majority of amphetamines detected to date have been methamphetamine (60%) or MDMA (33%). No cases of PMA or MDA have been detected.

Over the coming months D₂EWS will commence implementation of a wider dissemination of findings to other emergency departments across the State through a series of alert bulletins and quarterly reports.

Neurotoxicity

There is evidence from animal studies that administration of MDMA produces damage to serotonin neurones and that this is likely to persist. Human studies using brain imaging techniques have also found persisting abnormalities in brain structure in ex-users of ecstasy, even with moderate use. Although the significance of these findings for human functioning is uncertain there is a consistent finding in psychological studies that ecstasy users have slight impairments in short term memory function which cannot be attributed to the concurrent use of other drugs.

² Note that since ecstasy was usually one of a range of drugs detected, other drugs would also be classed as primary contributors. For more information on this issue refer to the *Party Drug Trends Bulletin April 2005 Update*.

Animal studies indicate that the effect of MDMA is influenced by ambient temperature with neurotoxicity being observed when the ambient temperature is 26 to 30°C but not at temperatures of 20 to 24°C.

Overall, there is mounting evidence that ecstasy has a neurotoxic effect, however, the long term consequences of ecstasy use in humans remain uncertain.

Health effects of ecstasy use

Note that the information in this section was gathered in 2001 and, therefore, details what was known about the health effects of ecstasy use at that time. Research into the health effects of ecstasy has continued to grow and a large number of papers have been published in scientific journals since 2001. A search of Medline using the terms "ecstasy review articles" between 2001 and 2005 identified over 80 entries. A 2005 update is provided at the end of the section.

Ecstasy users seldom report serious adverse effects but do report a number of physical and psychological problems, which occur during intoxication and while coming down. Most common physical effects include jaw clenching, energy loss, muscular aches, hot and cold flushes, blurred vision, numbness and tingling, profuse sweating, vomiting, and inability to urinate. Most common psychological side effects include irritability, trouble sleeping, depression and confusion. A significant minority of users report long term problems including weight loss, depression, irritability, energy loss, trouble sleeping, anxiety and teeth problems. A small minority experience severe reactions including seizures, suicidal thoughts and violent behaviour but ecstasy appears less likely to lead to violence than amphetamines or cocaine.

Given the hundreds of thousands of ecstasy tablets that are probably consumed worldwide each weekend the number of published reports of acute adverse effects is very low. A recent comprehensive review identified only 160 reports of adverse effects (Gowing et al 2001). Interpretation of the results of the published case reports is difficult because of uncertainties about the nature and amount of drugs consumed. In only 2/3 of reported cases had the drug use been confirmed by analysis of blood or urine samples. A number of those analyses indicated the presence of a variety of other amphetamine type stimulants, alcohol or other drugs.

The review concluded that MDMA alone can produce adverse effects including hyperthermia, disturbances of sodium and fluid balance, disturbances of cardiac function, cerebral haemorrhage, disturbed respiratory function, sudden collapse, and trauma while intoxicated (Gowing et al 2001).

Almost half (43%) of the published case reports of acute adverse effects of ecstasy use involved hyperthermia. Hyperthermia is typically accompanied by other serious clinical problems including seizures or convulsions, abnormalities in blood coagulation, breakdown of muscle tissue, and impairment of liver and kidney function. Forty eight percent of cases involving hyperthermia and 7% of cases involving disturbances of sodium and fluid balance resulted in death. The dose of MDMA taken does not predict the severity of the outcome and so these adverse effects cannot be called 'overdoses'. Animal studies suggest that the risk of hyperthermia is increased when the ambient temperature is high. The influence of ambient temperature is significant given that most reports of ecstasy-related hyperthermia in humans

are related to use in dance party or nightclub settings where a high ambient temperature is probable.

A number of other acute adverse effects of ecstasy use have been reported which may be the result of amphetamine type stimulants other than MDMA. These include seizures without hyperthermia or disturbances of sodium and fluid balance, and cerebral ischaemia or blood vessel ruptures.

PMA appears to be more toxic than MDMA and, to date, all published cases of adverse effects of PMA use have been fatal. Deaths associated with PMA sold as ecstasy have been reported in Australia, US, Canada, Norway, Denmark, Sweden, Spain, and Austria. Like MDMA, acute adverse effects of PMA typically involve hyperthermia (London Toxicology Group 2001).

Liver damage and some psychiatric problems (depression, panic disorder, “flashbacks” and delusions) can occur days or weeks following ingestion of ecstasy. Post acute psychiatric problems appear to occur in individuals who are already vulnerable due to family or personal history and in those who have consumed ecstasy concurrently with other drugs.

It appears that the prevalence of serious acute adverse effects of ecstasy use is low. However, the occurrence of serious acute adverse effects is unpredictable and when they do occur there is a high risk of death or substantial health problems. The risk of death is considerably higher with PMA and there may be some benefit in a testing procedure which could reliably detect this substance but it is important that users are aware that use of MDMA by itself can result in adverse effects.

Amphetamines, which are frequently sold as ecstasy, can also result in neurotoxicity and a range of serious health and social problems including psychosis, mood swings, anxiety, depression, paranoia, mania, hallucinations and/or violent behaviour. Physical problems include tiredness, loss of appetite, dehydration, jaw clenching, headaches, muscle pain, shortness of breath, tremors, and palpitations. Psychosis, paranoia and violent behaviour, in particular, are very different to the sought after effects of ecstasy and, in the context of a rave or dance party, could have serious consequences for the user and the other people present. There may be some benefit in testing if it enables users to avoid these effects.

2005 update on health effects

An increasing body of evidence is emerging of the effects of ecstasy use on cognitive functioning, particular on memory. For example, a meta analysis carried out in 2003 demonstrated significant decreases in both short-term and long-term verbal memory, processing speed and an increase in processing errors among ecstasy users (Verbaten, 2003). A number of other studies have demonstrated a link between ecstasy use and declines in executive function however there is still considerable debate about the confounding effects of polysubstance abuse in these studies (Halpern et al., 2004).

Aside from the experimental literature, more local knowledge of the health effects of ecstasy use is available from the users themselves in the 2004 Part Drugs Initiative report. Regular ecstasy users were asked to describe the risks and benefits they perceived to be associated with taking ecstasy. Nationally, 95% of the participants were able to nominate at least one

benefit while 87% identified at least one risk. Ten percent of the sample reported that there were no risks with taking ecstasy.

Existing harm reduction strategies for ecstasy use

Existing harm reduction strategies for ecstasy use are focussed on reducing the risk of hyperthermia and disturbances of sodium and fluid balance through the provision of information regarding the need to keep cool, consume appropriate amounts of water and take breaks from dancing or other physical activity. National Dance Party Protocols were endorsed and disseminated (to jurisdictions) for implementation nationally in 1997 but have not been published. The protocols make recommendations regarding ventilation and air temperature, the provision of sitting out facilities, provision of free water to patrons and the provision of preventive and harm reduction information regarding psychostimulant use.

Drug testing kits

Ecstasy testing kits

Note that the information in this section was gathered in 2001 and, therefore, details the test kits available at that time. A 2005 update is provided at the end of the section.

The test kits available on the market (in 2001) are listed below. All of the tests available work by mixing a scraping from a tablet with a drop of reagent and then matching the resulting colour against a colour chart.

Chemical Generation (Australia)

Chemical Generation is an Australian producer of two testing kits based on a colour metric spot test. The two test kits are known as 'E1:Marquis reagent' and 'E2:2nd Defence' which is used as a confirmatory test after using the Marquis Reagent. The recommended retail price for E1 kits is \$22.95 (AUD) and E2 is \$23.95 (AUD).

EZ Test (UK and Europe)

According to the EZ Test website the kit comes in small and large sizes (the small kit tests up to 3 samples and cannot be re-used while the large kit is resealable and contains 300 drops). It uses Marquis Reagent. The kit also comes with an information sheet and colour chart. The EZ kit is sold for \$31 (AUD) and can be purchased through the Erowid website.

The Green Party (UK)

The Green Party offer two testing kits, one consisting of Marquis reagent and a micrometer, and the other consisting of the reagent alone. The Green Party advises people to compare measurements taken with the micrometer against information on laboratory-analysed tablets posted on their website.

DanceSafe Testing Kits (USA/North America)

DanceSafe charge \$25 (\$US) for a large (15ml) Marquis Reagent kit which can be purchased through the Erowid or the DanceSafe website.

