Cannabis: General Facts
(How it works in the brain and body, strengths etc)

An extract from ‘Cannabis: A General Survey of its Harmful Effects’
Mary Brett updated January 2017

Cannabis sativa grows well in tropical and temperate climates. Marijuana consists of the dried plant parts, Hashish is the resin secreted by glandular hairs all over the plant mainly round the flowers, protecting the plant from water loss. Sinsemilla is the dried material from the tops of the female plants. Hashish oil (up to 60% THC) is obtained by extraction but rarely used in the UK.

Cannabis contains some 400 chemical substances. These vary with the habitat and are often contaminated with microbes, fungi or pesticides (Jenike 1993, BMA 1997). More than 60 cannabinoids, substances unique to the plant have been identified. The most psychoactive of these and the main cause of many of the other harmful pharmacological effects is THC (delta-9-tetrahydrocannabinol) (Ranstrom 2003). Other natural cannabinoids are delta-8-THC, cannabiol and cannabidiol (BMA 1998).

Brain signals pass along nerve cells in the form of electrical impulses, and chemicals called neurotransmitters carry the messages between cells. These dozens of neurotransmitters are released at the end of one neuron (nerve cell) and fit into receptor sites by shape on the next cell. Transmission of nerve signals takes a fraction of a second. The psychoactive THC mimics a neurotransmitter called anandamide and so affects its receptor sites (Devane et al, 1992).

Two types of receptor site have been identified, CB1 receptors are distributed in the brain in the areas concerned with motor activity and control of posture (cerebellum and basal ganglia), emotion (amygdala and hippocampus), memory, cognition, the “high”, distortion of the sense of time, sound, colour and taste, the alteration of the ability to concentrate and the production of a dreamlike state (cerebral cortex and hippocampus), sensory perception (thalamus), mood in general and sleep. No CB1 receptors are present in the brain stem so the drug does not affect basal bodily functions like respiration. This explains the lack of deaths by overdosing with cannabis (Harkenham et al, 1991, 1992, BMA 1997). CB2 receptors were discovered in 1994 by Lynn and Harkenham. They were outside the brain on specific components of the immune system. Binding of cannabinoids was also seen in the heart, lungs, endocrine and reproductive systems, so all these systems are affected.

Cannabinoids are absorbed rapidly into the body after inhalation from smoked cannabis preparations. The effects become noticeable in a matter of minutes. They are then rapidly distributed all over the body and maximum brain concentrations are reached within 15 minutes. The psychological effects can last for 2 to 4 hours then slowly decline over the next 12 hours. When taken orally, THC absorption is much slower and more variable and the onset of its effects are delayed by 30 minutes to 2 hours. The duration of its effects are prolonged, 5 to 6 hours due to continued absorption from the gut and some cognitive and motor skills are impaired for much longer e.g. driving. (Huestis et al 1992, BMA1997). Cannabis can cross the placenta, enter the circulation of the foetus and pass into breast milk.

Cannabinoids are highly lipid-soluble and so rapidly accumulate in the fatty tissues, being slowly released back into other body tissues and organs including the brain and bloodstream. Elimination of a single dose can take 30 days, unlike water-soluble alcohol that is removed at the rate of one unit per hour, and appears in the faeces and urine. Repeated doses will therefore accumulate in the body and affect the brain over long periods of time (BMA 1997). Cannabis is a multi-faceted drug. The inhibitory effects of THC on the release of a variety of neurotransmitters in the central nervous system has also been observed in several studies (Schliker and Kathmann, 2001, Katona et al 2000). Blood levels of THC drop rapidly after smoking due to its conversion into metabolites and sequestration into fatty tissues (Grotenhermen 2003).

Since 1971 when drugs were classified and cannabis was consigned to class B, the amount of THC in the plant in some varieties of Cannabis sativa has changed considerably. At that time the content of THC in marijuana was around 0.5 – 3% (Ranstrom 2003). Smokers in the late 80s and 90s had access to sinsemilla (7 to 11% THC, Schwartz 1991). Hashish has consistently had a THC content of 4 to 5%.
However, selective breeding of the plant, especially in Holland, has produced varieties such as Netherweed and Skunk with THC contents up to and over 20% (Jenike, 1993, BMA 1998). These stronger types, now commonly grown in the UK are favoured by today’s users, the lower levels being much less common (Ranstrom 2003). An article in The Guardian on 29th August 2006 reported that “Analysis of recent home-grown hauls detected THC levels as high as 20%, nearly 7 times higher than samples of imported resin, which used to be the predominant form of the drug on the streets, and typically contained around 3% THC” Detective Inspector Neil Hutchison said, “A decade ago 11% of the cannabis sold on the street was grown in the UK. Now more than 60% is produced in Britain ....”. The Forensic Science Service, Drugs Intelligence Unit confirmed this figure (10/10/06) and said that between 30 and 40% of the rest is imported resin, some imported herbal cannabis is still seen as well. At a meeting of the Science and Technology Committee of the House of Commons on 22nd November 2006, Dr Brian Iddon MP said that 70% of the cannabis in the UK is home grown and is skunk. The discovery of a new high-potency hybrid known as “Colombian” in December 2006 in Mexico has sent alarm bells ringing. It can be planted at any time of year and matures in 2 months. Worse than that, it cannot be killed by pesticides. A plot the size of a football field yields as much as was formerly grown on a 10 to 12 acre plot (Associated Press, Mark Stevenson 20/12/06).

A Home Office Cannabis Potency Study in 2008 found that seizures in early 2008 were 80.8% herbal and 15.3% resin, the rest (3.9%) were indeterminate or not cannabis. Over 97% of the herbal cannabis was sinsemilla (skunk), the remainder imported traditional. The mean potency of the sinsemilla was 16.2% (range 4.1 to 46%). The mean potency of the imported herb was 8.4% (range 0.3% to 22%) but accounted for very few samples. Mean potency of cannabis resin was 5.9%, similar to previous years. The CBD (antipsychotic) content of the herbal cannabis was less than 0.1% in nearly all cases. In the 60/70s herbal cannabis the CBD and THC content was almost equally balanced.

1985 Ellis et al looked at excretion patterns of cannabinoid metabolites after last use in a group of 86 chronic users. ‘We demonstrated that under very strictly supervised abstinence, chronic users can have positive results for cannabinoids in urine at 20 ng/ml or above on the EMIT-d.a.u. assay for as many as 46 consecutive days from admission, and can take as many as 77 days to drop below the cut off calibrator for 10 consecutive days. For all subjects, the mean excretion time was 27 days. Subject excretion patterns were clearly biphasic, with initial higher rates of excretion not sustained. During the subsequent period of leveling off, most subjects had one or more separate sequences of cannabinoid-negative urine test results, lasting a mean of 3 days each and followed by at least one positive result. Demographic, body type, and drug history variables proved to be only moderate predictors of excretion patterns. Findings were discussed in the context of potential clinical and forensic application’.

On 25th April 2007, the ONDCP (Office National Drug Control Policy) and NIDA (National Institute on Drug Abuse) issued the latest analysis from the University of Mississippi’s Potency Monitoring Project that the highest ever levels of THC had been found since analysis began in the late 1970s. The average amount of THC in seized samples is 8.5%, up from 7% in 2003, in 1983 the average was under 4%. More than 60% of teens receiving treatment for drug abuse or dependence report marijuana as their primary drug of abuse. In 2005 the number of marijuana-related hospital emergency room admissions was 242,200 up from 215,000 in 2004. The highest concentration found in a sample was 32.3%. Roughly 60% of first-time marijuana users are under 18 in the USA.

Moir et al reported that cannabis smoke not only contains about 50 substances that can cause cancer but also 20 times more ammonia (linked to cancer) than tobacco smoke. Hydrogen cyanide (linked to heart disease), nitrogen oxides (linked to lung damage) and certain aromatic amines were at levels 3 to 5 times more.

It should be mentioned that cannabis research is still very young. In 1996 the total number of scientific papers did not exceed 10,000 and today probably stands between 14 and 15,000. This is in contrast to research on tobacco with about 140,000 studies to date (Ranstrom 2003). The total collection of scientific papers on cannabis is held in the library of The University of Mississippi.

A new type of cannabis product was reported by Drug Watch International on 25th February 2008. It is called “Budder”. It is reported as being the purest cannabis product available at anywhere between 82 and 99.6% pure THC/CBD/CBN. One hit is equalled to 1 to 2 full cannabis joints and the “high” to be clearer and longer-lasting than average marijuana. Inhalation is the method of choice. A miniscule amount (head of pin) is applied to heated metal and inhaled. Major effects usually subside in 3 to 4
hours, others up to 8 hours. Hallucinations, paranoia, disconnection and hunger can all be felt. It is extremely potent and its effects can be delayed, leading some users to ‘over consume’ and be overwhelmed. It is made by whipping in air and freezing isomerized hash oil. The delta-9-THC is converted to delta-6-THC so normally inactive cannabinoids are activated.

A paper in 2005 by Pijlman and others found a considerable increase in the levels of THC in cannabis sold in Dutch coffeee shops. In 2004, the average level of THC in home grown Dutch marijuana (Nederwiet) was 20.4%, significantly higher than that of imported marijuana at 7%. Dutch hashish (Nederhashi) contained 39.3% THC in 2004 compared with 18.2% in imported hashish. The average percentage of THC in Dutch marijuana, Dutch hashish and imported hashish had almost doubled since 1999. It had remained consistent in imported marijuana.

2008 Home Office Cannabis Potency Study. 80.8% seizures were ‘skunk’, 15.3% resin. THC content of skunk was 16.2% ranging from 4.1 to 46%, resin (hashish) 5.9% THC, ranging from 1.3 to 27.8%. CBD in resin was 3.5% but in skunk was less than 0.1%.

2010 Another report into concentrations of THC in Dutch marijuana was conducted for 2009–2010 by The Netherlands Institute of Mental Health and Addiction (The Trimbos Institute). Random samples, sinsemilla (Nederwiet), imported marijuana, Dutch hash and hash from imported marijuana and the most potent herbal (202) were bought from coffee shops. The average THC content of all samples was 16.7%, and 22% in the hash samples. Average THC of Nederwiet was 17.8% imported marijuana 7.8%. Hash from Dutch hemp had more (32.6%) than hash from foreign cannabis (19.0%). Average THC in Nederwiet was higher in 2010 than 2009 (17.8 cf 15.1%). THC in foreign marijuana was lower than year before (7.5% in 2010 and 9.9% in 2009). Average most potent 17.9%. Nederwiet had considerably less CBD than imported marijuana.

