

## Adolescent Alcohol and Other Substance Use: Sharing the Australian Experience

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### Abstract

*Substance use is common among adolescents. Although substance use may be a manifestation of experimentation in adolescent development, it may have more serious implications. It may be an indicator of emotional disturbance, or may be associated with several other health risk behaviours in adolescence. Substance use may also progress to harmful levels that can have a significant impact on a young person's health. Health professionals are increasingly being exposed to teenagers who use alcohol and drugs. The following article aims to provide, based on clinical and research experience in a number of institutions in Melbourne, Australia, an overview of the epidemiology of adolescent drug use, a clinical approach to assess substance use in young people and the principles of management of drug use in adolescence.*

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**Key words:** Addiction, Adolescence, Assessment, Drugs, Management, Risk factors, Tobacco

### Introduction

The most common causes of morbidity in adolescence often have behavioural or social determinants, and can have enormous social and economic consequences for adolescent and future adult health and well being.<sup>1,2</sup> Adolescent substance use and abuse is an example of this. While substance use can to a certain extent be considered part of normal adolescent experimentation as young people develop into mature adults, epidemiological research<sup>3-5</sup> shows that adolescent alcohol and other drug use can have significant short-term and long-term adverse consequences on health and well being. Deteriorating mental health, unwanted pregnancies, sexually transmitted diseases, and their ongoing morbidity in adulthood challenge the assumption that adolescents will "grow out of" substance use without consequence. Health professionals need to be aware of these trends when attending to adolescents. They need to be skilled in identifying which young individuals are at higher risk of developing problems and work with them to improve their well being. The following article provides a brief overview of the area of adolescent alcohol and other substance use. It draws on clinical and research experience from several institutions in Melbourne, Australia

that attend to young people exposed to substance use. The article also draws on a Medline search of literature regarding alcohol and drug use specific to adolescents. Articles that described adolescents with young adults were included within the search. Statistical reports commissioned by the Commonwealth and State Governments of Australia relevant to substance abuse were also included in the examination of the available literature.

### Categories of Psychoactive Drugs

Psychoactive substances are drugs that have the ability to alter perception, cognition, mood and behaviour and can potentially induce a drug dependence syndrome. They can be broadly grouped into three main categories: depressants, stimulants and hallucinogens (Table I). Some substances have multiple actions, and can therefore be grouped into more than one of these categories.<sup>6</sup> Depressants slow brain activity and alter mood to induce relaxation and drowsiness at low doses. In large doses, they can produce euphoria (feeling "high") or induce a loss of consciousness. The depressant group of substances include alcohol, cannabis, heroin and other opiates, inhalants (for example, petrol, glue) and benzodiazepenes. In contrast to the depressants,

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TABLE 1: PSYCHOACTIVE DRUGS GROUPED ACCORDING TO THEIR MOOD PROPERTIES

| Depressants                              | Stimulants           | Hallucinogens   |
|------------------------------------------|----------------------|-----------------|
| Alcohol                                  | Caffeine             | Ecstasy (MDMA)  |
| Benzodiazepenes                          | Nicotine             | Cannabis        |
| Cannabis                                 | Amphetamines (speed) | Ketamine        |
| Opiates — heroin, pethidine              | Cocaine              | LSD             |
| Inhalants — solvents (e.g. glue, petrol) |                      | Magic mushrooms |
|                                          |                      | Mescaline       |

Adapted from Table 2.1 in “The Pharmacological Dimension of Psychoactive Drugs”<sup>45</sup>

stimulants increase nervous system activity. They raise arousal, increase concentration and decrease fatigue. As the amount consumed increases, they induce irritability, agitation, insomnia, hallucinations and delusions. In very large doses, they can induce convulsions and death. The stimulant category of drugs includes amphetamines (“speed”) and cocaine. The third main substance group, hallucinogens, alter perceptions inducing auditory, tactile or visual hallucinations. They can also influence sensory perceptions in the form of time distortion or intensification of sensory experiences. Cannabis, ecstasy, ketamine, LSD, magic mushrooms and mescaline belong to the hallucinogen group.