The most common reagent is the Marquis Reagent which consists of Sulphuric Acid and Formaldehyde. The EZ reagent also includes methanol in an attempt to slow down the chemical reaction. Marquis Reagent has been used as an indicative test by forensic and law enforcement bodies for many years (O'Neal et al 2000, Velapoldi and Wickes 1974) and is

currently used in the UK for presumptive testing for morphine, heroin and amphetamine (Home Office 1998). It is not, however, authorised as a presumptive test for ecstasy (Home Office 1998).

Websites on drug testing all report that Marquis Reagent turns black or purplish black very quickly when exposed to MDA, MDMA, or MDE; slowly turns grey to black with DXM; turns orange then brown when exposed to amphetamine or methamphetamine; and green/yellow when exposed to 2CB. Marquis Reagent can only give an indication of the substance likely to be the dominant ingredient in the pill. It can give no indication of other ingredients and no indication of the quantity of the dominant ingredient. It cannot distinguish between MDMA, MDA, or MDEA. PMA does not cause a colour change when tested with Marquis Reagent. The US National Institute of Justice Standard for Colour Test Reagents list of final colours produced by reagents with various drugs includes MDA Hydrochloride but does not include MDMA (National Institute of Justice 2000).

Chemical Generation in Australia produces two reagents E (Marquis Reagent) and E2 Second Defence which is a confirmatory test for use after the Marquis Reagent. According to the company, E2 contains Sulphuric Acid, water and Vanadium. This is based on the Mandelin Reagent which the US National Institute of Justice lists as containing Sulphuric Acid and Ammonium Vanadate. Chemical Generation claim that the two tests can identify Ecstasy, Speed, Ketamine, 2CB, Opiates, DXM, strychnine sulphate and PMA. Information from the US National Institute of Justice Standard suggests that the Mandelin Reagent can distinguish between opiates, cocaine, amphetamine HCl, d-Methamphetamine HCl, and methylphenidate HCl (Ritalin) but no data is provided on colours produced by MDMA, PMA, ketamine, strychnine sulphate or DXM. The following chart of colours produced using the “E2 Second Defence” (Mandelin) Reagent is taken from the Ecstasy Issues paper prepared by Victoria Police and the Commonwealth Department of Health and Aged Care.

Colour	Indicates the presence of
Blue/Dark Purple/Black	MDMA
Red/Purple	MDA
Olive	Methamphetamine (speed)
Green/Red/Brown	PMA – (para-Methoxyamphetamine)
Effervescence, Dark Orange/Brown	Ketamine-like substance

Forensic testing

Crackdown Drug Testing Ltd is a UK company which markets drug testing kits to law enforcement agencies in the UK. They produce a set of reagents which are used in particular groupings depending on the substance suspected and require a stepped process of testing to identify the presence of a particular drug. In contrast to the kits marketed to users, their kit for ecstasy testing uses four reagents and specifies the following steps (A1 Websites Ltd 1999).

1. A: Marquis Reagent – if a purple colour develops proceed to test B
2. B: Nitric Acid Reagent – If a yellow colour develops proceed to test K
3. K: Opiates Reagent – If a purple colour develops proceed to test (L)
4. L: Brown Heroin Reagent System – Following positive results on tests A, B and K a small sample of the suspect material is placed in Test (L). If ecstasy is present an immediate purple colour will appear with the breakage of the first ampoule.

Typically, colour test kits such as the one described are used to indicate the presence of an illicit substance and further confirmation is obtained by laboratory testing using gas chromatography, thin layer chromatography or high pressure liquid chromatography which is able to accurately identify all of the substances present in the sample as well as the quantity of each.

Limitations of existing test kits

The ecstasy testing kits available to users and harm reduction groups in Australia suffer from a number of limitations:

- False positive results are possible because a variety of substances may react with a single reagent to produce very similar colours. It can also be difficult to interpret the colours produced by the tests, particularly if testing is undertaken in poor light. (O'Neal et al 2000, Winstock and Vingoe 2000)
- The colour produced may vary as a result of the concentration of the drug, the chemical form of the drug (whether it is a salt or base form and which salt form is present), and the presence of contaminants in the sample (O'Neal et al 2000)
- The drug detection limit of a test is the smallest quantity of pure drug which can be detected using the particular test. If the scraping contains insufficient pure drug then the test result will not be valid. The drug detection limits for MDMA, MDA, MDE or 2CB with Marquis or Mandelin Reagent are not available although the National Institute of Justice gives limits for amphetamine (10micrograms with Marquis, 20 micrograms with Mandelin) and methamphetamine (5 micrograms with Marquis and 100 micrograms with Mandelin) which are significantly lower than the amounts typically found in street samples (National Institute of Justice 2000, O'Neal et al 2000).
- Single reagents are unable to specifically identify a number of substances. Law enforcement agencies which use colour tests use a stepped testing procedure with multiple reagents to improve the specificity of their results and back this up with laboratory testing (O'Neal et al 2000).
- Currently available kits cannot detect mixtures, they can only indicate the presence of the dominant ingredient. The kits do not provide any indication of dose, volume or purity.
- Marquis Reagent alone can not identify ketamine or PMA or distinguish between MDMA, MDA, MDE. Testing with this reagent needs to be backed up by comprehensive lab testing if the contents of the sample are to be accurately identified. Using E2 – Mandelin reagent in conjunction with Marquis does increase the accuracy of the test and appears to also indicate PMA and ketamine.
- The ambient temperature may affect the speed of reaction of the test kit. Speed of reaction is an important aspect of analysing the results of a reagent test. So in hot weather a DXM reaction might look like an ecstasy reaction. Likewise, in very cold weather, or if the reagent had been kept in the refrigerator, a real ecstasy reaction might slow down so that it appears to be a DXM reaction.
- A further source of uncertainty arises because ecstasy pills are illicit. They are made by amateurs and are not subject to the level of quality control characteristic of pharmaceutical products. Illegal pills may not be well mixed and there are anecdotal reports of a person who tested the same tablet four times and obtained four different results (Paul Dillon, Triple J website).

The use of a stepped testing process similar to that used in forensic testing and outlined above allows for more accurate identification of the presence of particular drugs. However, the tests

will still only be indicative and are unlikely to identify additional substances present or give any indication of the quantity of active ingredients.

The result of these limitations is that even after testing there is still uncertainty about the contents of ecstasy pills.

Heroin strength test

A simple test of the strength of heroin samples has been proposed as a measure to reduce the risk of heroin overdose (Anonymous 2000). The rationale for the development of this test was the finding of a moderate correlation between overdose deaths and both average heroin purity and range of heroin purity (Darke et al 1999). On the basis of 200 samples of heroin analysed at the Forensic Science Centre in South Australia it was concluded that the typical strength of an individual dose of heroin for personal use was between 0 and 15 mg.

The test involves dissolving a portion of the heroin sample in 0.4ml of water and placing 1 drop of the solution on a black plastic surface. A drop of sodium carbonate solution (1kg in 5 litres of water) is then added. A white precipitate is formed immediately. The colour of this precipitate is then compared with a reference card showing the precipitate formed by known weights of pure heroin. In developing the test, weights of 0, 5, 10 and 15 mg of pure heroin hydrochloride were used and the resulting precipitates were photographed to provide the reference cards.

The test can indicate the strength or concentration of heroin in the solution but not which other adulterants or substances may be present. The paper describing the test does not make clear what amount of an illicit sample would have to be dissolved in the water to validly carry out the test. Pure solutions of codeine sulphate, morphine hydrochloride and amphetamine sulphate did not form precipitates and the addition of sugar or glucose to the heroin hydrochloride solutions had no effect on the test results.

The test has not been formally trialled and there is no evidence regarding its usefulness. It is clear that the accuracy of the test relies on the ability of the user to precisely measure quantities of liquid less than 1mL, and to measure an appropriate amount of the sample to be dissolved. It is unlikely that such precise measuring equipment would be available to the average user unless it was packaged in a kit and the accuracy of the test would still depend on the capacity of the user to correctly use the equipment.

Heroin strength or purity makes only a moderate contribution to the likelihood of overdose and death. Other factors which are potentially more important include lowered tolerance and poly drug use. It is, therefore, unlikely that the use of this test would make a major contribution to reducing overdose deaths.

2005 update on drug testing kits

A number of additional drug testing kits have made their way onto the market since 2001. Few investigations into the reliability and validity of the reagent tests have been carried out and the manufacturers' claims must be viewed with caution. For example, while the tests are reasonably reliable in detecting the presence of MDMA (not the concentration), one recent South Australian study found only 11% of tablets with combinations of illicit substances had all correctly identified using reagent tests (Camilleri and Caldicott, in press). These researchers found that ketamine was particularly difficult to identify with only 18% of tests correctly identifying the presence of ketamine (confirmed through GCMS analysis).

