

POSITION STATEMENT

Cannabis Use and Health - 2014

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Introduction

Cannabis is a group of substances from the plant *cannabis sativa*. Cannabis is used in three main forms: flowering heads, cannabis resin (hashish) and cannabis oil. There are more than 60 psycho-active chemicals in cannabis, including the cannabinoids:

- delta-9 tetrahydrocannabinol (THC), which is found in the resin covering the flowering tops and upper leaves of the female plant and which alters mood and produces the feeling of a 'high'; and
- cannabidiol, which can offset the effects of THC.

Cannabis is usually smoked, either in a hand-rolled cigarette (a 'joint') containing the leaf, heads or resin of the plant, or through a water-pipe (a 'bong') where water is used to cool the smoke before it is inhaled. In Australia, cannabis is also commonly known as gunja, yarndi, weed and dope.

Patterns of Cannabis Use in Australia and its Public Health Impacts

In 2010, cannabis was the most commonly used illicit drug in Australia.^[1] Over one third of Australians (35.4%, approximately 6.5 million) aged 14 years and over had used cannabis at least once in their lifetime, and 1.9 million of these had used cannabis recently (i.e., in the last 12 months). Recent cannabis use among those 14 years and older has increased from 9.1% in 2007 to 10.3% in 2010, though daily users decreased from 14.9% in 2007 to 13% in 2010. In 2010, approximately 247,000 Australians 14 years and over used cannabis daily.

For most cannabis users, use is relatively light. Most young people have used it once or twice. However, the younger people start using cannabis, and the greater the frequency with which they use it, the greater the risk of harm.

Based on current use patterns, alcohol abuse and tobacco pose much greater harms to individual and public health in Australia than cannabis. Cannabis-related psychosis, suicide, road-traffic crashes and dependence were estimated to account for 0.2% of the total disease burden in Australia in 2003.^[2] This compares to 7.8% of the total burden

attributable to tobacco use and 2.3% attributable to alcohol use. In 2004-05, the estimated social costs of cannabis use (including health, crime, road crash and labour costs) was \$3.1 billion.^[3] Ninety percent of this cost was due to dependent cannabis use. In comparison, the health, crime, road-crash and labour costs of alcohol use in 2004-05 are estimated to be more than three times as much (\$9.4 billion).^[4]

The Health Effects of Cannabis Use

There is a dose-response relationship between cannabis use and its effects, with stronger effects expected from larger doses.

- Intoxicating effects occur within seconds to minutes and can last for three hours;
- Effects last longer with larger doses;
- Effects on cognitive function and coordination can last up to 24 hours;
- Short-term memory impairment may last for several weeks; and
- A single dose in a chronic user can take up to 30 days for the metabolites to be excreted.

Short-term effects of small doses

The most common short-term effects of using cannabis are:

- a feeling of euphoria or 'high' - with a tendency to talk and laugh more than usual;
- impaired balance, reaction time, information processing, memory retention and retrieval, and perceptual-motor coordination;^[5]
- increased heart rate;
- decreased inhibitions such as being more likely to engage in risky behaviour, e.g. unsafe sexual practice; and
- if smoked, increased respiratory problems including asthma.

Short-term effects of large doses

The most common short-term effects of a large dose can include:^[6]

- hallucinations and changed perceptions of time, sound, colour, distance, touch and other sensations;
- panic reactions;
- vomiting;
- loss of consciousness; and
- restlessness and confusion.

The severity of these short-term effects depend on a person's weight, tolerance to the drug, amount taken, interactions with other drugs, circumstances in which the drug is taken, and the mode of administration.

Long-term effects

The evidence associating regular cannabis use with specific long-term health conditions and adverse effects is of variable quality. Cannabis use is highly correlated with use of alcohol, tobacco and other illicit drugs, all of which have potential adverse health effects. There is sufficient evidence, however, to indicate that cannabis is a risk factor for some chronic health effects and conditions.