### Epidemiology of Adolescent Substance Use

Information regarding trends in substance use and abuse in the community is now increasingly becoming available. Although “illicit” drugs loom as the largest concern in public and political perceptions, alcohol and tobacco are the most commonly used substances and therefore account for the majority of drug related morbidity and mortality.

#### Alcohol

Adolescent alcohol consumption increases in prevalence with age.<sup>7-9</sup> In general, males drink more heavily than females; however, sex differences in alcohol consumption appear to be decreasing.<sup>9</sup> Young people, like adults, drink alcohol as a “social lubricant”. In many cases, they intend to drink heavily and quickly in order to experience being drunk. Heavy alcohol consumption, or binge drinking, is variably defined in the research literature, sometimes referring to intoxication, other times referring to consumption of a particular number of standard drinks (e.g. four, five, or ten or more) on a given occasion. As a result of these different definitions, prevalence rates for binge drinking vary. Most epidemiological surveys, however, show that binge drinking is common among young people.<sup>10-12</sup> Frequently identified adverse consequences of adolescent alcohol consumption are “having a hangover” and/or drinking so much that amnesia occurs regarding events of the night before.<sup>12</sup> Alcohol-related aggression and sexual risk taking, such as unwanted

intercourse and/or sex without condoms or contraception resulting in teenage pregnancy, are also frequently reported.<sup>5,10,12-16</sup>

#### Tobacco

For the majority of smokers, regular smoking (defined as tobacco consumption that occurs at least weekly) begins between the ages of 12 and 15 years and initiation of regular smoking after the age of 20 years is rare. The prevalence of smoking tobacco among adolescents increases with age.<sup>7,8,17,18</sup> Recent trends suggest that females may be taking up smoking at younger ages than males and may be more likely to continue smoking.<sup>19</sup> Rather than nicotine addiction, social factors such as parental and peer smoking, as well as mental health concerns (anxiety and depression) appear to be the major determinants of smoking behaviour in youth.<sup>20</sup>

#### Cannabis

Cannabis, or marijuana, is one of the most commonly used illicit substances. Cannabis may be smoked as a cigarette or using a water pipe. It can also be used in cooking (e.g. in biscuits) or brewed as a tea. Cannabis use typically commences in mid-adolescence, around 16 to 17 years of age. Adverse health outcomes associated with heavy cannabis use are increasingly being reported, including respiratory side-effects,<sup>21</sup> precipitation of psychosis<sup>22</sup> and cannabis dependence syndrome in young adulthood.<sup>3</sup>

#### Amphetamines

Amphetamines are also commonly used illicit substances, usually used by older adolescents and young adults. Amphetamines may be ingested, inhaled or injected. Young people generally do not consider amphetamines as potentially harmful and use them primarily for their effects of unlimited energy and euphoria. At low doses, amphetamines impart a sense of increased self-confidence, alertness and a heightened capacity for concentration. Chronic heavy use of amphetamines can lead to dependence on the drug or to aggression, violence and paranoid psychosis. Withdrawal from amphetamines is believed to

be more difficult than withdrawal from other drugs such as heroin.

### *Ecstasy*

Ecstasy, one of the first of the designer “party drugs”, is also called MDMA (methylene-dioxy-metamphetamine). Ecstasy is usually consumed orally in tablet form. This drug is most commonly used by older adolescents and young adults, who may use ecstasy alone, or in combination with other substances. It is a derivative of amphetamine and shares the clinical effects of both amphetamines and hallucinogens. Young people use ecstasy because it induces euphoria, positive mood and a sense of intimacy. For this reason, ecstasy is frequently found at nightclubs and ‘rave’ parties, where use of this substance enables all night dancing. Acute adverse health effects of this drug include jaw clenching, teeth grinding, and a degree of stimulation that interferes with concentration and studying,<sup>4</sup> dehydration, cardiac arrhythmias or death.<sup>6,23</sup> The latter side-effects, however, occur relatively rarely given the widespread use of this drug.<sup>23</sup> Hangover effects of ecstasy include painful jaw muscles, fatigue and sometimes depression.<sup>4</sup>