Currently, the three most commonly accessed kits are as follows:

EZ Test (UK and Europe)

EZ Test currently markets 4 pill testing kits the EZ Test Marquis, EZ Test Mandelin, EZ Test Mecke, and the EZ Test Xtreme.

- EZ Test Marquis: EZ Test Marquis is a chemical called 'Marquis reagent'. It shows different colours for Ecstasy-like substances (MDMA, MDEA and MDA), DXM and 2C-B and speed.
- EZ Mandelin: EZ Test Mandelin is a chemical called 'Mandelin reagent' that shows different colours for Ecstasy-like substances (MDMA, MDEA and MDA), speed, ketamine and PMA.
- EZ Test Mecke: EZ Test Mecke was originally developed to discriminate heroin from morphine. It also reacts to Ecstasy and has proven useful when looking for DXM, a major adulterant in the USA and the 2-CT-xx family. It shows different colors for Ecstasy-like substances (MDMA, MDEA and MDA), DXM and substances from the 2-C-T-xx family
- EZ Test Xtreme: EZ Test XTREME consists of 3 different tests: Marquis, Simon's and Robadope. By cross-referencing the outcomes the manufacturers claim you will know whether your pill has been mixed. It is a three stage process, first, you do a test with EZ Test Marquis to see whether there is an ecstasy like substance (MDMA, MDEA, MDA or MBDB) present in the pill. Second, the Simon's reagent is used to screen for MDMA, MDEA and Meth. Third, Robadope's reagent is used to screen for MDA, Speed, PMA or residue from the production process).

The Green Party (UK)

The Green Party offer two testing kits, one consisting of Marquis reagent and a micrometer, and the other consisting of the reagent alone. Manufacturers claim that a colour change will occur if your pill contains Ecstasy and no colour change if your pill contains adulterants. They purportedly tests for MDMA, MDA, MBDB, MDEA, speed, 2cb, PXM, PMA.

DanceSafe Testing Kits (USA/North America)

DanceSafe offers both a Marquis based reagent test and a Mecke based reagent test as well as access to Simon's reagent. You can purchase a Complete Adulterant Screening test that the manufacturers claim reliably screens for MDMA, MDA, DXM, and speed, as well as many other common adulterants.

The Marquis Reagent is still the most common drug testing kit base reagent and consists of Sulphuric Acid and Formaldehyde. The EZ reagent also includes methanol in an attempt to slow down the chemical reaction. Marquis Reagent has been used as an indicative test by forensic and law enforcement bodies for many years (O'Neal et al 2000, Velapoldi and Wickes 1974) and is currently used in the UK for presumptive testing for morphine, heroin and amphetamine (Home Office 1998). It is not, however, authorised as a presumptive test for ecstasy (Home Office 1998).

Websites on drug testing all report that Marquis Reagent turns black or purplish black very quickly when exposed to MDA, MDMA, or MDE; slowly turns grey to black with DXM; turns orange then brown when exposed to amphetamine or methamphetamine; and green/yellow when exposed to 2CB. Marquis Reagent can only give an indication of the

substance likely to be the dominant ingredient in the pill. It can give no indication of other ingredients and no indication of the quantity of the dominant ingredient. It cannot distinguish between MDMA, MDA, or MDEA. PMA does not cause a colour change when tested with Marquis Reagent. The US National Institute of Justice Standard for Colour Test Reagents list of final colours produced by reagents with various drugs includes MDA Hydrochloride but does not include MDMA (National Institute of Justice 2000).

The Mandelin Reagent contains Sulphuric Acid and Ammonium Vanadate (US National Institute of Justice). Information from the US National Institute of Justice Standard suggests that the Mandelin Reagent can distinguish between opiates, cocaine, amphetamine HCl, d-Methamphetamine HCl, and methylphenidate HCl (Ritalin) but no data is provided on colours produced by MDMA, PMA, ketamine, strychnine sulphate or DXM. The following chart of colours produced using a Mandelin Reagent is taken from the Ecstasy Issues paper prepared by Victoria Police and the Commonwealth Department of Health and Aged Care.

Colour	Indicates the presence of
Blue/Dark Purple/Black	MDMA
Red/Purple	MDA
Olive	Methamphetamine (speed)
Green/Red/Brown	PMA – (para-Methoxyamphetamine)
Effervescence, Dark Orange/Brown	Ketamine-like substance

The Mecke Reagent consists of selenious acid (H₂SeO₃) in concentrated sulfuric acid (H₂SO₄). Mecke reagent is primarily used for the identification of heroin and other opiates. Heroin turns green and then blue-green when treated with Mecke's reagent. Manufacturers claim that the Mecke reagent produces a more distinctive colour reaction than Marquis reagent does in the presence of ecstasy-like substances. The reagent is suggested to be able to quickly and easily distinguish between real ecstasy and all the common substitute drugs on the ecstasy market, including DXM.

Pill test report websites

Public domain

There are a number of public domain pill testing report websites that publish the results of users pill testing efforts and occasionally laboratory test results. The basic premise is that reports on individual pills are available publicly so that other users can access the sites and compare their pills to see what they contain and what effects they produce.

The makers of the sites purport to be engaged in harm minimisation and claim that users can access the site to verify the content of their ecstasy tablet. However, just as there are considerable risks in relying on reagent pill tests, there are similar if not more risks associated with relying on pill report websites.

Four of the most prominent sites are described below.

Ecstasy.org

Ecstasy.org is no longer maintained regularly and the webmasters state that some of the information on the site may now be out-of-date. The website provides an interactive ecstasy testing database where information is provided by the good will of ecstasy testers and ecstasy users.

An example of the information available on the website can be seen in Figure 1. As can be seen the users who submit the reports don't always supply information about the type of reagent test used.

ZORROS		
Date: 25/1/2003 City: Perth Country: Australia	Test result: turned black in 3 seconds Overall effect: Dancy Physical effect: Blurred/distored vision User reports: very nice clean pills, come up really smooth and during. Lasted around 4 hrs on a peak. had two from 10pm until now 6 am and am still going quite nicely. definate 9/10	Logo: z Type: Pill Shape: Round Colour: Beige Texture: Hard Speckled: no

Figure 1. Sample from the ecstasy.org pill testing site.

The site does provide a comprehensive disclaimer/warning:

“It (the information) may not be one hundred percent accurate. Please use the information purely as guidance. This database is primarily for sharing pill test results rather than subjective reports of effects of ecstasy pills. These results have been obtained using home ecstasy testing kits that use a chemical to test for the principal active ingredient in pills sold as ecstasy. They are *not* laboratory results. The test cannot indicate the quantity of a chemical in a pill, nor can it gauge what else might be in the pill if it contains a number of ingredients. Just because a pill tests positive for MDMA, does not automatically mean that it is safe to take. Please check out the safety and harm reduction information elsewhere on this site. If you are comparing a pill to one on the database, check for all distinguishing features: size, colour, logo, shade, score etc. Bear aware that 'copycat' pills exist - pills designed to look just like a 'good' one but with inferior ingredients.”

The site also used to provide a warning service to users identifying dangerous batches of ecstasy appearing on the scene. For example:

“Over the last few months a number of deaths in Europe, Australia and the United States have been attributed to ingestion of pills which were sold as ecstasy but contained an entirely different substance - para-methoxyamphetamine (PMA).

PMA can seem like 'weak' ecstasy at low doses - it takes about half an hour longer to come on, then produces mild euphoria, minor hallucinations and a stimulant effect. However, at higher doses it causes dramatic increases in temperature, blood pressure and heart rate, potentially leading to convulsions, coma and death.

According to the London Toxicology Group, ChEckiT in Austria analysed 48 tablets (September 2000) sold as Ecstasy and found that 4 contained about 40 mg PMA in combination with PMMA and amphetamine. They had the Mitsubishi logo, were red, 7 mm in diameter and 5 mm thick and weighed 230 mg. They were sold as 'red Mitsubishi' or 'killer'”.

DanceSafe.org

DanceSafe.org provides information on the results of pill tests directly from another public domain pill testing site EcstasyData.org. An example of the information available on the website can be seen in Figure 2. As can be seen the information is slightly more comprehensive than that offered by ecstasy.org.