A new “form” of cannabis, SPICE (JWH-018), is being used by young people, and was legal in the UK. This is a synthetic psychoactive substance, created by an American academic purely for research purposes in 1995. According to The Royal Society of Chemists, it gives a “marijuana-like high” and is said to be 4 to 5 times stronger than THC. The chemical is added to packets of herbs, all legal. The structure of spice is quite different from THC but it has the same effects. It has already been banned in Holland, Austria, Germany and Switzerland. It was banned in the UK in December 2009.

In July 2010 Alexandra Datig found several very harmful fungi associated with marijuana. Black mould, Stachybotrys, exists on almost all building materials. The growth of cannabis indoors poses a great problem as it provides ideal conditions. Also the 3 most dangerous strains of Aspergillus, fumigatus, flavus and niger exist naturally on the plant. A deadly aflatoxin could be the result. A 1996 treatment study by Withenshawe Hospital, Manchester, on 10,000 patients with invasive Aspergillosis has shown $633m in costs, average $63,300/patient to treat not cure the disease.

In 2010, Arendt et al published mortality figures among 20,581 drug users over a 10 year period (1996-2006) in Denmark. 1441 deaths were recorded in follow-up (111,445 person years). Standardised Mortality Ratios (SMRs) for primary users of specific substances were - cannabis 4.9, cocaine 6.4, amphetamine 6.0, heroin 9.1 and other opioids 7.7. For ecstasy the crude mortality rate was 1.7/1000 person years.

In 1981, the WHO Report on Cannabis Use said, “It is instructive to make comparisons with the study of effects of other drugs, such as tobacco or alcohol. With these drugs, “risk factors” have been freely identified, although full causality has not yet been established. Nevertheless such risk factors deserve and receive serious attention with respect to the latter drugs. It is puzzling that the same reasoning is often not applied to cannabis” ...“To provide rigid proof of causality in such investigations is logically and theoretically impossible, and to demand it is unreasonable”.

March 2011 A S Reece published ‘Chronic Toxicology of Cannabis.’ 5198 papers were screened by hand and preferentially include the most recent ones.

FINDINGS: There is evidence of psychiatric, respiratory, cardiovascular, and bone toxicity associated with chronic cannabis use. Cannabis has now been implicated in the etiology of many major long-term psychiatric conditions including depression, anxiety, psychosis, bipolar disorder,
and an a-motivational state. Respiratory conditions linked with cannabis include reduced lung density, lung cysts, and chronic bronchitis. Cannabis has been linked in a dose-dependent manner with elevated rates of myocardial infarction and cardiac arrhythmias. It is known to affect bone metabolism and also has teratogenic effects on the developing brain following perinatal exposure. Cannabis has been linked to cancers at eight sites, including children after in-utero maternal exposure, and multiple molecular pathways to oncogenesis exist.

CONCLUSION: Chronic cannabis use is associated with psychiatric, respiratory, cardiovascular, and bone effects. It also has oncogenic, teratogenic, and mutagenic effects all of which depend upon dose and duration of use.

2011 Accidental poisoning in children was reported in 4 cases in a care centre in Southern Spain by Croche Santander B et al. Paediatric accidental cannabis poisoning is an uncommon but life-threatening intoxication. Reduced level of consciousness, drowsiness, ataxia, tremble, apnea, hypotonia and seizures were all witnessed. THC was detected by urine screening. All recovered and were discharged within 24 hours. They concluded that the possibility of cannabis poisoning should be considered in unexplained acute onset of neurological findings in previously healthy children. 2011

2011 Abrams et al investigated Cannabinoid-Opioid Interaction in chronic pain. Abstract: Cannabinoids and opioids share several pharmacologic properties and may act synergistically. The potential pharmacokinetics and the safety of the combination in humans are unknown. We therefore undertook a study to answer these questions. Twenty-one individuals with chronic pain, on a regimen of twice-daily doses of sustained-release morphine or oxycodone were enrolled in the study and admitted for a 5-day inpatient stay. Participants were asked to inhale vaporized cannabis in the evening of day 1, three times a day on days 2-4, and in the morning of day 5. Blood sampling was performed at 12-h intervals on days 1 and 5. The extent of chronic pain was also assessed daily. Pharmacokinetic investigations revealed no significant change in the area under the plasma concentration-time curves for either morphine or oxycodone after exposure to cannabis. Pain was significantly decreased (average 27%, 95% confidence interval (CI) 9, 46) after the addition of vaporized cannabis. We therefore concluded that vaporized cannabis augments the analgesic effects of opioids without significantly altering plasma opioid levels. The combination may allow for opioid treatment at lower doses with fewer side effects.

Updated information on THC concentration in weed, netherweed and hash in Dutch coffee shops 2010 to 2011. Frans Koopmans, De Hoop Clinic, Dordrecht, Netherlands.

Since the nineteen seventies the policy on cannabis use in The Netherlands has substantially been different from that in many other countries. It is based on the idea that separating the markets for hard and soft drugs prevents cannabis users to resort to hard drug use. Over the years so-called coffee shops emerged. Coffee shops are alcohol free establishments where the selling and the use of soft drugs are not prosecuted, provided certain conditions are met. Many of the cannabis products sold in these coffee shops originate from Dutch-grown grass called ‘Nederwiet’. On behalf of the Ministry of Health, Welfare and Sports we investigate the potency of cannabis products as sold in coffee shops in The Netherlands.

Δ9-Tetrahydrocannabinol (THC) is the main psychoactive compound in marihuana and hashish. The aim of this study is to investigate the concentration of THC in marihuana and hash (=cannabis resin) as sold in Dutch coffee shops. In addition we examined whether there are differences between the cannabis products originating from Dutch grown hemp (Nederwiet) and those derived from imported hemp. This is the twelfth consecutive year that this study has been performed. Apart from THC, the content of two other cannabinoids, cannabidiol (CBD) and cannabinol (CBN), are measured.

The names and addresses of 50 (out of a total of 666) Dutch coffeeshops were randomly selected. For the purpose of this study, 65 samples of Nederwiet, 19 samples of imported marihuana, 9 samples of Dutch hash and 56 imported hash samples were anonymously bought in the selected coffeeshops. In addition, 49 samples of the most potent (herbal) marihuana product available were bought. As a rule samples of 1 gram were bought. Samples were bought anonymously.
Traditionally hash contains more THC than marijuana. The average THC-content of all the marihuana samples together was 15.3% and that of the hash-samples 16.5%. The average THC-content of Nederwiet (16.5%) was significantly higher than that of the imported marihuana (6.6%). The average THC-percentage of the marihuana samples that were bought as most potent (17.0%) did not differ from that of the most popular varieties of Nederwiet (16.5%). Hash derived from Dutch hemp contained more THC (29.6%) than hash originating from foreign cannabis (14.3%). The average THC-percentage of Nederwiet was lower in 2011 than in 2010 (16.5 vs. 17.8%), but this difference was not statistically significant. The THC-percentage in imported hash was significantly lower than the year before (14.3% in 2011 versus 19.0% in 2010).

There is some evidence that not only THC-content is indicative for the effects and risks of cannabis, but that CBD might attenuate some of the negative effects of THC. This means that cannabis with a high CBD / THC ratio would have less negative health consequences than cannabis that has little or no CBD. Nederwiet has very low levels of CBD (median = 0.3%), whereas imported hash contained on average 6.7% CBD.

The ratio between CBN and THC can give an indication of the freshness of the preparation (Ross and Elsohly, 1997). Levels of CBN were higher in imported marihuana and hash compared to products derived from homegrown cannabis. Also the ratio of CBN/THC was significantly higher in the imported products. The ratio was higher in imported marijuana compared to Nederwiet and in imported hashish as compared to hashish made from Nederwiet. Prices that had to be paid for imported marihuana were lower than those for any of the other cannabis products. The prices of hash made from Nederwiet were higher. The average price for a gram Nederwiet increased from 2007 to 2009 (up to 50%), but since then prices remained the same. On average, a gram of Nederwiet costs €8.30.

2012 Mason et al Treatment for cannabis addiction. Gabapentin, on the market to treat neuropathic pain and epilepsy, helps people to quit marijuana use. Fifty treatment –seeking users taking Gabapentin experienced fewer withdrawal symptoms, smoked less weed and scored higher on cognitive skills compared with those who had placebos. In the last 4 weeks of the study all Gabapentin users were cannabis free.

2012 Crippal and others looked at medicines to reduce intoxication (euphoria, disturbed perception, giggling, red eyes, dry mouth, increased appetite, increased heart rate, misperception of time etc). A recent increase in the number of emergency room visits for marijuana intoxication prompted researchers to look for medical treatment. Propanolol used to treat cardiac conditions reduced several symptoms in well-done studies.

2012 - Simonetto et al investigated cannabinoid hyperemesis in 98 patients who met the inclusion criteria i.e. recurrent vomiting and no other explanation but that of cannabis use. All were under 50 - most had used cannabis for 2 years and more than once/week. Abdominal pain was common and hot baths/showers provided almost universal relief. They concluded, ‘Cannabinoid hyper-emesis should be considered in younger patients with long-term cannabis use and recurrent nausea, vomiting and abdominal pain’.

2012 Agrawal et al discovered that a combination of tobacco and marijuana (common practice in USA now, about 50% of marijuana users e.g. as ‘blunts’) may be reacting to some unidentified mechanism that links the two drugs. ‘there may be something about marijuana use that seems to worsen marijuana use in some way’ said Erica Peters of Yale. It may it is thought be a genetic predisposition. In the few studies available, it appears that quitting both substances together at the same time is better. Quitters said the dual abstinence was less severe than from either drug alone.