### *Cocaine*

Cocaine use is more common in some countries than others. For example, in the USA and in Amsterdam, Netherlands, it is reported to be the second most used illicit drug. In the 1994 US National Household Survey on Drug Abuse of individuals aged 12 years and older, 12% of the population reported that they had ever tried cocaine and 3% had used it within the previous 12 months.<sup>4</sup> Cocaine may be taken intranasally (“snorted”) or it may be injected intravenously. The euphoric effects of cocaine decay relatively rapidly and cocaine users who try to maintain the euphoric state will take the drug repeatedly every 30 to 40 minutes if it is available. Acute adverse effects of this drug include impaired coordination, tremors, dizziness, muscle twitching, agitation, confusion, persecutory delusions or a paranoid syndrome during a toxic episode. More long-term side-effects may include auditory or visual hallucinations, violent or aggressive behaviour, decreased libido or impotence, and a cocaine dependence syndrome.<sup>6</sup>

### *Inhalant Abuse/“Chroming”*

Inhalants are products (often familiar household items such as glue, petrol or paint) that when vaporised and inhaled, make the adolescent feel intoxicated or ‘high’. “Chroming” refers to the practice of spraying chrome paint from an aerosol can into a plastic or paper bag and inhaling the vapours. This form of drug use is typically seen among younger adolescents, particularly high-risk adolescents. Young people can obtain ready access to these substances

because they are not illegal and they are widely available. Reasons for this form of substance use are mainly social (to have ‘fun’ or experience euphoria), but self-medication for emotional problems also occurs. Acute effects of chroming include euphoria, hallucinations, disinhibition, feelings of invincibility, enhanced risk taking and sometimes aggression. Dizziness and drowsiness can also occur. Chronic solvent inhalation can result in peripheral neuropathy, recurrent nose bleeds, oral and nasal ulceration, diminished cognitive function (especially memory) and depression.

### *Opiates*

Opiate use has a variable age of onset, but increased production and availability of these drugs has been associated with both a decrease in the age of onset of opiate use, and an increase in the prevalence of heroin use in the community.<sup>4</sup> Opiates may be burned and the fumes sniffed or snorted. They can also be injected intravenously. Opiates are usually taken for their euphoric effect. Acute opiate intoxication may result in respiratory depression and death. Chronic opiate use can result in opiate dependence syndrome and the associated decline in general physical and psychological health as well as in psychosocial functioning.

## **The Spectrum of Substance Use**

There are various stages in adolescent substance use and not all individuals who experiment with drugs proceed inexorably to abuse or dependence on drugs. Some adolescents experiment with drugs. That is, they use one or more substances at most up to several times. Other young people use drugs only in specific situations. That is, they use a drug(s) when attending parties or other social gatherings (sometimes referred to as “recreational use”) or as self-medication for insomnia. Abuse of a drug occurs when the substance use results in recurrent problems, such as failure to fulfil obligations at work or in study, or legal problems. Dependence on a drug occurs when the individual experiences physiological or psychological symptoms if not using the drug. As a result, the person spends increasing time in activities related to obtaining or using the substance, at the cost of balanced psychosocial functioning.<sup>24</sup> The factors that influence the transition from experimentation to abuse and subsequent dependence are increasingly the subject of research, in an effort to develop appropriate prevention and early intervention strategies that reduce drug-related harm.