Image	Pill Name	Size (mm) Weight (mg)	Location Date Received	Contents	Marquis Reaction
	Dragon	8.0 x 5.0 270mg	Philadelphia, PA March, 2005	Caffeine (66.7%) MDMA (33.3%)	Black / Purple

Figure 2. Sample from the DanceSafe.org pill testing site.

The disclaimer/warning on the DanceSafe website for the pill testing information states:

“Caution: Just because you have a pill that looks like one of the ones shown here does not mean it contains the same ingredients. There are often many versions of the same logo going around. Measuring the height and width of your pill with a pair of calipers like the ones shown [here](#) (available at any hardware store) can help you determine whether your pill is from the same batch as one we have tested. It is also helpful to test your pills with an [Ecstasy testing kit](#) and compare the color-change with the descriptions in the last column of the chart.”

EcstasyData.org

EcstasyData.org is an independent laboratory pill testing program co-sponsored by Erowid, Dancesafe, MAPS, and the Promind Foundation. Its reported purpose is to collect, manage, review, and present laboratory pill testing results from a variety of organizations. The authors of the site claim that the information is made publicly available to help harm reduction efforts, medical personnel, and researchers.

EcstasyData.org collects lab testing results from a variety of organizations (Dancesafe, MAPS, Erowid) , but also commissions its own tests which are conducted by Drug Detection Lab (DDL) in Sacramento. An example of the information available on the website can be seen in Figure 3.


Tablet	Name	Date	Active Contents	Location	Marquis	Size	Data Source
			Substance(s)	Test			
	Blue Lightning	Aug 17 2001	MDMA 2 : Caffeine 1 :	GC/MS	Los Angeles, CA	Black / Purple	232 mg 8 x 5 mm EcstasyData.org (info)

Figure 3. Sample from the ecstasydata.org pill testing site.

The site does not have a specific disclaimer or warning but provides basic information about the tests used.

Pillreports.com

Pillreports.com is the daughter site of www.bluelight.nu (an ecstasy forum discussion based site). The authors claim that "Pillreports.com's focus is on harm reduction through the use of accurate, unbiased reports of pills that are 'doing the rounds'."

An example of the information available on the website can be seen in Figure 4.


<u>Id</u>	<u>Image</u>	<u>Name and Info</u>	<u>Date</u>	<u>Location</u>	<u>Poster</u>	<u>Comments</u>	<u>Rating</u>
46840		Pink Playstation Lightish Pink Color: Lightish Pink Shape: Circular Logo: P	01- Apr- 2005	Melbourne	cloud 9..	SHAPE: Large round pill, flat top with flat bottom. Logo on one side, blank on the other. DIMENSI..... more <i>There are 15 user comment(s)</i> EZ Test Result: Went a little green on impact, but within no more than 3 secs went completely black. (Mandelin)	9

Figure 4. Sample from the pillreports.com pill testing site.

Pillreports.com does not provide a general disclaimer or warning.

Private domain

Not all organisations that test ecstasy pills report the results in a public forum. For example, both the Netherlands and Australia produce pill testing result profiles which are not available to the general public.

Within the Netherlands, the Drugs Information and Monitoring System (DIMS) (described in more detail below) produces "determination tables" that lists details of pills which have been tested. Every week a new table is sent to all the DIMS testing sites. Pills containing dangerous substances are not included in the list but the information about them is sent to the testing sites.

Within Australia, the NIFS Drug Logo Database is a register of Australian illicit tablets logos, using data provided via the Victoria Forensic Science Centre and forms a large part of the National Illicit Tablet Database. The information within the site covers all Victorian drug seizures, as well as data from across Australia and New Zealand. Access to the database is restricted to authorised users and access is assessed on an individual applicant basis.

Advantages and disadvantages of pill test report sites

The advantages of public domain pill test report sites according to developers and proponents are that the sites provide information to users about the content and effects of individual tablets to other users. Users who access the sites can get information on whether their tablets are 'safe' by making visual comparisons with the pictures and accompanying descriptions provided. In addition, the sites often provide an early warning system of potentially dangerous or lethal tablets in circulation.

Many of the disadvantages of pill test report sites mimic those of reagent testing at home or at venues and won't be repeated here. Additional disadvantages include, for example:

- a false sense of security which may arise from a belief that the sites and content are somehow more accurate;
- a lack of knowledge by users about 'copycat' pills. Users may not be aware that different batches of ecstasy may be branded similarly but contain different substances. Naive users may match the logo on their pill with one of the pills identified on the pill report site and assume the content is the same; and
- the websites are open to abuse from individuals who may report false information about the content of pills.

How does testing and the associated information effect the behaviour of users?

There is little evidence regarding how testing and the associated information provided effects the behaviour of users. There is some indication from the Benschop, Rabes, and Korf, (2002) study that testing may lead to users adopting different behaviours which would increase or reduce harm. However, given the lack of evidence in this area, particularly within an Australian context, there is a need for research into the characteristics and motivations of ecstasy users and their beliefs and decisions in relation to ecstasy testing.

International experience and government positions with respect to availability of ecstasy testing kits

The information in this section was gathered in 2001 and, therefore, details the international experience and government positions at that time. A 2005 update is provided at the end of the section.

There is limited information available on international positions with regard to drug testing kits. In particular, there is minimal mention of police responses in the available literature.

The Netherlands³

Large scale testing of ecstasy tablets at parties and agencies of the Drugs Information and Monitoring System (DIMS) has been undertaken in the Netherlands since 1992. The DIMS system is funded by the Ministry of Health. Information from the DIMS system is provided to the Ministry of Health through the national drugs monitoring system. Information is provided regarding what types of drugs are on the market and which substances people are really using. Such information informs prevention and harm reduction campaigns, and

³ This section is based on information supplied by Dr Raymond Neisinck of the Trimbos Institute in The Netherlands.

provides data for international organisations such as the European Monitoring Centre for Drugs and Drug Addiction (EMCCDA).

DIMS obtains information by analysing drug samples (tablets, powders, and liquids) supplied by potential users to addict care institutions which have set up a facility for the purpose. The Trimbos Institute coordinates this monitoring system. DIMS operates under a narcotics permit for scientific research and observes a standard of Good Testing Practice, whose purpose is to maintain acceptable quality standards of legal requirements, scientific quality, and concern for public health. DIMS conducts warning campaigns among ecstasy users and party goers if it encounters substances or doses that represent an acute risk to public health. In such cases it also alerts hospitals, municipal health authorities and addict care institutions.

This comprehensive monitoring system originated from testing at rave parties in 1986 and is a unique system for gaining insight into what kind of drugs are on the market and whether there are new substances being promoted as party drugs. DIMS has a network of approximately 25 participating office agencies spread throughout the Netherlands, with most of them involved in the prevention of drug abuse. These offices give quick information about substances which are circulating in the market, and provide information to users about drugs and the setting in which they are taken. DIMS states that there are no good pills, they are illegal products and therefore there is no quality control, so users take them at their own risk. DIMS sees testing pills as a way of reducing the risks. A small fee is charged for testing the pills.

Two types of testing are conducted by DIMS:

- Laboratory testing, where people hand in their pills to a DIMS agency, which sends them to the DIMS central office to the laboratory for chemical analysis. The laboratory conducts two qualitative analyses – thin layer chromatography and gas chromatography. Gas chromatography also provides a quantitative measure. Chemical audit of the reliability of drug testing at the DIMS laboratory concluded that the qualitative analysis had good reliability while the quantitative analysis was less accurate.
- ‘Quick Testing’ or ‘Office Testing’ – where pills are brought into the agency or testing booth and a Marquis test is conducted. Details of the pill’s diameter, thickness, weight, colour, and appearance (eg logo, whether there is a breaking groove) are then recorded and the pill is compared with the Determination Table (see details below). If the pill is on the determination table the consumer is advised of what is probably in the tablet, its effects, the risks of taking this drug. If the pill is not on the list the consumer is asked if it can be sent to the DIMS laboratory for chemical analysis with the results to be available from the DIMS office.

The Determination Table is the most important part of the DIMS system. The table consists of descriptions and results of laboratory analysis of all the pills tested at the DIMS laboratory in the previous eight weeks. The table is updated weekly. Each pill must be on the list at least 3 times before it is reasonably concluded that they are from a certain batch. Pills containing particularly dangerous substances are not included in the list, however, information about them is sent to the office testers.

Between 1992 and 1998 more than 25,000 tablet analyses were undertaken in the laboratory and a similar number were determined and recognised on the spot in office testing. There were dozens of new substances on the market which were sold as ecstasy but which did not

contain MDMA and there were ten major warning campaigns. Newsletters and monitoring reports are regularly produced to advise on the work of the DIMS system and in cases of emergencies, there is a red alert system.