2013 Kiriski looked at age of first time use of alcohol and cannabis to a transmissible risk for addiction in childhood and development of alcohol use disorder (AUD) and cannabis use disorder (CUD). They found that whereas transmissible risk is comparable in both AUD and CUD, its magnitude is 7 times greater in youths who initiated substance use with cannabis. The earlier they started, the greater the risk.
2013 Chueh et al looked at factors involved in the resistance of substance abuse. They found ‘Being female, having strong knowledge about the substance, and negative attitude towards substance use correlated with higher levels of self-confidence to resist substance use.

2013 Bostwick found that medical marijuana use for pain may interfere with normal development. 3 high school age patients attended Mayo Clinic’s chronic pain clinic. They were using cannabis for severe pain after everything else had failed. They reported worsening of the pain and impaired functioning. All 3 dropped out of school and social lives.

2013 Wang and others found no admissions of children under 12 for marijuana ingestion at a Colorado children’s hospital before September 30th 2009, but 14 afterwards. 9 had lethargy, 1 ataxia, and 1 had respiratory insufficiency - 8 were admitted, 2 to intensive care. Eight of the 14 cases involved medical marijuana and 7 of these exposures were from food products.

2013 Harrison et al looked at chronic non-malignant pain in adolescents. 3 cases of using medical marijuana were studied. None relieved the pain. They concluded that ‘Even short-term marijuana use may be associated with health and cognitive concerns that may prevent adolescents from achieving their full academic and vocational potential.

2013 Chittamma et al found that umbilical cord tissue was a viable specimen for the detection of maternal use of marijuana.

2013 Hurd et al looked at the effects of cannabis through generations of male inheritance. Metabolic and behavioural effects of cannabis in rats during adolescence were passed down to multiple generations of male offspring, even though these animals were not themselves exposed to the drug.

2013 Wu and others found that cannabis use disorders (CUD) are comparatively prevalent among non-white racial/ethnic groups and adolescents in the USA. In USA, non-white population is growing faster than the whites. All confounding issues were controlled for. Compared with whites, mixed-race people had higher incidences of CU (Cannabis Use), Asian Americans and Hispanics had a lower incidence. Past-year cannabis users who were black, Native American, Hispanic or Asian American had higher odds of CUD than whites, in all ethnic groups; - adolescents had higher odds than adults. Major depressive episodes, arrest history, nicotine dependence, alcohol disorder, were all associated with CU and CUDs. CUD disproportionately affects non-white groups and adolescents.

2013 Yetisan et al looked at Holographic Diagnostics in Medicine. ‘Smart’ holographs are used to detect various substances (including drugs) by turning colour in their presence. They are being researched at Addenbrooke’s Hospital in Cambridge. In the presence of certain compounds, the hydrogels either shrink or swell, causing the holograph to change colour. The process is fast, cheap and easy to use.

2013 Heron et al looked at prior cannabis risk factors and use at 16. Over 4,000 children provided information at the age of 16 in The Avon Longitudinal Study of parents and Children. They found that cannabis use was more common in girls than boys, 21.4% v 18.3%. Problem cannabis use in boys was higher than girls, 3.6% v 2.8%. Early onset persistent conduct problems were strongly associated with problem cannabis use, odds ratio (OR) 6.46. Residence in subsidised housing, OR 3.10, maternal cannabis use, 8.84, any maternal smoking in the postnatal period 2.69, all predicted problem cannabis use. Attributable risks for adolescent problem cannabis use associated with the previous factors were 25, 13, 17 and 24% respectively.

2013 Huang and others looked at adolescent substance use and obesity in young adulthood. 5141 adolescents were taken from the child sample of the 1979 National longitudinal Survey of Youth and biennial data across the 12 assessments from 1986 to 2008 was used. Cigarette smoking, alcohol use and marijuana use from age 12 to 18 and obesity trajectories from ages 20-24 were examined. Adolescents with the most problematic smoking trajectory, and those with an increasing marijuana trajectory were most likely to exhibit an increased obesity trajectory in young adulthood.

2014 Vallee et al discovered that Pregnenolone can protect the brain from cannabis intoxication. Pregnenolone is the inactive precursor of all steroid hormones. THC substantially increases the synthesis of Pregnenolone in the brain via activation of the CB1 receptor. Pregnenolone then acting as
a signalling specific inhibitor of the CB1 receptor reduces several effects of THC. This negative feedback protects the brain from CB1 receptor over-activation. This may open an approach for the treatment of cannabis intoxication and addiction.

2014 Wolff K Smoking infrequently a single cannabis cigarette leads to peak plasma concentrations of 21-267 micrograms/litre causing acute intoxication. In daily users the plasma THC concentrations are 1.0-11.0 micrograms/litre maintained by sequestration of the drug from the tissues.

2014 Hall and Degenhardt updated and summarised the most harmful effects of cannabis. They listed the most probable of the adverse health effects of regular cannabis use sustained over the years as indicated by epidemiological studies that have established the links. These are: dependence syndrome, impaired respiratory function and cardiovascular disease, adverse effects on adolescent psychosocial development and mental health, and residual cognitive impairment.

2014 Hartung et al looked at cannabis as a cause of death. They conducted post-mortems on 15 people whose deaths were linked to cannabis use. Other factors that might have contributed to the death, alcohol, liver disease etc were discounted. Two of the deaths could not be attributed to anything else but cannabis intoxication. Both men died of cardiac arrhythmia triggered by cannabis, and had enough active THC in their blood to show they had taken it recently. Neither had a history of heart problems.

2014 Capretto warned parents of a new drug ‘10’ times more potent than marijuana. BHO, Butane Honey Oil, or Dab is made by extracting THC and the use of household items such as butane containers, glass or metal tubes, baking dishes and even coffee filters.

2014 April 2nd BBC News (Canada and US) reported the first death due to cannabis in Colorado since legalisation. An exchange student fell to his death after ingesting edible marijuana. A Post Mortem examination found marijuana intoxication was a factor in the death.

2014 Chheda et al found sleep to be affected by cannabis use. Results showed that any history of cannabis use was associated with an increased likelihood of reporting difficulty in falling asleep, struggling to maintain sleep, experiencing non-restorative sleep and feeling daytime sleepiness. The strongest association was found in those who started early, before 15 being about twice as likely to have severe problems, and to have sleep problems as adults.

2014 Danielsson et al found that heavy pot use in teen years may predict later-life disability. Those who smoked heavily at 18 were most likely to end up on the nation’s (Sweden) disability rolls by 59. The Swedish cohort of 98% of the male population (conscripts) at baseline and a 39 year long follow up time provided new knowledge. Men who had used marijuana more than 50 times before the age of 18 were 30% more likely to go on disability sometime between 40 and 50 years of age.

2014 June Volkow (NIDA) et al wrote an update on Adverse Health Effects of marijuana Use in The New England Journal of medicine

2014 Correspondence followed the article by Volkow and others.

2014 Voss et al investigated the detection of cannabis use on the human skin via an electronic nose system. Their study produced evidence that a low-cost portable and fast-working E-Nose system could be useful for health protection, security agents and forensic investigations. There are implications for diagnosis of other drugs and even diseases.

2014 Stone looked at the presence of pesticides on legalized marijuana. Large yields of high quality plants are desirable so pesticides may be used by legal growers to achieve this aim. Currently there are no pesticides registered for cannabis in the USA due to its illegal status. Pesticide use presents occupational safety issues for workers. The absence of approved products for cannabis may well result in consumer exposures to otherwise more hazardous pesticides or higher residue levels.

2014 Palamar et al investigated hookah use among US high school seniors. Prevalence of hookah use is increasing significantly among adolescents. The hypothesis was that impoverished adolescents and cigarette smokers would use hookahs - 5,540 high school seniors were monitored. 18% of students used hookahs in the last year. High parent education and money (from weekly jobs), males and urban
students, users of alcohol, marijuana and other illicit substances, former tobacco smokers were at higher risk and current smokers at highest risk.

2014 Cone et al looked at non-smoker exposure to second-hand cannabis smoke. Six experienced cannabis users smoked cannabis cigarettes (5.3% THC in session 1 and 11.3% in sessions 2 and 3) in a sealed chamber with no ventilation in sessions 1 and 2 but with ventilation in session 3. Six non-smokers were seated in an alternating manner. THCCOOH concentrations generally increased with THC potency but ventilation substantially reduced exposure levels. They concluded that positive tests are likely to be rare, limited to the hours immediately post-exposure and occur only under environmental circumstances where exposure is obvious.

Wayne Hall, 2014 October, wrote an extremely important paper on the adverse health effects of cannabis. This is the abstract.

**Aims** To examine changes in the evidence on the adverse health effects of cannabis since 1993.

**Methods** A comparison of the evidence in 1993 with the evidence and interpretation of the same health outcomes in 2013.

**Results** Research in the past 20 years has shown that driving while cannabis-impaired approximately doubles car crash risk and that around one in 10 regular cannabis users develop dependence. Regular cannabis use in adolescence approximately doubles the risks of early school-leaving and of cognitive impairment and psychoses in adulthood. Regular cannabis use in adolescence is also associated strongly with the use of other illicit drugs. These associations persist after controlling for plausible confounding variables in longitudinal studies. This suggests that cannabis use is a contributory cause of these outcomes but some researchers still argue that these relationships are explained by shared causes or risk factors. Cannabis smoking probably increases cardiovascular disease risk in middle-aged adults but its effects on respiratory function and respiratory cancer remain unclear, because most cannabis smokers have smoked or still smoke tobacco. **Conclusions** The epidemiological literature in the past 20 years shows that cannabis use increases the risk of accidents and can produce dependence, and that there are consistent associations between regular cannabis use and poor psychosocial outcomes and mental health in adulthood.

2014 Nov Lanaro et al determined the amount of herbicides present in marijuana. Paraquat was detected in 12 samples (n=130), ranging from 0.01 to 25mg/g. Three samples were positive for glyphosphate (0.15-0.75mg/g) and one sample had AMPA (aminomethylphosphonic acid) as well.

2014 Dec. Pelissier et al looked at accidental intoxications in children. The number of children under 6 hospitalised for cannabis poisoning in a paediatric emergency department from 2007 to November 2012 were retrospectively evaluated. Twelve toddlers (4 boys, 8 girls, mean age 16.6 months) were included, all had ingested cannabis. Seven children experienced drowsiness or hypotonia. Three were given activated charcoal. Blood screening for cannabinoids was negative in two cases, urine samples positive in seven (70%). All had favourable outcomes after 2 to 48 hours hospitalisation. Nine were referred to social services before discharge. They concluded that cannabis intoxication in children should be reported to child protection services with the aim of prevention. Legal action may be considered.