Regular and prolonged cannabis use may cause:

- cannabis dependence, characterised by impaired control over its use and difficulties in ceasing use; increased tolerance^[7] (meaning more of the drug is needed to produce the same effect) and possible withdrawal symptoms, including anxiety, insomnia, appetite disturbance, and depression;^[8]
- increased risk of myocardial infarction in those who have already had a myocardial infarction;^[9] and
- deficits in verbal learning, memory and attention (in heavy users).^[10]

While not conclusive, there is evidence that regular cannabis use can cause chronic bronchitis and impaired immunological competence of the respiratory system.^[11] Occasional cannabis use, however, is not associated with adverse effects on pulmonary function.^[12] Cannabis smoke contains many carcinogens, but there is variable evidence concerning the relationship between cannabis smoking and lung cancer.^[13]

Evidence supporting an association between cannabis use and sexual and reproductive effects is weak. However, some studies show an association between cannabis use and increased risk of testicular cancer.^[14]

Daily consumption of large quantities of cannabis may lead to the neglect of other important personal and social priorities such as relationships, parenting, careers and community responsibilities.

Pregnant women

Cannabis is the most commonly used illicit drug in women of child-bearing age. Cannabis use during pregnancy has been consistently associated with lower birth-weight babies and pre-term birth, but does not appear to increase the risk of miscarriage or birth abnormalities.^[15] Some studies suggest that children exposed to cannabis *in utero* may have slight impairment in higher cognitive processes such as perceptual organisation and planning.^[16] There is insufficient evidence of an association between prenatal cannabis use and postnatal behaviour.^[17]

Accidental ingestion by young children

Accidental ingestion of cannabis can cause coma in young children. Cannabis ingestion can be confirmed by positive urine screening for cannabinoids. Cannabis ingestion needs to be considered in toddlers and children with impaired consciousness.

Driving under the influence of cannabis

Cannabis slows reaction time and increases the risk of having a car crash. Other risk factors are blurred vision, poor judgement and drowsiness^[18] which can persist for several hours. The effects are increased by alcohol.

Dependence and tolerance

Cannabis dependence is usually defined as impaired control over continued use and difficulty ceasing despite the harms of continued use.^[19] Dependence can negatively affect personal relationships, education, employment and many other aspects of a person's life. Data from Australia and other countries indicates that demand for professional help related to cannabis is increasing. Cannabis dependence is the most frequent type of substance-dependence in Australia after alcohol and tobacco.^[20] It has been estimated that cannabis dependence will affect around one in ten cannabis users, and around half of those who use it daily.^[21]

Animal and human studies demonstrate that tolerance to many of the psychological and behavioural responses to cannabis occurs with repeated exposure to the drug. The symptoms of withdrawal from cannabis appear similar to those associated with tobacco, but less severe than withdrawal from alcohol or opiates.

There is a view that the cannabis being used today has a higher THC content and potency than in the past. This may be a perception caused by changes in the mode of use (i.e. through 'bongs' rather than 'joints', and with more consumption of the heads of the cannabis plant). However, there is some independent evidence that cannabis used today can be of a higher potency. The cannabis in recent street-level seizures in Sydney and the North Coast of NSW has been shown to have a high potency, with around 15% THC, with little or no cannabidiol.^[22]

Cannabis as a Gateway Drug

The gateway hypothesis is that cannabis use may act as a causal 'gateway' to the use of other illicit drugs such as cocaine and heroin. It is a controversial hypothesis with proponents arguing that because the use of so-called harder drugs is almost always preceded by cannabis use, this means that cannabis use physiologically and/or psychologically causes people to progress to harder drugs. The alternative theory is known as the 'common cause' theory whereby a person's use of cannabis and their later

use of other illicit drugs are both seen as effects of common causes such as personal or socio-economic factors, or exposure to illicit drug distribution networks.

Evidence for the gateway hypothesis is inconclusive given the difficulties in disentangling the effect of other potential influences in drug use progression. Meta-analyses suggest that the progression in use that has been observed is likely to be due partially to the influence of independent common causes.^[23]

Cannabis and Mental Health

Cannabis and psychosis

Cannabis use is associated with poor outcomes in existing psychosis and is a risk factor for developing psychosis.^[24] For those with existing psychosis, using cannabis can trigger further episodes of psychosis, worsen delusions, mood swings, hallucinations and feelings of paranoia, as well as contributing to poor compliance with medication regimes.