During 1998, 6,268 tablets were submitted for testing by DIMS. The proportion of these tablets which contained MDMA rose from an average of 58% in the first quarter to an average of 80% in the last quarter. The proportion containing amphetamine or methamphetamine decreased during the course of the year from 20% of all tablets in the first quarter to 5% in the last quarter. The percentage of tablets containing other psychoactive substances (such as 2CB, DOB, MBDB, 4-MTA, atropine) declined slightly during 1998.

*Austria*⁴

High quality laboratory style testing at large raves in Vienna and other parts of Austria is offered by the ChEckIt project, which is supported by the drug policy coordination unit in Vienna. The project team consists of a group of chemists from the Department of Toxicology at the University Hospital of Vienna and a group of social workers and psychologists. The chemists test tablets using high pressure liquid chromatography (HPLC) which is able to give accurate qualitative and quantitative results within 15-30 minutes. This method is able to identify all the active ingredients in the pill and measure the dose. Results are given to the person who brought the pill for testing and are posted under a number in a separate tent where the social workers and psychologists are available to provide information and counselling. Only the person who brought the tablet to be tested knows which results relate to their tablet but the display allows anyone to see the full range of substances and doses detected. Because a high percentage of the people bringing pills for testing wait for the results there is an opportunity for them to receive other harm reduction information and drug information while they are waiting for their results.

The project has been evaluated since its inception in 1997. Between 1997 and 1999 the team had attended nine raves and tested 650 drug samples. In 1999, when 170 samples were tested, 130 were bought as ecstasy and 104 actually were MDMA. This was in contrast to the previous years when large amounts of tablets sold as ecstasy did not contain any MDMA. Similarly, a high proportion of samples sold as amphetamines did not contain amphetamine.

*France*⁵

Medicins du Monde – France have been operating Marquis reagent testing at raves and dance parties since 1997 and have also established a laboratory testing program using high pressure liquid chromatography and gas chromatography. The French government recognised and extended the testing program in 1999. The program contributes to the European early warning system and monitors trends in the composition of drugs as well as providing information to users.

⁴ Kreiner H and Schmid R (2000) High quality onsite testing of illicit substances. Information, counselling and safer use measures at raves in Austria. Paper presented at the Club 2000 Conference Amsterdam, The Netherlands.

⁵ Beauverie P et al (2001) Is stationary drug analysis a new harm reduction tool for dance pills users? Two years experience. Paper presented at the 12th International Conference on the Reduction of Drug-Related Harm, New Delhi, India, 1-5 April 2001

United Kingdom

Although it is not widely known, and is limited in terms of scope and value, tablet testing is now taking place in the UK. The organisation 'Release' has been using the Marquis Reagent test at underground parties since 1998, checking around 20 pills on a busy night. The Green Party, whose manifesto calls for decriminalisation of the possession of small amounts of drugs for personal use, have been doing the same. Neither Release nor the Greens advertise what they are doing.

It is also possible and legal to buy home testing kits in the UK. The most popular is the commercially marketed EZ test. The Green Party offer two testing kits one consisting of the Marquis Reagent alone and the other consisting of the reagent and a micrometer. The Greens advise people to compare measurements taken with the micrometer against information on laboratory analysed pills posted on the website www.ecstasy.org. 'Release' and the Green Party are both aware of the rudimentary nature of their testing and, in order to help improve this, the latter have called on the government to grant public access to the laboratory results of tablets examined by the National Criminal Intelligence Service.

The Greens kits were launched at the end of 1997. In 1998, the Home Office minister with special responsibility for drugs, confirmed to Parliament that the kits were legal and the government had no plans to change this. However, at the time, there were a number of newspaper articles reporting that the then British Government's anti drugs coordinator, Keith Hellawell had attacked the kits as immoral and dangerous and claimed that use of the kits would encourage more young people to consume ecstasy.

The 'Release' website discusses legal implications of testing and reminds kit users that while the test kits are legal it is an offence to possess the drugs on which the tests will be used. The legal definition of supply includes situations where drugs are shared, or looked after by someone else and where a drug is passed between two people for the purpose of testing.

The United States

The legal situation with regard to ecstasy testing kits in the USA is complex as a result of variations in state and federal law. In some states the kits are illegal under paraphernalia laws which include anything which identifies, analyses or tests scheduled substances (Erowid 2001). In other states and in the federal law this wording is not included and possession of the kits is legal. For the most part the legal situation with regard to possession and supply of drugs for testers and users is that anyone bringing drugs for testing is guilty of possession and commits supply when handing them over for testing. Similarly, the tester is guilty of possession while holding the drugs for testing and of supply when handing them back to the user. There is opposition to the availability of drug testing and test kits from police groups, the Drug Enforcement Agency (DEA) and others advocating a 'zero tolerance' approach.

Testing of ecstasy pills is carried out by DanceSafe, a volunteer harm reduction organisation. DanceSafe has three pill testing programs, a laboratory testing program, an onsite pill testing program at raves and dance clubs and a testing kit distribution program. The organisation is funded by private companies and individuals.

Laboratory analysis is undertaken by a private laboratory contracted by DanceSafe which is licensed by the DEA to undertake qualitative testing of anonymously sent controlled substances. The DEA prohibits quantitative testing of anonymously sent drugs. Testing is performed using gas chromatography. Results are posted on the DanceSafe website and, for

pills containing more than one active ingredient, the ingredients are listed in order of relative amount with the dominant ingredient listed first.

Onsite testing at raves and dance parties, using Marquis Reagent, is undertaken by volunteers who are trained to follow strict harm reduction protocols, which the organisation believes result in responsible testing procedures. The protocols have also been taken up by organisations in other countries and are published on the DanceSafe website. Testers record details of every pill they test on a standard record form. Information recorded includes the name, colour, size, appearance, where it was purchased (ie at the rave or elsewhere), the test result and reports from the user of the effects (if provided after consumption). Printed cards explaining the meaning of a positive result are displayed and users are required to read the cards as well as have it explained to them verbally. The wording of these cards is shown below (from DanceSafe website).

This test produced a normal reaction

That means this pill does contain some real ecstasy
(either MDMA, MDA, MDE or a combination)

It does NOT mean the pill is “pure”
(there could be something else in it)

It does NOT mean the pill is “safe”
(No drug is completely safe, even if it is pure)

It does NOT tell you how much is in the pill.
(There could be a lot or a little. You never know)

Volunteers are trained never to say that a pill is safe or that the user will be ok if they take the pill. If the pill test is negative for ecstasy, the testers explain that they do not know what is in the pill. If no colour change occurs, testers will say that the pill definitely doesn't contain ecstasy or an ecstasy like substance. According to the website, testers never tell a user not to take a pill or that it is dangerous, they only provide information on likely effects and whether adverse effects are more likely than with MDMA. This is because it would imply that it was safe to take other pills which had a positive result. Media articles from the US about DanceSafe's testing program report that volunteers talk to users about the dangers of drugs, provide harm reduction information, and distribute earplugs, condoms and fruit (San Francisco Chronicle 2000).

Testing kits containing Marquis Reagent are also sold by DanceSafe for home use and are accompanied by instructions for use and warnings about the limitations of the test.

Canada

The situation in Canada is similar to that in the US and the UK. Ecstasy testing at parties is undertaken by Ravesafe who also sell testing kits for home use. Laboratory testing is not available to the public in Canada and so all testing relies on kits using the Marquis Reagent. Ravesafe has as one of its aims to campaign for the establishment of a laboratory to which members of the public can send pills for testing.

New Zealand

EZ tests are marketed in New Zealand by the Catalyst Trust in association with the Wild Greens, the youth arm of the Green Party who are also proposing to undertake testing at raves and dance parties. The official response from the National Bureau of Criminal Intelligence has been that the police will not enter into any debate about ecstasy tests but would simply enforce the law. A lawyer consulted for comment in a media article said that the testing regime would “open up a myriad of technical offences” in relation to possession and supply.

2005 update on international experience

Since the information above was gathered, large scale testing of ecstasy tablets has continued in the Netherlands under the auspices of the Drugs Information and Monitoring System (DIMS). DIMS supplies information to the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) who provide education, prevention, and policy advice as well as commissioning research throughout Europe. In 2001, EMCDDA produced a comprehensive inventory of on-site pill-testing interventions in the European Union. Among other things the report concluded that "there is still no strict scientific proof for the protective impact of on-site pill-testing interventions but on the other hand, there is also no scientific evidence to conclude that such interventions rather promote drug use or might be used by dealers for marketing purposes".