2014 Nordholm-Carstensen A abstract: Cannabinoid hyperemesis syndrome (CHS) is characterised by unrelenting nausea, recurrent vomiting, abdominal pain and compulsive, hot bathing behaviour. The symptoms contrast the traditional effects associated with cannabis use. We report a "textbook example" of a 26-year-old man with CHS. CHS is an important differential diagnosis to consider in patients with similar symptoms and the distinctive symptom relief in hot water. Early recognition may prevent extensive, unnecessary medical examinations and frequent hospital admissions.

2014 Nov Jehle et al looked at the rising trend of cannabis use in burn injury. Thousands of patients from the NBR (National Burn Repository) from 2002 to 2011 were included. They found that the rate of patients testing positive for cannabis in burn units is rising quickly. These patients are younger, less
likely to be insured, have larger burns, spend more time in ICUs and have a greater number of operations.

2014 Andas et al detected the time taken for THC in oral fluid to disappear after frequent cannabis smoking. 26 drug addicts, admitted for detoxification in a closed detox unit were studied. Findings in oral fluid were compared with urine readings during monitored abstinence. THC was detected in 11 of the 26 patients. Negative samples could be interspersed with positive samples several days after cessation whereas THC-COOH concentrations in urine were decreasing. THC in this study was detected in oral fluid for up to 8 days after admission.

2014 Hunault et al investigated acute subjective effects after smoking joints containing up to 69mg Delta-9-THC (23% THC) in recreational users. 24 recreational users smoked joints of 4 potencies – placebo, 29, 49 and 69mg of THC on 4 separate test days in a randomised, double-blind, placebo-controlled study. Subjective effects were then measured after 8 hours on each occasion. The ‘high’ feeling, heart rate, blood pressure and THC serum concentrations were regularly recorded during the sessions. THC significantly increased the high feeling, dizziness, dry-mouthed feeling, palpitations, impaired memory and concentration, and 'down', 'sedated' and 'anxious' feelings. In addition, THC significantly decreased alertness, contentment and calmness. A cubic relationship was observed between 'feeling the drug' and 'wanting more'. The THC-induced decrease in 'feeling stimulated' and increase in anxiety lasted up to 8 h post-smoking. Sedation at 8 h post-smoking was increased by a factor of 5.7 with the highest THC dose, compared to the placebo.

They concluded that the study shows a strong effect of cannabis containing high percentages of THC on the rating of subjective effects. Regular users and forensic toxicologists should be aware that the THC-induced increase in 'feeling sedated' continues longer with a 69 mg THC dose than with a 29 mg THC dose.

2014 Kowal et al found that smoking cannabis does not make you more creative. Smokers who ingested a low dose of THC or none at all (they were given a placebo), performed best in thinking tasks. A high dose of THC was actually shown to have a negative effect on the ability to come up with as many solutions as possible to a problem. E.g. 'Think of as many uses you can for a pen' (divergent thinking) and 'finding the only right answer to a problem – “What is the link between the words ‘time’, hair’ and ‘stretching’? The answer is ‘long’.

2015 Koch et al explained the ‘munchies’ in a study at Yale. Cannabinoids hi-jack brain cells that normally suppress appetite. It suggests the cannabis causes the brain to produce a different set of chemicals that transform the feeling of fullness into a hunger that is never satisfied. Hovarth who led the study said, ‘It’s like pressing a car’s brakes and accelerating instead’. A group of nerve cells (POMC pro-opiomelanocortin) neurons, which normally produces feelings of satiety, were activated to release hunger stimulating chemicals rather than appetite suppressing chemicals.

2015 Dzodzomenyo et al discovered that marijuana use is associated with excessive daytime sleepiness in adolescents. Ten per cent of adolescents sent to a Sleep Center for evaluation of excessive daytime sleepiness with testing results consistent with narcolepsy, confoundingly had urine drug screens positive for marijuana. This was a 10 year retrospective study of 383 children. 43% of children with positive urine tests for marijuana actually had test results consistent with narcolepsy or abnormal REM sleep patterns. Most didn’t come back for repeat diagnostic studies after they were drug free.

2015 Feb Garcia-Morales et al looked at the acute use of cannabinoids and the depression of motor neuron activity. Synthetic analogues of the psychoactive compounds of marijuana significantly reduce the activity of motor neurons in animals – cannabinoids hinder the transmission of information so muscle weakness is produced. This could lead to problems speaking, breathing and even swallowing food, which would explain these difficulties suffered by some habitual users.

2015 Subbaraman and Kerr looked at people using cannabis and alcohol together and separately. Over 8,000 individuals were surveyed in this study. The results showed that the prevalence of simultaneous
use was almost twice as high as concurrent use, implying that individuals who use both alcohol and cannabis tend to use them at the same time. Also simultaneous use was associated with increased frequency and quantity of alcohol use. Simultaneous use was also the most detrimental: compared to alcohol use only, simultaneous use approximately doubled the odds of drunk driving, social consequences, and harms to self. The magnitudes of differences in problems remained when comparing drunk driving among simultaneous users to concurrent users.

2015 April 30th, Murray wrote a general paper on marijuana, Marijuana and Madness: Clinical Implications of increased Availability and Potency. He updated the research findings on dependence, psychosis and cognitive impairment. He also highlighted the increased potency of skunk and the virtual absence of CBD.

2015 May, Hoch et al looked at the dark side of cannabis – panic attacks, nausea. Summary: Although the use of cannabis as a medical drug is booming, we should not forget that leisure time consumption – for example smoking weed - can cause acute and chronic harms. These include panic attacks, impaired coordination of movement and nausea. These symptoms depend on a person’s age, the amount consumed and the frequency of drug use, also the form of cannabis used e.g. bong, joint or hash cake.

2015 Herrmann et al found that exposure to second-hand cannabis smoke causes mild intoxication. Second-hand exposure to cannabis smoke under ‘extreme conditions (unventilated room or enclosed vehicle) can cause non-smokers to feel the effects of the drug, have minor problems with memory and coordination and in some cases test positive for the drug in urinalysis. Some participants did not pass the equivalent of a workplace drug test. The implications for driving need to be noted.

2015 Rizvi et al found that ‘boys who smoke cannabis are 4 inches shorter’. Levels of puberty-related hormones such as testosterone and luteinizing hormone(LH), they discovered, were increased in cannabis smokers, and levels of the stress hormone cortisol were significantly higher. In contrast, growth hormone levels had decreased. Non-smoking boys were on average, four kilos heavier and 4.6 inches taller by the age of 20 than the dope smokers.

2015 May, Hartman et al found that any dose of alcohol combined with cannabis significantly increases the levels of THC and its primary active metabolite 11-hydroxy-THC(11-OH-THC), than cannabis use alone. In a study of motor vehicle deaths, The US Dept of Transportation found an increased risk 0.7 for cannabis use, 7.4 for alcohol use and 8.4 for cannabis use and alcohol combined.

2015 Ogeil et al found that social drug users who report risky alcohol and cannabis use also report poor sleep. Women had poorer sleep outcomes than men. Problems with sleep quality were more common than complaints of excessive daytime sleepiness.

2015 May Fergusson et al, gave a research update – Psychosocial sequelae of cannabis use and implications for policy: findings from The Christchurch Health and Development Study. In general, the findings of the CHDS suggest that individuals who use cannabis regularly, or who begin using cannabis at earlier ages, are at increased risk of a range of adverse outcomes, including: lower levels of educational attainment; welfare dependence and unemployment; using other, more dangerous illicit drugs; and psychotic symptomatology. It should also be noted, however, that there is a substantial proportion of regular adult users who do not experience harmful consequences as a result of cannabis use. They concluded: Collectively, these findings suggest that cannabis policy needs to be further developed and evaluated in order to find the best way to regulate a widely-used, and increasingly legal substance.

2015 May, Bui et al report on a case of marijuana intoxication. We use a case report to describe the acute psychiatric and medical management of marijuana intoxication in the emergency setting. A 34-year-old woman presented with erratic, disruptive behavior and psychotic symptoms after recreational ingestion of edible cannabis. She was also found to have mild hypokalemia and QT interval prolongation. Psychiatric management of cannabis psychosis involves symptomatic treatment and
maintenance of safety during detoxification. Acute medical complications of marijuana use are primarily cardiovascular and respiratory in nature; electrolyte and electrocardiogram monitoring is indicated. This patient's psychosis, hypokalemia and prolonged QTc interval resolved over two days with supportive treatment and minimal intervention in the emergency department. Patients with cannabis psychosis are at risk for further psychotic sequelae. Emergency providers may reduce this risk through appropriate diagnosis, acute treatment, and referral for outpatient care.

2015 May, Lee et al looked at unemployment predictions among marijuana users. Six hundred seventy-four participants (53% African-Americans, 47% Puerto Ricans) were surveyed (60% females) from ages 14 to 36. The first data collection was held when the participants were students attending schools in the East Harlem area of New York City. We found that the chronic marijuana use and the late marijuana quitter trajectory groups were associated with an increased likelihood of unemployment compared with the no marijuana use trajectory group. The results suggest that those who use marijuana chronically are at greater risk for being unemployed.

2015 May, Keith and others looked at undergraduates at one university in the USA. Approximately 1 in 12 undergraduates (8.5%) reported using marijuana more than 10 days in the past month. Frequent marijuana use was associated with increased likelihood of other substance use and alcohol-related negative outcomes. Marijuana use was associated with increased reports of anxiety, and frequent use was associated with depression and substance use problems. Perceived stress was not associated with marijuana use.

2015 Onders et al reported on marijuana exposure among children under 6 in the USA. Marijuana exposure among children of 5 and younger rose 147% from 2006-2013 across the USA. In states where it has been legalised for medical use before 2000, the rise was 610%. More than 75% of the exposed children were under 3, and most had swallowed marijuana. Most cases resulted in only minor clinical effects but some experienced coma, decreased breathing or seizures. More than 18% were hospitalised. Overall there were 1969 young children reported to The Poison Control Centres in the USA for marijuana exposure between 2000 and 2013.