The research base on cannabis and psychosis has expanded in recent years with studies showing a consistent association between early-aged onset of cannabis use, regular use and a later diagnosis of schizophrenia. Meta-analyses have noted a doubling of the risk of psychotic outcomes in regular cannabis users,^[25] and earlier onset (by 2.7 years) among cannabis users who develop psychosis.^[26] There is increasing evidence that the association between cannabis and onset of psychosis is not due to other co-occurring factors.^[27] The most plausible view is that cannabis use is a 'contributory cause' of psychosis in vulnerable individuals, and that it is one of a number of potential factors that can bring on psychosis (including genetic predisposition).^[28]

Cannabis and depression

The association between cannabis use and depression is weak and insufficient to establish a causal connection. Studies that have found an association are likely to have been affected by confounding variables such as family and personality factors, other drug use and marital status.^[29] There is currently insufficient evidence available to conclude whether cannabis use is associated with suicide. Research is made difficult by confounding factors such as the stresses of an illicit drug-dependent life and pre-existing poor mental health.^[30]

Cannabis and anxiety

There is emerging evidence associating cannabis use with anxiety disorders. However, the current level of evidence is not yet sufficient to establish a causal relationship.^[31]

Medical Uses Of Cannabis

In addition to psychoactive compounds, cannabis has constituents with other pharmacological effects, including antispastic, analgesic, anti-emetic, and anti-inflammatory actions.^[32] These constituents may have therapeutic potential.

Cannabis extracts and synthetic formulations have been licensed for medicinal use in some countries, including Canada, the USA, Great Britain and Germany, for the treatment of severe spasticity in multiple sclerosis, nausea and vomiting due to cytotoxics, and loss of appetite and cachexia associated with AIDS. The synthetic cannabis product Nabiximols (Sativex), which is delivered as a buccal spray and so avoids the harms of cannabis smoke inhalation, is effective in the management of spasticity and pain associated with multiple sclerosis. The psycho-active effects of Nabiximols can also be managed through controlling dosage. In Australia, the synthetic cannabinoids nabilone and dronabinol are scheduled by authorities for medicinal use. Sativex is also being trialed in Australia for cancer and cannabis withdrawal. Canada has allowed the medical use of smoked cannabis if this is authorised and monitored by a doctor.^[33]

There is a growing body of evidence that certain cannabinoids are effective in the treatment of chronic pain, particularly as an alternative or adjunct to the use of opiates, when the development of opiate tolerance and withdrawal can be avoided.^[34] Controlled trials have also shown positive effects of cannabis preparations on bladder dysfunction in multiple sclerosis, tics in Tourette syndrome, and involuntary movements associated with Parkinson's disease.^[35] Based on existing data, the adverse events associated with the short-term medicinal use of cannabis are minor.^[36] However, the risks associated with long-term medicinal use are less well understood, particularly the risk of dependence, and any heightened risk of cardiovascular disease.^[37]

Though there is a growing body of evidence regarding the therapeutic use of cannabinoids, it is still experimental.

Synthetic Cannabis

Synthetic cannabis products have been developed, usually in herbal form for smoking. These products have been marketed in Australia as 'legal highs' with product names such as 'Spice', 'K2', and 'Kronic'.^[38] The psychoactive components are usually THC analogues that bind to cannabinoid receptors in the brain. These analogues are not easily detectable by routine testing, and until recently have not been captured by legislation. These synthetic cannabis products are attractive to their users because they are perceived as safe, are not easily detectable in drug tests, and until recently have not been illegal.^[39]

The synthetic cannabis products can not be considered safe given that the synthesized psychoactive substances in them have not been rigorously tested, and little is known about their long or short-term health effects, dependence potential or adverse reactions.^[40] Psychotic symptoms have been associated with use of some synthetic cannabinoids, as well as signs of addiction and withdrawal symptoms similar to those of cannabis.^[41] Adverse outcomes have been reported from the use of Kronic in Australia.

The Control of Cannabis Use and Supply

Australian legislation

The possession, cultivation, use, and supply of cannabis is prohibited in all Australian States and Territories. In some Australian jurisdictions there are *criminal* penalties for the possession, cultivation and use of cannabis, and in others there are less severe *civil* penalties. Legislation in Australia often distinguishes between possession of small amounts of cannabis (for personal use), possession of larger amounts (trafficable quantities), and possession of even larger “commercially trafficable” quantities. The supplying of cannabis and the possession of large quantities attract criminal penalties in all Australian jurisdictions.^[42] All Australian States and Territories have diversionary schemes for minor and early cannabis offenders which require them to undertake educative and treatment programs as an alternative to receiving a criminal penalty.^[43]

Criminalisation and health

It is often thought that criminal penalties are a deterrent to cannabis use and, therefore, an effective way to prevent the health impacts and other harms associated with cannabis use. These beliefs have little foundation. A system of criminal prohibition for cannabis use applied in Australia for many years, but the incidence of cannabis use was still significant. The introduction of less serious civil penalties and diversionary alternatives to criminal sanctions did not significantly increase the rates of uptake and use among Australians.^[44]