## **Risk Factors for Substance Abuse**

### *Social Context*

Societal factors such as the availability of drugs, laws relating to drug use and the socioeconomic status of a community affect levels of use in both adolescents and

adults. For example, laws that are favourable towards alcohol and other drugs positively influence its use, but taxes on the purchase of alcohol are associated with decreases in both consumption and long-term adverse effects.<sup>25</sup> Lowering the legal drinking age has been associated with increases in teenage drinking and driving and is associated with increased teenage driving fatalities.<sup>26</sup> Access to substances (both in terms of availability and cost) is also important, with greater availability associated with increased use. For instance, periods of increased black market opiates have been linked with an increased prevalence of both opiate use and overdose deaths.<sup>4</sup> Communities that are economically deprived, have poor social supports, high rates of delinquency and a criminal subculture also have high rates of drug use and abuse.

### *Biological Factors*

A number of biological factors have been identified as important predictors of substance abuse. Factors linked to higher use range from alterations in the enzymes involved in the metabolic pathways for substances, alterations in neurotransmitters within the central nervous system mediating substance effects,<sup>27</sup> to inheritance of certain temperament and personality traits such as antisocial personality disorder.<sup>28-30</sup> Sensation seeking has also been implicated, with individuals demonstrating a tendency to novelty seeking and reward dependence being more likely to use and abuse drugs.<sup>30</sup>

### *Peer and Parental Influences*

Peer use of substances is another consistently identified risk factor for substance use in youth.<sup>31-35</sup> A number of familial factors have also been implicated in increasing drug use. These range from familial attitudes that are favourable to the use of substances to parental modelling of drug use and abuse, and/or poor or inconsistent parenting practices.<sup>25,36</sup>

### *Age of Onset of Drug Use*

Early onset (less than 15 years of age) of substance use strongly predicts subsequent misuse of drugs. For example, in the National Longitudinal Alcohol Epidemiological Survey in the United States, over 40% of all individuals who reported drinking alcohol before age 14 years became alcohol dependent compared with one quarter this rate (10%) among those who reported that they had started drinking at age 20 years and older.<sup>37</sup>

### *Mental Health and Well Being*

Long-term prospective studies have shown that substance use is highly linked to emotional and behavioural problems in childhood and adolescence. This relationship is likely to be bi-directional, in that substances may be used in an effort

to “self-medicate” problems, but heavy or long-term substance use can create or exacerbate problems such as depression. The conditions most consistently linked with substance use are conduct disorder, depression and attention-deficit hyperactivity disorder.<sup>38-43</sup> Adolescents who have poor social attachments (e.g. to school, community groups) are also more likely to become involved with drugs.<sup>25</sup> A low degree of commitment to school and/or academic failure have both been linked with substance abuse, although it is uncertain whether this association is independent of conduct disorder or antisocial behaviour.<sup>25</sup>

## **Assessment of Adolescent Substance Use**

### *History*

Polysubstance use is typical among adolescents and therefore specific enquiry about both licit and illicit drugs as well as each psychoactive substance group is usually needed in order to obtain a comprehensive history. Details regarding quantity and frequency of substance use as well as effects on psychosocial functioning and past experience of any adverse side-effects (outlined earlier) are required. Table II lists relevant history and physical examination findings that help the clinician ascertain where, along the spectrum of substance use, the young person lies (i.e. experimentation, substance abuse or dependence?) and hence what management approach would be most appropriate. For instance, in the case of experimentation with substance use, education about potential harms associated with drug use is usually required, but if substance dependence is diagnosed, discussion of detoxification with the young person should be considered.

### *Physical Signs*

Suspicion of drug abuse may arise through non-specific signs such as fatigue, emotional problems or school drop-out or failure. This is especially relevant in the early phase of drug use. If the adolescent presents intoxicated or under the influence of a substance, general examination may help narrow down potential candidate substances. For example, if the young person has taken a substance from the depressant class of drugs, then the clinical picture will be one of sedation or of respiratory depression. If the drug taken belongs to the stimulant class, then the clinical picture will be one of arousal, belligerence or alertness. If multiple substances have been consumed, the clinical picture may be mixed. Venepuncture marks and old scars, most usually in the cubital fossa but sometimes also tracking down the forearm are clues to intravenous drug use. Other sites for venepuncture are the lower limb and the neck. A number of scars of differing ages suggest that the drug use has been occurring for some time. Often, urine toxicology is required to assist in ascertaining what substances have been taken.