2015 June Kim et al looked at cyclic vomiting presentations following marijuana liberalization in Colorado. The prevalence of cyclic vomiting increased from 41 per 113,262 ED visits to 87 per 125,095 visits after marijuana legalisation – almost double the numbers. Patients in the postliberation period were more likely to endorse marijuana use.

2015 USA. Thompson et al looked at the prevalence of marijuana-related traffic on Twitter, 2012-3. 36969 original tweets were analysed. A majority from adolescents (65.6%) reflected a positive attitude towards cannabis 42% indicating personal use. 36.0% indicated parental support for the adolescent’s use. Adolescents and others on Twitter are being exposed to positive discussion, normalising use. Twitter was increasingly used to disclose marijuana use.

2015 Whiting et al undertook a systematic review and meta-analysis of cannabinoids for medical use. 79 trials were included. There was moderate quality evidence to support the use of cannabinoids for the treatment of chronic pain and spasticity. There was low-quality evidence suggesting improvements in nausea and vomiting due to chemotherapy, weight gain in HIV infection, sleep disorders and Tourette Syndrome. Cannabinoids were associated with an increased risk of short-term AEs.

2015 Hasin et al looked at medical marijuana laws and adolescent use in the USA from 1991 to 2014. Data was obtained from The Monitoring The Future Study. Around 400 schools are involved looking at 8th, 10th and 12th grade students. Any marijuana used in the past 30 days was monitored. They concluded that ‘overall, adolescent use is higher in states that ever passed such a law than in other states but the passing of state marijuana laws does not seem to increase the use of marijuana.

2015 Miech and others looked at the trends in use of marijuana and attitudes towards marijuana among youth before and after decriminalisation: The case for California 2007-2013. Data from The Monitoring The Future was used to investigate 8th, 10th and 12th grade students. In 2012 and
afterwards, as compared to their peers in other states, California 12th graders were 25% more likely to have used marijuana in the last 30 days, 20% less likely to perceive regular marijuana use as a great health risk, and 20% less likely to strongly disapprove of regular marijuana use, and about 0% more likely to expect to be using marijuana five years in the future.

2015 Dube et al looked at weight gain in cannabis users. It is well known that cannabis stimulates the appetite but less is known about possible weight gain. 1294 young people aged 12 or 13 agreed to share information about their daily lives. It was found that cannabis use does indeed influence weight gain but various other factors modify the effects. In male non-cigarette smokers, greater cannabis use increased weight, while in cigarette smokers, the effect was almost the opposite. THC and nicotine affect males and females differently, hormonal changes and possible psychological differences may be involved. Frequency of use and general activity were other factors.

2015 D’Amico et al looked at medical marijuana adverts and their influence on children. Sixth to eighth grade youth, 8214 in 16 middle schools in South California were surveyed (average age 13). Exposure to advertising for medical marijuana, marijuana intentions and marijuana use were assessed. Greater initial medical marijuana advertising exposure was significantly associated with a high probability of marijuana use and stronger intentions to use a year later, and initial marijuana use and stronger intentions to use were associated with greater medical marijuana advertising exposure a year later.

2015 Mair et al looked at places with more marijuana dispensaries and hospitalizations. When the location of marijuana dispensaries were mapped and cross-referenced it with the ZIP code of each patient’s home, they found that each additional dispensary per square mile in a ZIP code was associated with a 6.8% increase in the number of hospitalizations linked to marijuana abuse and dependence.

2015 Kosty et al looked at parental transmission of risk for cannabis use disorders to offspring. 719 probands were studied along with their biological mothers and fathers. There was an increased risk for CUD onset among probands with parental histories of CUD, hard drug use disorders or antisocial personality disorder. Females with a maternal CUD history were at higher risk for CUD onset compared with females without a maternal CUD. Maternal CUD was not associated with CUD onset among males, nor was there evidence for parent-offspring gender concordance for paternal effects for paternal CUD-specific transmission.

2015 Hancock-Allen et al looked at a death following ingestion of an edible marijuana product. A 23 year old had purchased marijuana cookies and gave one to his 19 year old friend. Contrary to instructions he ate the whole cookie. For the next 2 hours, he exhibited hostile behaviour and erratic speech. He then jumped off a fourth floor balcony and died from trauma. Marijuana intoxication was found to be the chief contributing factor. No other drug was present.

2015 Liakoni et al reported on acute health problems due to recreational drug use at an urban emergency department in Switzerland. All cases between October 2013 and September 2014 were examined. 216 cases were directly related to acute toxicity of recreational drugs – mean age 31, and 69% were male. Cocaine was most common (36%) followed by cannabis (31%). They concluded, ‘Medical problems related to illicit use of drugs mostly concerned cocaine and cannabis and mainly involved sympathomimetic toxicity and/or psychiatric disorders.

2015 Lu and Agito found that marijuana is both anti-emetic and pro-emetic. Although marijuana is sometimes used to treat chemotherapy-induced nausea and vomiting, when used long-term it can have a paradoxical hyperemetic effect known as cannabinoid hyperemesis syndrome. Knowledge of this phenomenon may reduce the ordering of unnecessary and expensive investigations, as well as inappropriate medical and surgical treatment in patients presenting with recurrent vomiting of unknown cause. This article reviews the pathophysiology, clinical presentation, diagnosis, and management of this emerging condition.
2015 Decuyper et al addressed cannabis allergy. For about a decade, IgE-mediated cannabis (marihuana) allergy seems to be on the rise. Both active and passive exposure to cannabis allergens may lead to a cannabis sensitization and/or allergy. The clinical manifestations of a cannabis allergy can vary from mild to life-threatening reactions, often depending on the route of exposure. In addition, sensitization to cannabis allergens can trigger various secondary cross-allergies, mostly for plant-derived food. This clinical entity, which we have designated as the "cannabis-fruit/vegetable syndrome" might also imply cross-reactivity with tobacco, latex and plant-food derived alcoholic beverages. These secondary cross-allergies are mainly described in Europe and appear to result from cross-reactivity between non-specific lipid transfer proteins or thaumatin-like proteins present in Cannabis sativa and their homologues that are ubiquitously distributed throughout plant kingdom. At present, diagnosis of cannabis-related allergies rests upon a thorough history completed with skin testing using native extracts from buds and leaves. However, quantification of specific IgE antibodies and basophil activation tests can also be helpful to establish correct diagnosis. In the absence of a cure, treatment comprises absolute avoidance measures including a stop of any further cannabis (ab)use.

2015 Danielsson et al studied the use of cannabis and the risk of adverse life course outcomes. A total of 49,321 Swedish men born in 1949–51, who were conscripted to compulsory military service at 18-20 years of age were studied. Individuals who used cannabis at high levels in adolescence had increased risk of future unemployment and of receiving social welfare assistance. Adjusted for all confounders (social background, psychological functioning, health behaviours, educational level, psychiatric diagnoses), an increased relative risk of unemployment and social welfare assistance remained in the group reporting cannabis use > 50 times.

2015 Salas-Wright et al investigated trends in disapproval and use of marijuana in the US 2002-2013. Between 2002 and 2013 the proportion of adolescents aged 12-14 reporting "strong disapproval" of marijuana use initiation increased significantly from 74.4-78.9%. Concurrently, a significant decrease in past 12-month marijuana use was observed among younger adolescents. No significant trend was observed for marijuana use disapproval among adolescents aged 15-17 between 2002 and 2013. Yet a significant decrease in the past 12-month marijuana use was observed (2002 = 26.2%, 2013 = 21.9%) among this group. Among young adults (aged 18-25), a substantial decrease - from 40.5% in 2002 to 22.6% in 2013 - was observed in the proportion reporting "strong disapproval" of marijuana use initiation; however, increases in the past 12-month use were relatively small among young adults but statistically significant.

2015 Cone et al looked at passive smoking. The increasing use of highly potent strains of cannabis prompted this new evaluation of human toxicology and subjective effects following passive exposure to cannabis smoke. The study was designed to produce extreme cannabis smoke exposure conditions tolerable to drug-free nonsmokers. Six experienced cannabis users smoked cannabis cigarettes [5.3% Δ(9)-tetrahydrocannabinol (THC) in Session 1 and 11.3% THC in Sessions 2 and 3] in a closed chamber. Six non-smokers were seated alternately with smokers during exposure sessions of 1 h duration. Sessions 1 and 2 were conducted with no ventilation and ventilation was employed in Session 3. Positive tests for THC in oral fluid and blood were obtained for non-smokers up to 3 h following exposure. Ratings of subjective effects correlated with the degree of exposure. Subjective effect measures and amounts of THC absorbed by non-smokers (relative to smokers) indicated that extreme second-hand cannabis smoke exposure mimicked, though to a lesser extent, active cannabis smoking.

2015 Wen et al looked at the effects of medical marijuana laws on adolescent and adult use of marijuana, alcohol and other substances. The effect of medical marijuana laws (MMLs) in ten states between 2004 and 2012 on adolescent and adult use of marijuana, alcohol, and other psychoactive substances was estimated. Increases in the probability of current marijuana use, regular marijuana use and marijuana abuse/dependence among those aged 21 or above were found. However, there was also an increase in marijuana use initiation among those aged 12-20. For those aged 21 or above, MMLs further increase the frequency of binge drinking. MMLs have no discernible impact on drinking behavior for those aged 12-20, or the use of other psychoactive substances in either age group.

2015 Driedger et al looked at what kids are getting up to – presentations to a Canadian pediatric emergency department. They conducted a retrospective review of all youth, ages 10-16 years, who presented to a pediatric ED with complaints related to recreational drug use (n=641) for 2 years ending on December 31, 2009. The median age of patients was 15 years; 56% were female. Six percent of patients were homeless, and 21% were wards of the state. The most frequent ingestions included
ethanol (74%), marijuana (20%), ecstasy (19%), and medications (15%). Over one third of patients had ingested two or more substances. Sixty-eight percent received IV fluids, 42% received medication and 4% were intubated. The admission rate was 9%.