For those who are not deterred from use by criminal penalties, criminalisation can add to the potential health and other risks to which cannabis users are exposed. These include: ^[45]

- **exposure of cannabis users, including teenage and occasional users, to ‘harder drugs’.** Those who acquire cannabis from large scale illicit drug distribution networks will also become exposed to more harmful drugs, including the direct marketing of those drugs to them;

- **exposure of cannabis users to criminal networks and activity**, including exposure to the threat of violence and the risk of taking part in criminal distribution;
- **the personal and health-related costs of a criminal conviction**. A criminal conviction can negatively impact on a person's employment prospects and their accommodation and travel opportunities. Limited employment and accommodation prospects can lead to poor health, including mental health. Individuals with a criminal record are also at a disadvantage in any subsequent criminal proceedings;
- **a deterrent to individuals seeking health advice, treatment and support regarding their cannabis use**;
- **the inability to collect high quality, reliable data regarding patterns of use and harms.** [\[46\]](#)

Harm reduction

A harm-reduction approach is defined as policies and initiatives that aim to reduce the adverse health, social and economic consequences of substance use to individual drug users, their families and the community. Harm reduction considers both the potential harms to individuals using substances like cannabis and the potential harms and negative impacts of the different approaches for controlling the use and supply of these substances.

When harm reduction is the primary goal, the key policy focus will be on measures to reduce individuals' harmful levels of cannabis use, or cannabis use among individuals who are most vulnerable to adverse health impacts, or cannabis use in contexts which involve serious risks to users. Harm-reduction measures include targeted efforts to reduce the supply of cannabis and to reduce demand for it among vulnerable groups. In certain contexts, and with certain groups, measures emphasizing abstinence may also contribute, in a preventive way, to reducing harms.

Policy and legislative approaches that do not effectively address cannabis-related harms or create significant risks and adverse impacts are not consistent with harm-reduction. Prohibition of cannabis use with criminal penalties has the potential to produce harms and risks. The effectiveness of criminal prohibition of cannabis use in reducing the health-related harms associated with cannabis use is questionable.

Treatment Options

The number of people seeking treatment for cannabis use is increasing, but most of those who experience cannabis dependence do not seek help. [\[47\]](#) Many regular cannabis users do not believe they need treatment, and there is also a low awareness of the treatment options available and how to access them.

There are fewer treatment options for cannabis dependence than for alcohol or opiate dependence, and limited research on the effectiveness of different cannabis treatment options. Treatments for problematic cannabis use include psychological interventions such as cognitive behavioural therapy and motivational enhancement, and pharmacological interventions with medications to ease the symptoms of withdrawal or block the effects of cannabis.^[48] The research on pharmacological interventions for cannabis is in its infancy, with medications still in the experimental stages of development.

Cognitive behavioural therapy helps the cannabis user develop knowledge and skills to identify risk situations when using cannabis and to modify behaviour accordingly. Motivational enhancement techniques build the cannabis user's desire to address their problematic use.^[49] These counseling interventions are increasingly available online as web-based programs, as well as face-to-face with a counselor. Online programs have the advantage of convenience and anonymity, for those who are concerned about possible stigma. Difficulties in maintaining motivation, and limitations in personalising the programs to individual needs, are drawbacks. According to current research, web-based treatment programs may not be as effective as in-person treatment.^[50]

Some problematic cannabis users have particular treatment needs, including those with cannabis dependence and mental health issues. These individuals require integrated treatment and coordinated care. General practitioners can play an important role in developing a coordinated care plan to suit the needs of these patients.^[51]

The Australian Medical Association Position

The AMA acknowledges that cannabis use is harmful and can lead to adverse chronic health outcomes, including dependence, withdrawal symptoms, early onset psychosis and the exacerbation of pre-existing psychotic symptoms. While the absolute risk of these outcomes is low and those who use cannabis occasionally are unlikely to be affected, those who use cannabis frequently and for sustained periods, or who initiate cannabis use at an early age, or who are susceptible to psychosis, are most at risk.

The AMA also recognises that cannabis use has short-term effects on cognitive and perceptual functioning which can present risks to the safety of users and others.