Research into the effectiveness of pill testing within Europe has been somewhat slow to emerge. The most recent, and most comprehensive analysis of pill testing was published in 2002. Benschop, Rabes, and Korf undertook an evaluation of pill testing across three European cities (Amsterdam, Hanover, and Vienna). Among other things, the evaluation investigated whether use of pill testing services lead to changes in patterns of drug use. Approximately 700 people participated in the study and were broken down into three groups testers (party goers who had taken ecstasy at least once in the last 12 months and had used a pill testing service at least once in their lives), non-testers (party goers who had taken ecstasy at least once in the last 12 months but had never used a pill testing service), and non-users (partygoers who had never used ecstasy).

When testers were asked why they used the services the top three responses were 'to know what the pill contains', 'because of warnings' and 'health responses'. In contrast, the non-testers top three responses for not using services were 'trust in supplier', 'use regardless', and 'exciting not to know'. The study found that pill testing does not lead to a "direct and profound change in the careers of ecstasy users, but neither does it seem to increase ecstasy consumption." (p. 96, Benschop, Rabes, and Korf, 2002). Ecstasy use appeared to be adjusted according to the test results to reduce risks.

Legislatively there has not been a great deal of change in the United States with DanceSafe continuing to operate widely. DanceSafe also now operates in Canada.

Social and health aspects relating to the availability and use of drug testing kits

There is no evidence regarding the social and health impacts of the public availability of ecstasy testing kits, however, many concerns and questions have been raised as part of this review.

Rationale for testing

Ecstasy testing kits are promoted as a harm reduction measure in the belief that knowing something about the content of a pill is better than knowing nothing and that users will refuse to take pills which do not contain MDMA or which contain unwanted substances such as PMA, ketamine, methamphetamine or dextromethorphan. Promoters of the tests recognise that a proportion of people will make decisions to take ecstasy in spite of its illegality and information about possible harms, and regard it as important that these people have as much information as possible on which to base their decisions.

Websites promoting testing kits all include warnings that the kits are not definitive and that MDMA itself can be harmful. Some also include information about the nature and effects of other drugs commonly sold as ecstasy as well as some legal information. On a number of sites drug testing is likened to other harm reduction strategies such as information giving and clean needle programs.

Organisations which undertake testing at raves report that testing provides a point of contact which enables them to communicate with users and provide additional information about the effects and risks of the drugs, as well as basic harm reduction information regarding keeping cool and drinking appropriate amounts of fluids.

In the clubbing and dance party scene, harm reduction initiatives, including drug testing, have predominantly been user driven initiatives. Most of the harm reduction organisations involved in testing have arisen as a result of groups of dance drug users coming together because they want to assist clubbers to make more informed choices and reduce the harm associated with ecstasy use.

Extent of use of ecstasy testing kits in Australia

While accurate information on the extent of kit use is not available, indications from media reports, Chemical Generation, and user groups suggest that there is increasing demand for testing kits and that there is extensive ‘underground’ testing taking place. If this is the case and there is high demand for testing, banning the test kits may lead to the development of a black market for the kits and the involvement of criminal groups in their manufacture and supply.

Potential harms arising from limitations of the tests

As described in section 3, all the kits available in Australia are subject to limitations which affect the interpretation of their results. The concern is that users may not understand the complexity and uncertainty associated with the testing kits and think that they know exactly what they are getting in their tablets. Some anecdotal information from user groups suggests that most ecstasy users understand that testing is only indicative and doesn’t guarantee that pills are safe (N Bath, AIVL personal communication). However, other sources suggest that some users believe that if they get a result indicating the presence of MDMA that it means the pill is a ‘good pill’ and that a proportion of these people will then go and try to buy more of them (Winstock and Vingoe 2000).

How does testing and the associated information affect the behaviour of users?

A key question regarding the use of drug testing kits as a harm reduction intervention is whether testing leads to users adopting different behaviours which would increase or reduce harm.

- How do users view the tests, what do they expect from them?
- Do users regard contents other than MDMA as undesirable?
- Do the testing kits encourage people who wouldn't otherwise use ecstasy to take it?
- Does testing give a false sense of security and convince users that the tablets are safe?
- Does it encourage users to take more than they would have previously, or to use more often?

There is currently no evidence with which to answer these questions other than anecdotal comments from users and organisations conducting testing.

When there is no testing available, ecstasy users purchase tablets and take them. Any information they have about them comes from recommendations from friends and dealers. Generally there is little or no information about the contents of the tablets.

User groups and websites promoting testing claim that when people have their tablets tested many of them do refuse to take tablets which show an unclear result or which contain substances other than MDMA. Others change their behaviour according to the known effects of the substances detected. For example if the test shows MDMA then users will pay particular attention to harm reduction guidelines such as keeping cool, using chill out rooms, and drinking appropriate amounts of fluid. If the test indicates amphetamines, they will take precautions to reduce the negative effects of amphetamines.

Other people working in the field are sceptical regarding these claims. Winstock and Vingoe (2000) expressed concern that users may believe that if their test shows MDMA there is no need to implement other harm reduction strategies. Others such as Dillon (Triple J website) believe that users who have paid \$50 or more for a pill would be highly unlikely to discard it and may on-sell it or take it anyway.

While there have been no studies of users' behaviour in relation to pill testing, a UK survey of 1200 clubbers asked what they did when they thought the quality of pills got better or worse (Winstock and Vingoe 2000). In this group 40% said that when the quality gets better they take more. Only 12% were put off taking more of the pills. When quality of pills gets worse up to 40% said it would not make any difference and 20% said they would take more because the pills were not very strong. A limitation of this study is that the meaning of quality was not defined and may not refer to actual contents of the pills.

Given the lack of evidence in this area there is a need for research into the characteristics and motivations of ecstasy users and their beliefs and decisions in relation to ecstasy testing.

Individual testing versus organised testing

It is likely that the implications for public health are different depending on whether testing kits are used privately by individuals or by harm reduction organisations as part of a systematic program.

Individuals are less likely to understand the complexities of the test and what the results mean, less likely to have access to standard colour charts and other interpretive aids, and more likely to assume that a 'positive' result means that a pill is 'safe'. They are also less likely to have access to comprehensive harm reduction information regarding issues such as neurotoxicity, the risks of poly drug use, and dance party guidelines. Private use of testing

kits by individuals means that results are not systematically collected to allow monitoring of the market and the development of warning campaigns.

A further concern regarding use of the testing kits by individuals who may be drug affected is that the kits are made from acids which need to be stored and handled with great care to prevent damage to people and property. It is important that users understand how to safely neutralise and dispose of the tested samples, and the safety precautions to be followed in storing and using the kits.

Organised and supervised testing by harm reduction organisations is more likely to involve the provision of additional information about the meaning and interpretation of the test result, the nature and effects of drugs and other harm reduction measures. There is also an opportunity to systematically monitor test results in order to understand trends in the ecstasy market and to develop warning campaigns about the presence of particularly dangerous substances.

What impact does regular testing have on the market?

There is little evidence regarding the impact of regular testing on the ecstasy market and the evidence available is conflicting. Data reported by *Medicins du Monde* in France suggests that regular testing may lead to reductions in the number of adulterated and ‘fake’ tablets appearing in the market. This data implies that dealers were aware that users would not buy tablets containing substances other than MDMA (Beauverie et al 2001). Reports from the DIMS testing system in the Netherlands found a large number of substances being sold as ecstasy between 1992 and 1998, however during 1998 the proportion of tablets whose main ingredient was MDMA rose from an average of 58% in the first quarter to 80% in the last quarter. Similar results have been found in the Austrian testing program. On the other hand, information from the DanceSafe website suggests that, in the US, the proportion of ‘fake’ or adulterated pills identified in their laboratory analysis program is increasing suggesting that testing has not always had a positive impact on the market.

Possible reasons for these differences may be differences in the regularity and endorsement of testing and in policies regarding posting laboratory results on the internet. The European testing programs involve regular systematic testing and have some official support and endorsement. These programs do not post test results on the internet and, in the Netherlands, the discrimination tables are only available to DIMS agencies and testing stations. This is to minimise the risk of manufacturers obtaining detailed information about so-called ‘good’ pills and then producing counterfeits. In the US, the DanceSafe testing program does not have official endorsement, and the laboratory testing program relies on anonymous individuals to send in tablets for testing. Laboratory results are posted on the internet. A number of other websites encourage users who have tested their own tablets to post descriptions and results on the internet and these may also be a source of information for counterfeiters.