2015 Boyd et al looked at the use of medical marijuana by adolescents. They wanted to examine the annual use of medical marijuana and determine if legal medical marijuana users are at lower risk for frequent marijuana and other substance use when compared to adolescents who use diverted medical marijuana from an illicit source. 4394 12th graders were studied. Users of medical marijuana and diverted medical marijuana had notable odds of using daily, using prescription drugs, and using other illicit drugs among other substance use behaviours. Medical marijuana users had much higher odds of using medical marijuana because of being hooked when compared to diverted medical users and illicit users.

2015 Freisthler et al investigated the relationship between Marijuana use, medical marijuana dispensaries and abusive and neglectful parenting. Current marijuana use was positively related to frequency of child physical abuse and negatively related to physical neglect. There was no relationship between supervisory neglect and marijuana use. Density of medical marijuana dispensaries and delivery services was positively related to frequency of physical abuse.

2015 Lanza et al reported that alcohol use is declining among teens but marijuana use is on the rise. Survey results from almost 600,000 American high school seniors between 1976 and 2013, alcohol, cigarettes and marijuana use were monitored. In 1993 black teenagers were equally likely to use tobacco and marijuana, and have continued an upward trend in marijuana use since. White adolescents were more likely to smoke cigarettes than use marijuana until 2011, when marijuana use slightly surpassed that of cigarettes. In 2013, nearly 19% of white teens smoked cigarettes while almost 22% used marijuana. At the same time, only about 10% of black teens smoked cigarettes but nearly 25% used marijuana.

2015 Weitzman et al found many teens with chronic illnesses (e.g. asthma, juvenile arthritis, type 1 diabetes, cystic fibrosis) use pot and/or alcohol. Four out of ten high school students with medical conditions used one or both in the past year. Just over 400 students (age 9-18) were studied, average age 15. 75% were white and almost 75% had a parent with a college degree. Most of them (82%) were in high school. More than a third had consumed alcohol in the last year, a fifth had used marijuana in the last 12 months. Those taking alcohol were more likely to have missed taking their medication. Most had no idea of any interactions with alcohol or marijuana and their medication.

2015 Ruffle et al looked at cannabinoid hyperemesis syndrome (CHS). CHS is often undiagnosed and treated as cyclic vomiting syndrome, a functional gastrointestinal problem. Data from 2013-2015 was studied. 10 cases of CHS in men had been misdiagnosed. The mean length of cannabis use was 42 months. Healthcare providers should be aware of this and questions about cannabis use should be asked.

2015 Kaar et al in Australia investigated trends in cannabis-related ambulance presentations from 2000 to 2013. Rates of cannabis-related ambulance attendances involving 15-59 year olds were studied. The rates increased significantly over the period. In 2000-2010 the rate/100,000 was 0.6 to 5.5 in 2010-2013. The highest increasing rate (15.6) was for Cannabis-Only attendances among 15-29 year old males.

2015 Daniulaityte et al looked at marijuana dabbing videos on YouTube. 116 videos were found. Total views were 9,545,482. Most were located in California. 89% showed at least one person dabbing, most were male (67%), many (42%) appeared to be under 25 years old. Only 20% had an age restriction Approximately 34% contained a product review, 28% provided instructions on dabbing or other educational information. 21% contained at least a brief cautionary message.

2015 Krauss et al looked at Twitter data on dabs. 125,255 tweets were collected between October 20th and December 20th 2014. Almost 22% contained identifiable state-location geological information. Dab-related tweets were highest in states that allowed recreational and/or medical use. And lowest in states that have not passed medical laws. Results were statistically significant.
2015 Vaughn et al investigated home-schooled adolescents and whether they were less likely to use alcohol, tobacco and other drugs? In the US nearly 2 million children are home-schooled. Data between 2002 and 2013 from the National Survey on Drug Use and Health were used. Home-schooled adolescents were significantly less likely to report using tobacco, alcohol, cannabis or other illicit drugs, and to be diagnosed with an alcohol or marijuana use disorder.

2015 Parker and Bradshaw investigated teen dating violence (TVD) victimisation and patterns of substance use among high school students. The adolescents who had experienced physical and psychological TVD were more likely to be polysubstance users or use alcohol and marijuana.

2015 Bancks et al looked at 3,000 people in America and found that people who currently used marijuana were 65% more likely to have poor sugar control which can lead to type 2 diabetes. Those who had smoked it 10 times or more but no longer used, were 49% more likely. A heightened incidence of pre-diabetes failed to establish a direct connection to diabetes 2 itself, however it is unclear how marijuana could place someone at increased risk for pre-diabetes and not diabetes itself.

2015 Kleine-Brueggeney et al looked at medical marijuana (THC extract) to prevent nausea and vomiting after surgery in patients at high risk of this common complication (gynaecological or breast surgery). Intravenous THC or a placebo were administered before surgery was completed. 300 patients were assigned to the study but the trial was halted after the first 40 patients due to ‘clinically unacceptable’ side-effects of THC as well as questionable effects on post-operative nausea and vomiting (PONV). In both THC and placebo groups, about 60-70% of patients experienced PONV during the first 24 hours. The relative risk reduction of THC was just 12% - well under the statistically significant cut off point. Problems with side-effects included: THC patients were more sedated, psychotrophic effects (mood changes) were ‘unpredictable in quality and quantity, patient satisfaction varied from ‘best experience’ to ‘the worst ever’.

2015 Wei and others tested for secondhand marijuana exposure with a very sensitive urine test. They combined ultra high performance liquid chromatography and tandem mass spectrometry with positive electro-spray ionization mode to develop a reliable fast and accurate method to test for THC and its metabolites (10-100 times more sensitive than current tests).

2015 Hasin and others reported the prevalence of marijuana use disorders in US adults between 2001-2 and 2012-3. The past year prevalence of marijuana use was 4.1% in 2001-2 and 9.5% in 2012-3. The past year prevalence of DSM-IV marijuana use disorder was 1.5% in 2001-2 and 2.9% in 2012-3.

2015 Deogan et al looked at the cost-effectiveness of school-based prevention of cannabis use. The cost-effectiveness of Project ALERT (Adolescent, Learning, Experiences, Resistance and Training) compared with the ordinary ATOD (Alcohol, Tobacco and Other Drug Education) among Swedish students in the eighth grade of compulsory school. The programme was cost saving on the basis of evidence from the USA (ratio 1:1.1), and was cost effective (incremental cost-effectiveness ratio €22,384 per QALY) after reasonable adjustment for the Swedish context and with 20 years of follow-up. When the target group was restricted to boys who were neither studying nor working/doing work experience, the programme was cost effective after 9 years and cost saving (ratio 1:3.2) after 20 years.

2015 Fitzcharles et al looked at cannabinoid treatments in rheumatic diseases. In four short-term studies comprising 201 patients, cannabinoids had a statistically significant effect on pain in 2 of them, sleep in two and improved quality of life in one. The study in OA was terminated prematurely due to futility. Dizziness, cognitive problems and drowsiness as well as nausea were reported for nearly half the patients. No serious adverse effects, no studies done with herbal cannabis. Conclusion: There is currently insufficient evidence to recommend cannabinoid treatments for management of rheumatic diseases.

2015 Lavi et al reported on sudden onset unexplained encephalopathy in infants. Three infants presented to an emergency department with encephalopathic signs without prominent systemic manifestations. There was no information about neurotoxic agents available. All three were subsequently diagnosed with THC intoxication. All three recovered with supportive care, fluids and monitoring. The importance of including cannabis intoxication in the differential diagnosis of infants with unexplained changes in mental status.
2015 Bell et al looked at hash oil burns in Colorado. 29 cases were admitted to the local burn center from January 2008 to August 2014 (utilizing the National Burns Repository). No cases presented prior to the medicalization of marijuana, 19 during this time and 12 in 2014 since legalization. The majority were white Caucasians, average age 26. Median range of stay was 10 days. 6 required intubation (airway protection), 19 skin grafts, 8 wound care only and one surgical debridement.

2015 Madras BK of Harvard Medical School published an ‘Update of Cannabis and its Medical Use’. It included the chemistry of cannabis, signalling in the brain, toxicity, abuse, CUDs (Cannabis Use Disorders) and use in medicine.

2015 Dines and others investigated emergency department presentation following cannabis use involving 10 European countries. Of 2198 presentations between 1st October 2014 to 31st March 2015 356 (16.2%) involved cannabis, 36 (1.6%) of them involved lone use of cannabis. Of the 35 non-fatal cases, 22.9% were agitated or showed aggression, 20% psychotic, anxiety 20%, vomiting 17.1%. Most (71%) received no treatment and 30(85.7%) were discharged or self-discharged from the ED. The one fatality, an 18 year old male. He collapsed with asystolic cardiac arrest while smoking and suffered hypoxic brain injury related to prolonged cardiac arrest.

2015 Pacula et al produced ‘In the weeds’: a baseline view of cannabis use among legalising states and their neighbours. Individuals, 2009 from Washington, Oregon 506, Colorado 503 and New Mexico 213 were involved. Mean age was 53 (18–91).

“Rates of lifetime medical cannabis use are similar in Colorado and Washington (8°8% and 8°2%) but lower in Oregon and New Mexico (6.5% and 1%). Recreational use is considerably higher than medical use across all states (41%) but highest in Oregon and Washington. About 86% of people who report ever using cannabis for medicinal purposes also use it recreationally. Medical users are more likely to vaporize and consume edibles, and report a higher amount (in grams) consumed, and spend more money per month than recreational users. Individuals who use cannabis do not commonly use it with alcohol, irrespective of whether they are consuming cannabis recreationally or medically. Fewer than 1 in 5 recreational users report simultaneous use of alcohol and cannabis most or all of the time and less than 3% of medicinal users report frequent simultaneous use of alcohol and cannabis”.

They concluded “In the USA, the degree of overlap between medicinal and recreational cannabis users is 86%. Medical and recreational cannabis users favour different modes and amounts of consumption. Only a small proportion (12%) of medicinal cannabis users usually consume cannabis and alcohol simultaneously, while concurrent use is common among recreational users”.

2015 Morean et al looked at the use of e-cigarettes to vaporize cannabis. They evaluated lifetime rates of using e-cigarettes to vaporize cannabis among, lifetime users of e-cigarettes (27.9%), lifetime users of cannabis (29.2%) and lifetime users of both e-cigs and cannabis(18.8%). It proved to be common in all groups, to vaporize hash oil, wax infused with THC, and dried cannabis leaves.