The AMA believes that cannabis use should be seen primarily as a health issue and not primarily as a matter for law enforcement. The most appropriate response to cannabis use should give priority to policies, programs and regulatory approaches that reduce the harms potentially associated with cannabis use, and particularly the health-related harms. The positions outlined below should be read in the light of this harm-reduction principle.

The AMA believes the following are the important considerations and central elements in an appropriate harm-reduction response to cannabis use.

Prevention and Early Intervention

- As younger people and those who use cannabis frequently are most at risk of harm, prevention and early intervention initiatives to avoid, delay and reduce the frequency of cannabis use in these populations are essential.
- All children should have access to developmentally appropriate school-based life-skills programs to assist in preventing or reducing potential substance use problems.
- Evidence-based information on the potential risks of cannabis use and where to seek further assistance should be widely available, particularly to young people.
- Medical professionals can play an important role in the early identification of patients they believe to be at risk of adverse health outcomes from cannabis use.
- When a cannabis user comes into contact with law enforcement or justice administration agencies this should be used as an opportunity to direct them to education, counseling or treatment. This is particularly important with young and first time or early offenders.

Diagnosis and Treatment

- Medical professionals have the knowledge and opportunity to screen for and diagnose cannabis-related disorders, including dependence, withdrawal symptoms, and cannabis-induced psychosis. Referral networks and linkages should be established within regions between primary care and specialist mental health and drug and alcohol services, to ensure integrated and coordinated treatment support for cannabis use problems.
- Medical professionals, particularly general practitioners, have the opportunity to counsel patients who are at risk of cannabis-related harms, and they should be supported to provide education and advice about those potential harms.
- Targeted treatment regimens should be developed and resourced for groups with particular needs, including those with dual diagnoses, multiple drug use, young teenage users and culturally appropriate services for Aboriginal peoples and Torres Strait Islanders. Of particular importance are suitable treatment services for cannabis users with mental health needs.

- Every effort should be made to address the personal and systemic barriers that cannabis users face in seeking treatment and support when they need it. These include barriers associated with perceptions of stigmatisation, users' and professionals' awareness of treatment options, and users' beliefs that they do not have a health problem.
- Doctors should consider accidental cannabis ingestion in the differential diagnosis of children with impaired consciousness.
- Cannabis users should have access to the rehabilitative services and support they require to manage associated disorders and particularly the risk of relapse.

Medical Uses of Cannabis

The Australian Medical Association acknowledges that cannabis has constituents that have potential therapeutic uses.

- Appropriate clinical trials of potentially therapeutic cannabinoid formulations should be conducted to determine their safety and efficacy compared to existing medicines, and whether their long-term use for medical purposes has adverse effects.
- Therapeutic cannabinoids that are deemed safe and effective should be made available to patients for whom existing medications are not as effective.
- Smoking or ingesting a crude plant product is a risky way to deliver cannabinoids for medical purposes. Other appropriate ways of delivering cannabinoids for medical purposes should be developed.
- Any promotion of the medical use of cannabinoids will require extensive education of the public and the profession on the risks of the non-medical use of cannabis.

Law Enforcement, Cannabis Regulation and Health

- In assessing different legislative and policy approaches to the regulation of cannabis use and supply, primary consideration should be given to the impact of such approaches on the health and well-being of cannabis users.
- The AMA does not condone the trafficking or recreational use of cannabis. The AMA believes that there should be vigorous law enforcement and strong criminal penalties for the trafficking of cannabis. The personal recreational use of cannabis

should also be prohibited. However, criminal penalties for personal cannabis use can add to the potential health and other risks to which cannabis users are exposed. The AMA believes that it is consistent with a principle of harm reduction for the possession of cannabis for personal use to attract civil penalties such as court orders requiring counselling and education (particularly for young and first time offenders), or attendance at 'drug courts' which divert users from the criminal justice system into treatment.

- When cannabis users come into contact with the police or courts, the opportunity should be taken to divert those users to preventive, educational and therapeutic options that they would not otherwise access.
- In allocating resources, priority should be given to policies, programs and initiatives that reduce the health-related risks of cannabis use. Law enforcement should be directed primarily at cannabis supply networks.
- The AMA believes that the availability and use of synthetic cannabis products (including herbal forms) poses significant health risks, given that the psychoactive chemical constituents of these products are unknown and unpredictable in their effect. There are particular challenges in regulating these products, and Australian governments must make a concerted effort to develop consistent and effective legislation which captures current and emerging forms of synthetic cannabis.