Further research is needed to determine whether regular testing results in a decrease in the number of fake and adulterated tablets being sold as ecstasy.

Potential increase in harm if users are given the impression that the drug that has been tested is safe to use

There is no evidence available to answer this question and it is very difficult to quantify any potential increase in harm.

People who intend to take ecstasy already do so without the benefit of testing and there are no accurate estimates of the prevalence of harm from ecstasy use. Similarly, there is no evidence indicating whether testing would encourage non users to commence using ecstasy. Levels of harm will depend to a considerable extent on how users behave as a result of the test result and the context in which they are using. The difficulty is compounded by the unpredictability of serious adverse effects of MDMA and related compounds.

It is likely that users will only gain the impression that the drug is safe if the test result indicates an MDMA like substance (a rapid change to black with Marquis Reagent or bluish black with Mandelin Reagent). These reactions occur if the dominant ingredient in the drug is MDMA, MDA or MDE. There could well be other substances in the tablet which may be more toxic.

While the effects of MDE and MDA are similar to those of MDMA there are important differences. The effects of MDE last for a considerably shorter time than those of MDMA which may encourage users to take more tablets to try and prolong the experience. On the other hand, MDE tends to be strongly intoxicating, making users feel stoned and making it more difficult for them to walk and dance properly which may have the effect of discouraging further use. MDA effects tend to last for much longer than MDMA and include hallucinogenic effects which are not present with MDMA and negative effects such as more pronounced nausea, erratic eye movements and jaw tension. Other risks are similar to MDMA. There is no evidence regarding relative levels of harm from these ecstasy analogues when compared with MDMA.

There is the possibility that testing may encourage false beliefs regarding 'good' pills versus 'bad' pills and reinforce views that acute adverse effects and deaths are the result of contents other than MDMA. The reality is that many of the deaths related to ecstasy use are the result of MDMA and there is a need for ongoing education of users about this.

Another potential source of harm is the use of testing results by dealers to market pills, particularly if they make false claims about the contents of their pills (Winstock and Vingoe 2000).

Potential benefits of testing

If testing is accompanied by good information and harm reduction advice and if users are aware of the limitations of testing it may provide an opportunity for a variety of harm reduction interventions and may attract users into appropriate services to reduce their drug use and address drug related problems. Winstock and Vingoe (2000) suggest that testing also helps users understand that drug effects are not just related to the content of the pill but also to expectations, environmental factors and what else they were doing or taking at the time.

If testing encourages users to avoid pills containing PMA, 4-MTA, and DXM then it is likely that deaths will be avoided. The DIMS system of systematic testing in the Netherlands has shown the effectiveness of targeted, carefully used public health alerts at averting major toxic effects of other drugs sold as ecstasy. It is clear from this example that the utility of testing is greatly enhanced when colour test kits are supplemented by laboratory based testing.

Systematic testing assists in monitoring the ecstasy market and trends in manufacturing. It has been suggested as a method of evaluating the success of precursor legislation (Winstock and Vingoe 2000).

Legality of manufacture or sale of drug testing kits in Australia

Qld	Possession of drug testing kits is not an offence
ACT	There is no criminal statute relating directly to the manufacture, sale or use of the kits.
Tasmania	Unless the kits contain a chemical which is itself subject to controls, no offence would be committed in their manufacture.
NT	It is not illegal to buy the kits in the shops or to possess them.
SA	It is not illegal to manufacture drug testing kits in Australia.
NSW	There is no legislation dealing with the manufacture, sale or possession of the kits.
Victoria	The sale, possession and use of these kits are legal in all states of Australia.
WA	It is not illegal in WA to be in possession of a drug testing kit, or to manufacture or sell the kits.

Ecstasy test kits

The manufacture, importation, sale or possession of ecstasy testing kits is not in itself illegal in any state in Australia. Under customs legislation they are not listed as prohibited imports and they are not prohibited by virtue of being related to or encouraging drug use. The kits consist of readily available chemicals which are used for a wide range of industrial and scientific purposes. Even if the kits were declared illegal it is unlikely to be feasible to ban the reagents or the chemicals from which they are made as this would cause considerable difficulty to other users of the substances.

There is currently no evidence regarding the demand for testing kits and the extent to which users would seek them out if they were not legally available. However, if the currently available kits (which are well packaged and have the acid reagent in a safe container), were to be banned, a possible consequence is clandestine manufacture and distribution of reagents without the usual safe guards and quality controls employed in chemical industries. Since the reagents are made from concentrated acids, this would have the potential to lead to serious harm.

Advice from NSW reports that there are offences for inciting or encouraging the commission of crimes and the printing of articles which do so and suggests that an offence may be committed if the kits are promoted in such a way as to encourage drug use. This may have legal implications for the marketing and distribution of the test kits.

Heroin test

The proposed heroin test procedure would be impossible to ban as the reagent consists of ordinary washing soda (sodium carbonate) which is non toxic and is sold in supermarkets.

Law enforcement implications of possession of illicit drugs by persons conducting tests and those seeking to have their drugs tested

Qld	Possession of illicit drugs for the purpose of testing them is illegal.
ACT	Those found in possession of illicit drugs are liable for prosecution unless they are exempt under the provisions of Section 175 of the Drugs of Dependence Act.

Tasmania	Anyone knowingly possessing an illicit drug without proper authority is committing an offence. There is also a possibility that it could be argued that a person testing the drug to facilitate its use could be aiding and abetting that offence.
NT	It is an offence to possess the drug and this applies to both the tester and the person who brought the drug to be tested.
SA.	Under Section 31(1) of the Controlled Substances Act a person who possesses an illicit drug commits an offence of possessing a prohibited substance. Upon handing the drug to another person to be tested they may be committing the offence of supply. Similarly the tester can be charged with possession while they are holding the drug for testing and with supply when they hand it back to the user.
NSW	In the context of a testing station established at a dance party, it is considered unlikely that a person who tests an illicit drug on behalf of another person could be found guilty of the offence of possession of an illicit drug, or, upon returning the drug to its owner, could be found guilty of the offence of supplying a prohibited drug. In the absence of a discretion guideline, a drug user in possession of a prohibited drug would be subject to a normal possession offence and/or appropriate diversion options if stopped by police while taking a drug to be tested.
Victoria	Both the user and the tester are guilty of possession. A person facilitating testing could also be viewed as aiding and abetting the commission of the offence by the user even if the user actually conducts the test.
WA	It is an offence to be in possession of illicit drugs. This applies both to those conducting tests and those seeking to have their drugs tested.

Responses from the Police Drug and Alcohol Coordinators in several jurisdictions (Qld, ACT, Tas, NT, SA) indicate that the person bringing the tablets to be tested is committing an offence (possession) and by handing the tablet to a tester is committing the offence of supply. Similarly, when the tester accepts the tablet for testing he or she is committing the offence of possession and is committing the offence of supply when handing the tablet back. The response from Tasmania suggested that it could be argued that, since the user is committing an offence by possessing the drug, a person testing the drug to facilitate its use could be aiding and abetting the offence.

Advice from the Courts and Legal Services of the NSW Police Service suggests that the situation is not so clear cut in that jurisdiction and that the question of criminality associated with the possession and use of testing kits would depend on the circumstances. It was considered that a tester in the context of a testing station would not be committing an offence of possession because the charge requires that the person has knowledge of the substance being an illicit drug and has physical control over the substance. It is suggested that a tester would not know what the substance was until after the test was performed and it is likely that holding the drug for long enough to perform a test does not constitute control.

NSW Police Service also considered it unlikely that a person who provides a testing facility could be found guilty of the offence of aiding or abetting the possession or use of a prohibited drug. It is believed that for a person to be aiding and abetting the offence they must be 'linked in purpose' with the drug user and that it is also necessary for the person to engage in some action or encouragement which makes the offence more likely to occur.

On the other hand, a person who was testing a drug for the purposes of facilitating the sale or purchase of a quantity of drugs could be committing the offence of being knowingly concerned in the supply of a quantity of drugs.

Organisations overseas, which promote testing have developed some procedures to reduce their risk of prosecution for these offences. In DanceSafe, based in California, the testers hand the pill back to the user as soon as they have taken a scraping and before performing the test. In this way they can claim that they did not know the content of the pill at the time they were holding it. In the UK, the Green Party and a harm reduction organisation called Release undertake testing on a small scale. Their testers do not handle the drugs at all, instead the users take a scraping from the pill themselves.