2016 Marijuana wax (Honey oil, shatter, dabs) Marijuana wax is not marijuana, there is an extremely bad hallucinatory side. You can overdose on concentrates though it isn’t fatal. To make the drug, butane and other chemicals are used to draw out THC from marijuana plants. Wax can have a potency of up to 95 percent. Police have responded to calls for people who were "far beyond high and debilitated" on wax. It's the meth of the marijuana world. The popularity of the drug has soared in recent years due to its increased potency, lack of odour and ease of concealment – the drug can be loaded into E-cigarettes and smoked through vaporizers. Wax could be 20 to 30 times more potent than regular marijuana.

2016 January Russo was interviewd by the Jouurnal Cannabis and Cannabinoid Research (Dr Piomelli) about Cannabis sativa v Cannabis indica. Apart from THC, cannabiol and cannabidiol, there are many additional components that may increase or modify their effects, e.g. terpenes such as myrcene a strong sedative and alpha-pinene that may counteract the tendency of THC to impair short-term memory. Dr Russo argues that while the C. sativa and C. indica strains are morphologically different, the common notion that C. sativa is ‘uplifting and energetic’ while C. indica is sedating is completely wrong. ‘Almost all Cannabis on the market has been from high-THC
strains. The differences in observed effects in Cannabis are then due to their terpenoid content, rarely assayed, let alone reported to potential customers. The sedation of the so-called indica strains is falsely attributed to CBD content, when in fact, CBD is stimulating in low and moderate doses’.

2016 Weinberger et al found that marijuana users were 5 times more likely to develop an alcohol use disorder, alcohol abuse or dependency. The researchers analyzed data from 27,461 adults enrolled in the National Epidemiologic Survey on Alcohol and Related Conditions who first used marijuana at a time when they had no lifetime history of alcohol use disorders. The population was assessed at two time points. Adults who had used marijuana at the first assessment and again over the following three years (23 percent) were five times more likely to develop an alcohol use problem, compared with those who had not used marijuana (5 percent). Adult problem drinkers who did not use cannabis were significantly more likely to be in recovery from alcohol use disorders three years later.

2016 Volkow et al conducted a review of the effects of cannabis on human behaviour. With a political debate about the potential risks and benefits of cannabis use as a backdrop, the wave of legalization and liberalization initiatives continues to spread. Four states (Colorado, Washington, Oregon, and Alaska) and the District of Columbia have passed laws that legalized cannabis for recreational use by adults, and 23 others plus the District of Columbia now regulate cannabis use for medical purposes. These policy changes could trigger a broad range of unintended consequences, with profound and lasting implications for the health and social systems in our country. Cannabis use is emerging as one among many interacting factors that can affect brain development and mental function. To inform the political discourse with scientific evidence, the literature was reviewed to identify what is known and not known about the effects of cannabis use on human behavior, including cognition, motivation, and psychosis.

2016. Troup et al looked at the effects of cannabis on emotion processing. Cannabis users showed a greater response to faces showing negative expressions, especially angry faces, compared to a control group of non-cannabis users. Positive expressions, e.g. happy faces elicited smaller responses. When asked to concentrate on the sex of the face and then identify the emotion, cannabis users scored much lower than non-users. There was a depressed ability to ‘implicitly’ identify emotions.

2016 Cerda et al looked at persistent cannabis and alcohol dependence and midlife economic and social risks. Summary of Findings: ‘People who smoked cannabis four or more days of the week over many years ended up in a lower social class than their parents, with lower-paying, less skilled and less prestigious jobs than those who were not regular cannabis smokers, shows a research study that followed children from birth up to age 38. These regular and persistent users also experienced more financial, work-related and relationship difficulties, which worsened as the number of years of regular cannabis use progressed’. Caspi said, ‘“These findings did not arise because cannabis users were prosecuted and had a criminal record, even among cannabis users who were never convicted for a cannabis offense, we found that persistent and regular cannabis use was linked to economic and social problems.” Findings came from The Dunedin Study.

2016 Miller et al Looked at group identifications and how they affect the likelihood of teenagers smoking, drinking and taking cannabis. Summary ‘Teenagers who interact positively with their family, school and friends are far less likely to smoke, binge drink and use cannabis than peers who fail to identify with these social groups, according to research. The research team surveyed more than 1000
high school pupils aged 13-17 from the Fife area. The results showed that group identification protects against adverse health behavior, with levels of identification with family, school and friendship groups predicting the likelihood of teenagers having smoked cigarettes, drank to excess or smoked cannabis in the past month.

2016 Hashmi et al reported a case of cannabis-induced hemoptysis in a cannabis smoker. Abstract: ‘Abstract: As the principal route of marijuana use is by inhalation, potential harmful consequences on pulmonary structure and function can be anticipated. Here, we present a case of hemoptysis attributed to smoking cannabis in a 38-year-old man. The patient experienced an episode of hemoptysis and shortness of breath immediately after smoking marijuana. Chest radiograph and computed tomography (CT) scans of the chest showed bilateral diffuse ground-glass opacities. A fiber optic bronchoscopy confirmed bilateral diffuse bleeding from respiratory tract. Additional evaluation of hemoptysis indicated no infection or immunological responses. Urine toxicology was positive for cannabis’.

2016 Davis et al looked at The public Health Effects of Medical Marijuana legalisation in Colorado. Data from Denver metropolitan area and Colorado were collected for hospital discharges and poison centre calls before and after 2009 and analysed in 2014. Hospital discharges coded as marijuana dependent rose by 1% every month from 2007 to 2013. After 2009, poison center calls increased by 0.8%/month. Poison Center calls also increased 56% in the period following the policy change. There was one hospital discharge coded as dependent for every 3,159 medical marijuana registrant applications.

2016 International cannabis consortium, Stringer et al aims to identify genetic risk variants of cannabis use. Four genes were found to be significantly associated with lifetime cannabis use – NCAM1, CADM2, SCOC and KCNT2. There is a strong genetic correlation between lifetime cannabis use and cigarette smoking.

2016 Olsson and others looked at risk factors for untimely deaths, using a register follow-up in a criminal justice population with substance use problems. They found that fatal accidental intoxication was associated with males, use of heroin and use of cannabis.

2016 Zhang et al looked at marijuana use as a predictor of unemployment status in the early forties. Five trajectories of marijuana use were identified: chronic users/decreasers (8.3%), quitters (18.6%), increasing users (7.3%), chronic occasional users (25.6%), and nonusers/experimenters (40.2%). Compared with nonusers/experimenters, chronic users/decreasers had a significantly higher likelihood of unemployment at mean age 43 (adjusted odds ratio = 3.51), even after controlling for the covariates.’

2016 Desjardins et al reviewed the literature concerning cannabinoid hyperemesis syndrome. Abstract: ‘Cannabis is the most widely used illicit drug in the world. In France, cannabis use has been increasing among youth since 2011, in both experimental use and regular consumption. A distinct syndrome, characterized by recurrent vomiting associated with abdominal pain and compulsive bathing, has been increasingly recognized in adult chronic users. Cannabinoid hyperemesis syndrome (CHS) is still underdiagnosed in adults and even more so among adolescents. Classically, CHS progresses into three distinct phases: prodromal, hyperemetic, and recovery. During the prodromal phase, the patient develops early morning nausea, a fear of vomiting, and abdominal discomfort. Afterward, the hyperemetic phase consists of incapacitating nausea and profuse vomiting. Most patients complain of
mild abdominal pain and weight loss. Patients are relieved by taking hot showers. The recovery stage begins with cessation of cannabis use. The majority of patients will develop this symptom within 1-5 years after the beginning of consumption. CHS is a clinical diagnosis and should be considered in every case of cyclical vomiting. To date, the specific etiology of CHS is unknown as is the pathophysiology of improvement with hot baths. All youth presenting with cyclic vomiting should be questioned about cannabis use and compulsive hot bathing. The early recognition of this syndrome will save unnecessary and invasive investigations.

2016 van de Giessen et al investigated deficits in striatal dopamine release in cannabis dependence. Most drugs of abuse lead to a general blunting of dopamine release in the chronic phase of dependence, which contributes to poor outcome. To test whether cannabis dependence is associated with a similar dopaminergic deficit, we examined striatal and extrastriatal dopamine release in severely cannabis-dependent participants (CD), free of any comorbid conditions, including nicotine use. Lower dopamine release in the associative striatum correlated with inattention and negative symptoms in Cannabis Dependents, and with poorer working memory and probabilistic category learning performance in both CD and Healthy Controls. This study provides evidence that severe cannabis dependence—without the confounds of any comorbidity—is associated with a deficit in striatal dopamine release. This deficit extends to other extrastriatal areas and predicts subclinical psychopathology.

2016 Manrique-Garcia et al looked at cannabis, psychosis and mortality in a cohort study of 50,373 men. A longitudinal study of 50,373 Swedish male conscripts aged 18-19 followed in the National Cause of Death Register up to around age 60. Those with a baseline history of heavy cannabis use had a significantly higher risk of death than those without such a history, they were 40% more likely to die at 60 than non-users. No interaction was found between cannabis use and a diagnosis of psychotic disorders with regard to mortality.

2016 Wilson et al found that 1 in 6 children hospitalized (Colorado hospital) for lung inflammation (coughing, wheezing and other symptoms of bronchiolitis) tested positive for marijuana exposure. More of the children were positive for THC after legalisation (21% compared with 10% before). Secondhand smoke may be a rising child health concern.