Research

- Further research is needed into the relationship between cannabis use and psychosis and other mental health problems, including the identification of those at greatest risk of cannabis-induced psychosis.
- There should be continuing research to identify the risk factors that contribute to individuals developing problematic or early onset cannabis use, and the factors and interventions that can protect against these.
- Australian governments should fund research into best practice treatment methods, including suitable pharmacotherapies, for those who are cannabis-dependent or who wish to reduce or cease their use.
- There should be systematic ongoing monitoring of the different legislative and policy approaches on cannabis operating in overseas jurisdictions to assess their health and harm-related impacts. The evidence obtained should inform critical reviews of the approaches that operate in Australia.

EndNotes

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- [1] Australian Institute of Health and Welfare 2011. *2010 National Drug Strategy Household Survey Report Drug Statistics Series No. 25*. AIHW Canberra.
- [2] Begg, S., et. al. 2007. *The burden of disease and injury in Australia in 2003*. Australian Institute of Health and Welfare, Canberra.
- [3] Moore, T. 2007. *Monograph No. 14: Working estimates of the social costs per gram and per user for cannabis, cocaine, opiates and amphetamines*. DPMP Monograph Series. Sydney: National Drug and Alcohol Research Centre.
- [4] Collins, D and Lapsley, H. 2008. *The costs of tobacco, alcohol and illicit drug abuse to Australian society in 2004/05*, Commonwealth of Australia
- [5] Solowij, N 1998 *Cannabis and Cognitive Functioning*, Cambridge, UK: Cambridge University Press.
- [6] Hall, W and Degenhardt, L, 2009. "Adverse health effects of non-medical cannabis use", *The Lancet* Vol 374, October 17.
- [7] Budney, AJ and Hughes JR. 2006, "The cannabis withdrawal syndrome", *Current Opinion in Psychiatry* vol 19, pp: 233-38
- [8] Allsop, D., Copeland, J., et. al., 2012. Quantifying the clinical significance of cannabis withdrawal. *PLoS ONE* Vol 7 Issue 9
- [9] Mittleman, MA, et. al 2001. "Triggering myocardial infarction by marijuana" *Circulation* vol 103, pp: 2805-09.
- [10] Solowij N. et. al. 2002 "Cognitive functioning of long-term heavy cannabis users seeking treatment", *Journal of the American Medical Association* vol 287 pp: 1123-31.
- [11] Tetrault JM, et. al. 2007. "Effects of marijuana smoking on pulmonary function and respiratory complications: a systematic review", *Archives of Internal Medicine* Vol 167 pp 221-28.

[12] Pletcher, M. J., et. al. 2012. "Association between marijuana exposure and pulmonary function over 20 years", *Journal of the American Medical Association*, Vol. 307, pp. 173-181.

[13] Hashibe M et. al. 2005. "Epidemiologic review of marijuana use and cancer risk", *Alcohol* vol. 35 pp: 265-75

[14] Lacson, J. C., 2012. "Population-based case-control study of recreational drug use and testis cancer risk confirms an association between marijuana use and nonseminoma risk", *Cancer* Vol. 118, No 21, pp: 5374-5383.

[15] Mohammad R., Hayatbakhsh, et. al. 2012. 'Birth outcomes associated with cannabis use before and during pregnancy', *Pediatric Research* Vol. 71, pp 215-219.

[16] Fried, PA and Smith AR, 2001. "A literature review of the consequences of prenatal marijuana exposure: an emerging theme of a deficiency in aspects of executive function" *Neurotoxicology and Teratology* vol 23 pp: 1-11.

[17] McLeod, J, et. al., 2006 "Psychological and social sequelae of cannabis and other illicit drug use by young people: a systematic review of longitudinal general population studies", *Lancet* vol. 363 pp 1579-88

[18] Drummer, OH, et. al, 2004. "The involvement of drugs in drivers of motor vehicles killed in Australian road traffic crashes", *Accident Analysis and Prevention* Vol. 36, pp: 239-48.

[19] Hall, W and Degenhardt, L, 2009, op. cit.

[20] Hall, WD and Pacula, RL, 2003 Op cit.

[21] Hall, W and Degenhardt, L, 2009. op cit

[22] McGregor, I. 2012. Cannabis and Cannabinoids: plants, rats, detox and reintox. 2nd National Cannabis Conference, NCPIC: Brisbane.