Current level of tolerance to testing kits

Qld	QPS has no policy of tolerance in this area.
ACT	There is no criminal statute in the ACT which relates directly to the manufacture, possession, sale or use of drug testing kits.
Tasmania	If an offence was committed there would be no tolerance and the matter would be treated like any other.
NT	It is not illegal to buy or possess the kits. NT Police would look very seriously at any use of them in a public place.
SA	SAPOL does not support their use at the present time.
NSW	Given that drug testing kits are a relatively new phenomenon legal and law enforcement issues regarding persons operating testing stations at dance parties or at other venues require further clarification. There is currently no discretion guideline in relation to drug testing kits.
Victoria	It is not illegal to buy or possess the kits but Victorian police would not show tolerance to anyone using the testing kit to test drugs for other people.
WA	n/a

Police Drug and Alcohol Coordinators were asked about the level of tolerance to testing kits existing in Australia at this time. Jurisdictions which responded to this question stated that there would be no policy of tolerance in relation to testing although the majority indicated that they were not aware of any instances of the use of drug testing kits. One coordinator reported that they had been approached by a harm reduction organisation with a proposal to set up a testing booth in nightclubs and said that their response was that if they became aware of such a testing booth they would station an officer next to it. Most coordinators said that their organisation did not support the use of drug testing kits at this time because of their limitations.

NSW has developed guidelines on areas of discretion in relation to other harm reduction activities including methadone clinics, needle and syringe programs, non fatal drug overdose and medically supervised injecting centres which could be adapted to the circumstances of drug testing kits if they were recognised as an appropriate harm reduction strategy.

In the USA, DanceSafe claim to have the support of the local police in all the places they have undertaken pill testing at raves. According to the Frequently Asked Questions section of their website police officers present agree not to prosecute users making use of the test site in the same way that they do not arrest clients of needle and syringe programs, addiction

treatment services or overdose victims seeking treatment at emergency departments(DanceSafe Website).

Potential legal liability of manufacturers, marketers, and distributors of testing kits

Concerns have been raised that the manufacture, distribution and use of ecstasy testing kits could potentially lead to huge problems with civil liability in the event of adverse reactions occurring after consumption of tablets which have been tested. Concerns were also raised by police drug and alcohol coordinators about whether a police force which agreed to testing kits being used as a harm reduction strategy would also incur liability. At this stage it has not been possible to obtain a legal opinion on these questions and it is likely that no definitive answer to this question can be given until an actual case has been decided.

In order to attribute liability it would be necessary to establish that there had been a breach of duty of care or an act of negligence on the part of the manufacturer or distributor of the test, the tester, or the organisation which agreed to the use of the tests as a harm reduction measure. Manufacturers, marketers and distributors of these kits would need to be careful in what they claim the test kits will indicate as a matter of duty of care. Duty of care is a jurisdictional issue and jurisdictions would need to seek their own advice as to the potential legal liability.

It is also necessary to establish a causal link between the testing kit and the adverse effect resulting from taking the tested drug. Among other questions at issue are what the test results mean, what is implied by a particular reaction, what information was provided to the user, and whether the user would have taken the tablet if it had not been tested.

As described in Section 4 above, DanceSafe has adopted standard procedures for testing and information giving which represent an attempt to limit liability in the event of an adverse event. These procedures include never stating or implying that any pill is safe to use or that the user will be alright if they take it.

Conclusions

Ecstasy testing kits

There is very little published material regarding the impact and legality of ecstasy testing kits and most of the information available is anecdotal. Consequently, it is not possible to come to a definitive position regarding their availability.

Ecstasy related harms

MDMA itself causes a range of harms. Overall there is mounting evidence that ecstasy (MDMA) has a neurotoxic effect, however, the long term consequences of ecstasy use in humans remains uncertain. It appears that the prevalence of serious acute adverse effects of ecstasy use is low, however, the occurrence of serious acute adverse effects is unpredictable and when they do occur there is a high risk of death or substantial health problems. The risk of death is considerably higher with PMA and there may be some benefit in a testing procedure which could reliably detect this substance. Other substances sold as ecstasy such

as ketamine, methamphetamine, GHB and dextromethorphan may also be more toxic than MDMA.

Harm reduction strategies

The risk of serious adverse effects associated with hyperthermia and disturbances of sodium and fluid balance can be reduced by taking precautions such as keeping cool, consuming appropriate amounts of water and taking breaks from dancing or other strenuous activity as promoted by existing harm reduction strategies. The finding that the extent of harm may be related to the ambient temperature highlights the importance of the National Dance Party Protocols as a harm reduction measure. Testing of ecstasy tablets may have some value in enabling users to avoid more toxic substances such as PMA, but it is important that users are aware that use of MDMA by itself can result in adverse effects and so such testing should always be accompanied by other harm reduction information and education.

Limitations of test kits

The ecstasy test kits available in Australia are all colour spot test kits which work by mixing a scraping from a tablet with a drop of reagent and then matching the resulting colour against a colour chart. They suffer from a number of limitations so that even after testing there is considerable uncertainty regarding the content of ecstasy pills. The only way to obtain accurate qualitative and quantitative information regarding all the contents of pills is to use laboratory based testing techniques such as thin layer chromatography, high pressure liquid chromatography and gas chromatography.

International experience

International experience with ecstasy testing and the use of colour spot test kits is varied. The kits are legal in all countries for which information was available although legal status varies from state to state in the US. Three countries, Austria, France and the Netherlands, have set up or supported supervised drug testing programs. All of these programs use accurate laboratory based testing procedures to supplement, or substitute for, colour spot testing kits. The most comprehensive program is the Drug Information Monitoring System in the Netherlands which has enabled systematic monitoring of the ecstasy market and the dissemination of public health warnings.

In the US, UK, Canada and New Zealand 'underground' testing using colour spot test kits is undertaken by harm reduction organisations without official support. They also promote and sell kits for home use. These organisations recognise the limitations of their testing programs and DanceSafe in the US has contracted a private laboratory to test drugs sent in anonymously. In Canada and the UK, harm reduction organisations have campaigned for access to laboratory based testing. In all of the international testing programs testing is accompanied by other harm reduction information and education.

Social and health impacts

There is no evidence regarding the social and health impacts of the public availability of ecstasy testing kits. A key question is whether testing leads to users adopting different behaviours which would increase or reduce harm. Given the lack of evidence in this area there is a need for research into the characteristics and motivations of ecstasy users and their beliefs and decisions in relation to ecstasy testing.

It is likely that the implications for public health are different depending on whether testing kits are used privately by individuals or by harm reduction organisations as part of a

systematic program which also provides other harm reduction information. Systematic programs are more likely to be of benefit than unsupervised testing by users.

Preliminary research from France suggested that regular testing may have an impact on the composition of tablets available on the ecstasy market. Further research is needed to determine whether regular testing results in a decrease in the number of fake and adulterated tablets being sold as ecstasy.

Potential increase in harm

There is no evidence available to assess the potential increase in harm if users are given the impression that the drug that has been tested is safe to use. Levels of harm will depend to a considerable extent on how users behave as a result of the test result and the context in which they are using.

Potential benefits of testing

Systematic testing programs have the potential to provide an opportunity for a variety of harm reduction interventions. If testing encourages users to avoid pills containing PMA, 4MTA and other substances which are more toxic than MDMA then it is likely that deaths will be avoided. Systematic testing can also enable monitoring of the ecstasy market and the use of targeted public health alerts when toxic substances are identified.

Legality of manufacture or sale

The possession, manufacture and sale of ecstasy testing kits is legal in all states and territories in Australia.

Law enforcement implications of possession

In most states both the person bringing the drug and the person holding the drug for the purposes of testing could be charged with 'possession of an illicit drug'. There is also the possibility that both persons could be guilty of 'supply' when handing the drug over for testing and handing it back. In some states the tester could be considered guilty of aiding and abetting an offence. In NSW the situation is not so clear cut and depends on the circumstances and it is considered unlikely that a person could be charged in the context of a testing station at a dance party.

There are currently no guidelines for police discretion in relation to drug testing kits and in most states there would be no tolerance exercised if people were detected while using them.

Potential legal liability

It has not been possible to obtain a legal opinion on these questions and it is likely that no definitive answer to this question can be given until an actual case has been decided.

Heroin strength test

The test requires further trial and refinement before it could be used by heroin users. Given that heroin strength or purity makes only a moderate contribution to the likelihood of overdose it is unlikely that the use of this test would make a major contribution to reducing overdose deaths at this time.

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