TABLE II: SPECIFIC HISTORY AND PHYSICAL EXAMINATION FINDINGS IN THE ASSESSMENT OF ADOLESCENT DRUG USE

| History                                           | Reason for presentation now?                                                                                                                                                                                                                                                                                            |
|---------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Substance use                                     | Ask for each drug class:<br>How much (quantity)?<br>How often (frequency)?<br>Is this typical pattern of use for the adolescent? Or is drug use increasing? decreasing?<br>When did they first start using that drug?<br>When did they last use that drug?<br>Route of administration?                                  |
| Risk behaviours associated with the substance use | Frequent intoxication?<br>History of overdose?<br>Driving while intoxicated?<br>Unsafe sex?<br>Use alone?<br>Sharing injecting equipment? (if applicable)                                                                                                                                                               |
| Complications associated with substance use       | Hepatitis B? C? HIV?<br>Liver disease?<br>Seizures? If so, when using the substance or when withdrawing from it?<br>Cardiac problems (e.g. SBE)?                                                                                                                                                                        |
| Psychiatric history                               | Symptoms of depression/anxiety?<br>Insomnia?<br>Hallucinations?<br>Paranoid ideas?<br>Self-harm/suicide attempts?<br>Diagnosis of schizophrenia or drug-induced psychosis?                                                                                                                                              |
| Social history                                    | Supports? Relationships?<br>Living environment?<br>Education/employment?<br>Legal complications of substance use?<br>Family history of substance use?                                                                                                                                                                   |
| <b>Examination</b>                                |                                                                                                                                                                                                                                                                                                                         |
| Evidence of intoxication?                         | Alcohol on breath? Blood alcohol concentration? Sedated? Slurred speech? Ataxic gait?<br>Opiates: pinpoint pupils? Low blood pressure? Venepuncture marks?<br>Benzodiazepenes: disinhibited? Intoxicated, but not drunk?<br>Psychostimulants: rapid speech? Large pupils? Agitation? Restlessness? High blood pressure? |
| Evidence of withdrawal?                           | Alcohol on breath? Tremulous? High blood pressure?<br>Opiates: dilated pupils? High blood pressure? Venepuncture marks? Sweaty? Rhinorrhea?<br>Cramps?<br>Benzodiazepenes: tremulous, hyperreflexia, hallucinations (particularly tactile)?<br>Psychostimulants: agitation? Restlessness?                               |
| Other observations                                | Underweight? Anaemic? Jaundiced? Splinter haemorrhages in nailbeds?<br>Intravenous drug use: Injection sites — present/absent? New/old? Cellulitis? Abscesses?<br>Thrombophlebitis?<br>Chroming: Paint on fingers? Smell of solvent on the breath?                                                                      |
| Respiratory                                       | Infection?                                                                                                                                                                                                                                                                                                              |
| Cardiovascular                                    | Endocarditis, especially right sided?                                                                                                                                                                                                                                                                                   |
| Abdominal                                         | Hepatomegaly?                                                                                                                                                                                                                                                                                                           |
| Neurological                                      | Mental state? Peripheral neuropathy? Ataxia?                                                                                                                                                                                                                                                                            |

## Management of Adolescent Substance Use

### Principles of Management

#### 1. Establishing rapport with the adolescent:

Successful work with any adolescent requires rapport.

This process is often referred to as ‘engaging the adolescent’. To engage a young person successfully, the health professional needs to take a broad history, gathering information about the social, cultural and educational/vocational background of the adolescent. Gathering this

information helps to engage the young person by demonstrating that the medical practitioner is interested in the young person and not just the substance use. It also helps to develop a management approach that is specific to that particular individual, improving the chance of successful outcomes.