[23] Degenhardt, L, et. al., 2010, "Evaluating the drug use 'gateway' theory using cross national data: Consistency and associations of the order of initiation of drug use among participants in the WHO World Mental Health Surveys", *Drug and Alcohol Dependence* vol. 108, pp: 84-97

[24] Degenhardt, L and Hall W, 2012. "Extent of illicit drug use and dependence, and their contribution to the global burden of disease", *The Lancet*, Vol 379 January 7.

- [25] Arseneault L, et al., 2004 "Causal association between cannabis and psychosis: examination of the evidence", *British Journal of Psychiatry* vol 184, pp: 110-117; Degenhardt L and Hall WD, 2006 op. cit..
- [26] Large M, et al., 2011. "Cannabis use and earlier onset of psychosis: a systematic meta-analysis" *Archives of General Psychiatry* vol. 68 pp: 555-61.
- [27] Moore, T., et. al., 2007 "cannabis use and risk of psychotic or affective mental health outcomes: a systematic review", *The Lancet* vol. 370, pp: 319-28 ; Degenhardt L and Hall WD 2006. "Is cannabis a contributory cause of psychosis?", *Canadian Journal of Psychiatry* vol. 51, pp: 556-65.
- [28] Degenhardt L., et. al. 2009. "Should burden of disease estimates include cannabis use as a risk factor for psychosis? *PLOS Medicine* vol. 6, pp: 1-7
- [29] Degenhardt L and Hall W. 2012. op. cit.
- [30] Degenhardt L and Hall W. 2012. op. cit.
- [31] Degenhardt L and Hall W. 2012. op. cit
- [32] Grotenhermen, F and Muller-Vahl, K., 2012, "The therapeutic potential of cannabis and cannabinoids", *Deutsches Arzteblatt International* Vol 109, pp. 495-501.
- [33] Degenhardt, L and Hall, W., 2008 "The adverse effects of cannabinoids: implications for use of medical marijuana". *Canadian Medical Journal* Vol. 178, pp: 1685-6.
- [34] Lucas, P. 2012, "Cannabis as an adjunct to or substitute for opiates in the treatment of chronic pain", *Journal of Psychoactive Drugs* Vol. 44, pp: 125-33.
- [35] Grotenhermen, F and Muller-Vahl, K., 2012. op. cit.
- [36] Wang T, et. al., 2008. "Adverse effects of medical cannabinoids: a systematic review", *Canadian Medical Association Journal*, Vol 178, pp: 1669-1678.
- [37] Degenhardt, L and Hall, W., 2008. op.cit.
- [38] Dillon, P and Copeland, J., 2012, "Synthetic cannabinoids: The Australian experience", *Bulletin Series 13*, National Cannabis Prevention and Information Centre, University of New South Wales, March.
- [39] Fattore, L. and Fratta, W., 2011. "Beyond THC: the new generation of cannabinoid designer drugs", *Frontiers in Behavioural Neuroscience* Vol 5, pp: 1-12.
- [40] Dillon, P and Copeland, J., 2012. op. cit.

[41] Vardakou, I. et. al., 2011. "Spice drugs as a new trend: Mode of action, identification and legislation." *Toxicology Letters* Vol. 197, pp: 157-162.

[42] Rickard, M. 2001. 'Reforming the old and refining the new: A critical overview of Australian approaches to cannabis', *Australian Parliamentary Library*, Research Paper 6.

[43] For information on legislative arrangements in Australian jurisdictions, see *Cannabis and the Law* at <http://ncpic.org.au/workforce/alcohol-and-other-drug-workers/cannabis-information/factsheets/article/cannabis-and-the-law>

[44] Rickard, M., 2001. op. cit.

[45] Lenton, S, et. al., 2000 *The Regulation of Cannabis Possession, Use and Supply*, National Drug Research Institute.

[46] Degenhardt, L and Hall W, 2012. op. cit.

[47] Gates, P., et. al., 2009. "Barriers and facilitators to cannabis treatment", Technical report No. 1, National Cannabis Prevention and Information Centre. University of New South Wales.

[48] National Cannabis Prevention and Information Centre, 2012. "Treatment for cannabis use problems" Fact Sheet 16.

[49] National Cannabis Prevention and Information Centre, 2012, op. cit.

[50] National Cannabis Prevention and Information Centre, 2012, op. cit.

[51] There are also brief interventions online (for example, at <https://reduceyouruse.org.au/sign-up/>) and by telephone (for example, <http://ncpic.org.au/ncpic/helpline/>)