## 2. Assessing the developmental stage of the adolescent:

Successful engagement of a young person also requires an assessment of the developmental stage (physical, cognitive and psychosocial) of the individual. This assessment is important because it influences the way in which the doctor presents or explains information and incorporates developmentally appropriate discussions on health promotion.

## 3. Motivational assessment:

Assessing the level of motivation requires an understanding of the ‘stage of change’. The stepwise process that occurs before significant behaviour change takes place was originally described by Prochaska and includes: precontemplation, contemplation, action and maintenance.<sup>44</sup> ‘Precontemplation’ refers to when the adolescent is not seriously considering changing his/her substance use, at least not for the next six months. ‘Contemplation’ refers to the period when an adolescent is seriously thinking about ceasing or reducing their drug use. ‘Action’ refers to the period of attempting to stop or reduce substance use. ‘Maintenance’ refers to the period of abstinence or reduced drug use until abstinence or relapse occurs. Important ways to increase motivation to change in adolescents and therefore their progression from precontemplation to contemplation include exploring the advantages and disadvantages of their substance use (e.g. *Drinking can make you feel relaxed and at ease in company, but sometimes being drunk can lead to unpleasant things...what is your experience?*), discussing with the young person what bothers them most about changing their substance use (e.g. *Girls often worry that they will gain weight if they stop smoking – is that something that concerns you?*) and how they would react to the adverse consequences of which they may currently be at risk, for instance, infection with a blood-borne virus (e.g. *What would you do if you found out that you had hepatitis C?*). This dialogue provides important opportunities to advise the young person of the potential harms in substance use, how to recognise the development of harmful use and appropriate strategies to avoid adverse health outcomes.

## 4. Tailoring the intervention to the adolescent:

Management of the substance-using adolescent will vary according to the context. Interventions include education, counselling for co-morbid depression or anxiety, support

during withdrawal/assisted detoxification, blood-borne virus screening and vaccination. A significant part of management of chronic misuse of drugs also includes reintegration into education/employment and into healthier alternatives to drug use, such as sport, hobbies, etc. Substance abuse typically follows a chronic relapsing pattern and it often takes several attempts at drug withdrawal before the young person succeeds. Specific pharmacological management of adolescents in withdrawal from each substance of abuse is beyond the scope of this article but generally follows the same principles as applied in the management of adults. Clinicians should note, however, that both convulsions and delirium may occur in severe withdrawal from alcohol or benzodiazepenes, and that this may potentially be life-threatening. Sometimes abstinence from substance use is too challenging a goal for a young person, and a gradual reduction in substance use, or ‘weaning’ process is a more realistic goal.

## 5. Attending to the family of substance-using adolescents:

Parents of substance-using adolescents also require the attention of the health professional. The medical practitioner can help empower families through education about substance use, advice regarding parenting strategies and counselling for parental depression or anxiety. In cases of entrenched substance abuse, disengagement between the young person and the family may have occurred. Families are an integral part of the adolescent’s world and it is therefore important to try to assist the young person to rebuild the connection. Depending on the individual circumstance, this connection may be achieved through mediation by the medical practitioner or more formally with family counsellors.

Managing adolescents requires patience and constant reassurance (of the young person, their family and of ourselves) that change in complex behaviours and emotions takes time. Reassuring adolescents of this and setting small yet realistic goals can alleviate much of the tension relating to why improvements in substance use behaviour are not occurring sooner. Positive reinforcement through comments on any change in substance use, however small, is valuable in maintaining the adolescent’s motivation. For instance, commending a young person for a reduction in even a few cigarettes per day, or for a moderate reduction in marijuana use can be helpful. Young people are influenced and motivated by what their doctors say and medical practitioners should not underestimate the opportunity they have to develop an effective relationship with an individual over time, during which improved health outcomes can be observed.

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