2016 Rosevear reported urological problems in his practice in Colorado. Two men after having vasectomies reported experiencing a seizure. They had both used cannabis. A young couple in their twenties reported infertility after a year. The male’s sperm showed abnormal morphology, decreased counts and low motility. Again they both confessed to using cannabis, almost daily. A few months later, after abstaining, she conceived.
Abstract: Cannabis use history as predictor of neurocognitive response to cannabis intoxication remains subject to scientific and policy debates. The present study assessed the influence of cannabis on neurocognition in cannabis users whose cannabis use history ranged from infrequent to daily use. Drug users (N = 122) received acute doses of cannabis (300 μg/kg THC), cocaine HCl (300 mg) and placebo. Cocaine served as active control for demonstrating neurocognitive test sensitivity. Executive function, impulse control, attention, psychomotor function and subjective intoxication were significantly worse after cannabis administration relative to placebo. Cocaine improved psychomotor function and attention, impaired impulse control and increased feelings of intoxication. Acute effects of cannabis and cocaine on neurocognitive performance were similar across cannabis users irrespective of their cannabis use history. Absence of tolerance implies that that frequent cannabis use and intoxication can be expected to interfere with neurocognitive performance in many daily environments such as school, work or traffic.

2016 Reece et Hulse looked at Chromothripsis and epigenomics complete causality criteria for cannabis- and addiction-connected carcinogenicity, congenital toxicity and heritable genotoxicity

Abstract:
The recent demonstration that massive scale chromosomal shattering or pulverization can occur abruptly due to errors induced by interference with the microtubule machinery of the mitotic spindle followed by haphazard chromosomal annealing, together with sophisticated insights from epigenetics, provide profound mechanistic insights into some of the most perplexing classical observations of addiction medicine, including cancerogenesis, the younger and aggressive onset of addiction-related carcinogenesis, the heritability of addictive neurocircuitry and cancers, and foetal malformations. Tetrahydrocannabinol (THC) and other addictive agents have been shown to inhibit tubulin polymerization which perturbs the formation and function of the microtubules of the mitotic spindle. This disruption of the mitotic machinery perturbs proper chromosomal segregation during anaphase and causes micronucleus formation which is the primary locus and cause of the chromosomal pulverization of chromothripsis and downstream genotoxic events including oncogene induction and tumour suppressor silencing. Moreover the complementation of multiple positive cannabis-cancer epidemiological studies, and replicated dose-response relationships with established mechanisms fulfils causal criteria. This information is also consistent with data showing acceleration of the aging process by drugs of addiction including alcohol, tobacco, cannabis, stimulants and opioids. THC shows a non-linear sigmoidal dose-response relationship in multiple pertinent in vitro and preclinical genotoxicity assays, and in this respect is similar to the serious major human mutagen thalidomide. Rising community exposure, tissue storage of cannabinoids, and increasingly potent phytocannabinoid sources, suggests that the threshold mutagenic dose for cancerogenesis will increasingly be crossed beyond the developing world, and raise transgenerational transmission of teratogenicity as an increasing concern.

2016 Meier et al looked at results from The Dunedin study, now 38 years old, and the associations between cannabis use and physical health problems in early midlife.

They tested whether cannabis use from ages 18 to 38 years was associated with physical health at age 38, after controlling for tobacco use, childhood health, and childhood socioeconomic status. They also tested whether cannabis use from ages 26 to 38 years was associated with within-individual health decline using the same measures of health at both ages. Frequency of cannabis use and cannabis dependence at ages 18, 21, 26, 32, and 38 years was tested.

The 1037 study participants were 51.6% male (n = 535). Of these, 484 had ever used tobacco daily and 675 had ever used cannabis. Cannabis use was associated with poorer periodontal health at age 38 years and within-individual decline in periodontal health from ages 26 to 38 years. For example, cannabis joint-years from ages 18 to 38 years was associated with poorer periodontal health at age 38 years, even after controlling for tobacco pack-years. Additionally, cannabis joint-years from ages 26 to 38 years was associated with poorer periodontal health at age 38 years, even after accounting for periodontal health at age 26 years and tobacco pack-years. However, cannabis use was unrelated to other physical health problems. Unlike cannabis use, tobacco use was associated with worse lung
function, systemic inflammation, and metabolic health at age 38 years, as well as within-individual decline in health from ages 26 to 38 years.

2016 Hindocha et al investigated whether the combination of tobacco and cannabis can increase the likelihood of dependence. 33,687 cannabis users, participants of the 2014 Global Drug Survey, took part anonymously in the research. Tobacco routes for cannabis, joints, blunts or pipes are more popular in Europe (between 77.2% and 90.9%) while only 51.6% of Australians and 20.7% of New Zealanders used them. They are least popular in the Americas. Cannabis users who favour non-tobacco routes had 61.5% higher odds of wanting professional help to use less cannabis and 80.6% higher odds of wanting to use less tobacco than those who used tobacco routes. Cannabis users who prefer non-tobacco routes had 10.7% higher odds of wanting to use less tobacco and 103.9% higher odds of actively planning to seek help to use less tobacco. These results suggest that people who regularly mix tobacco with cannabis are more at risk of psychological dependence than those who use cannabis and tobacco separately, without mixing them.

2016 Chen et al looked at current patterns of marijuana use initiation by age among US adolescents and emerging adults. 26,659 participants ages 12 to 21 from the National Survey on Drug Use and Health, 54.4% male, 55.6% white) were analysed. Up to age 11 the hazards were small but did occur. After age 11 the hazards increased rapidly with two peaks at 16 and 18, separated by a reduction at 17. The age pattern differed significantly by gender, hazards high to low, male to female and race/ethnicity hazards high to low – multiracial, Black, White, Hispanic, Asian. By age 21, 54.1% (56.4% male, 51.9% female had initiated marijuana use – mean onset age 16.5 years.

2016 Martz et al found that marijuana use dampens brain response to reward over time. Measurable changes were found in the brain reward system with marijuana use even when other factors like alcohol and tobacco use were taken into account. 108 people in their early 20s, taking part in a larger study on substance abuse had brain scans at 3 points over 4 years (75% men, almost all white). In the moment of anticipating a reward (e.g. may win money) the nucleus accumbens (part of the reward system) pumps out dopamine (pleasure neurotransmitter), the greater the anticipation the more dopamine is produced. However the more marijuana used, the smaller the response over time. This suggests that long-term marijuana use dampens the emotional response of a person – anhedonia. These brain changes may increase the risk of continued drug use and addiction.

2016 Andrade produced a superb paper on the Use of cannabis and cannabinoids for medical purposes. He found that, relative to placebos, cannabinoids are associated with only modest benefits for chemotherapy-related nausea and vomiting, small and inconsistent benefits for pain and spasticity, and inconclusive benefits for other indications. In randomised controlled trials, cannabinoids increase the risk of total adverse events, serious adverse events and dropout due to adverse events. Cannabinoids also increase the risk of a large number of specific adverse effects.

2016 Scripps Institute research (Center for Psychological Studies) found striking discrepancies in how marijuana users perceived themselves versus how others perceived them. Cannabis users believed that the drug improved their self-awareness and thus enhanced their relationships with loved ones. In contrast, the perceptions of their family members revealed gross perceptual distortions, specifically in regards to interpersonal competence and emotional availability. Genuine intimacy, particularly between husband and wife or parent and child requires time, shared interests, and deep emotional connection – exactly the opposite of the vacant, isolated and depersonalised effect associated with cannabis. Research shows that users lack awareness of their loved one’s feelings, struggles, dreams, hopes and disappointments. Regular use of cannabis in young adults is indicative of multiple failed relationships. Emotional maturity appears to stop when cannabis use begins – measureable deficits in interpersonal skills, including empathy, acceptance, warmth and genuineness.

2016 Bierut et al looked at the advertising of marijuana online (Weedmaps). A total of 146 recreational marijuana retailers in Colorado and Washington were examined on Weedmaps. We studied the age verification practices made in retailers’ own websites, the presence of health claims they made about marijuana on Weedmaps, and the characteristics of followers of Weedmaps on social media sites. Many retailers had no security measure to determine age. 41% in Colorado and 35% in Washington. Approximately 61% of retailers in Colorado and 44% in Washington made health claims about the benefits of marijuana, including anxiety reduction, treatment of depression, insomnia, and pain/inflammation. Inferred demographic characteristics of followers of Weedmaps on Twitter and
Instagram revealed that over 60% were male and nearly 70% or more were age 20-29 years old, yet some (15-18%) were under the age of 20. Our findings indicate that marijuana retailers have a visible presence on the Internet. Potential customers might be enticed by retailers who tout health claims about marijuana use. It may also be appealing for a younger demographic to overlook age restrictions and engage with marijuana retailers via social media. As a whole, our findings can help to guide future policy making on the issue of marijuana-related advertising.

2016 Compton et al investigated marijuana use and disorders in adults in the USA 2002 – 2014. Data from US civilians aged 18 years or older who participated in annual, cross-sectional US National Surveys on Drug Use and Health from 2002 to 2014 was analysed. The sample in each US state was designed to be approximately equally distributed between participants aged 12–17 years, 18–25 years, and 26 years or older. For each survey year, we estimated prevalence of marijuana use and use disorders, initiation of marijuana use, daily or near daily use, perception of great or no risk of harm from smoking marijuana, perception of state legalisation of medical marijuana use, and mean number of days of marijuana use in the previous year. 996 500 adults participated in the 2002–14 surveys. Marijuana use increased from 10-4% to 13-3% in adults in the USA from 2002 to 2014, and the prevalence of perceiving great risk of harm from smoking marijuana once or twice a week decreased from 50-4% to 33-3%. Changes in marijuana use and risk perception generally began in 2006–07. After adjusting for all covariates, changes in risk perceptions were associated with changes in prevalence of marijuana use, as seen in the lower prevalence of marijuana use each year during 2006–14 than in 2002 when perceiving risk of harm from smoking marijuana was included in models. However, marijuana use disorders in adults remained stable at about 1-5% between 2002 and 2014. Prevalence and frequency of marijuana use increased in adults in the USA starting in approximately 2007 and showing significantly higher results in multivariable models during 2011–14 (compared with 2002).

2016 Wang et al investigated unintentional paediatric exposures to marijuana in Colorado from 2009 to 2015. Colorado’s Children’s Hospital and Colorado’s RPC (Regional Poison Centre) admissions were examined for 0 to 9 year olds between 2009 and 2015 for single-substance marijuana exposures. Of the 163 cases at the RPC, median age of exposure was 2 years and 85 (52%) were girls. Of the 81 Hospital admissions, median age was 2.4 years, 25 (40%) were girls. The mean rate of marijuana-related visits to the Hospital increased from 1.2/100,000 of the population 2 years prior to legalisation to 2.3%/100,000 2 years afterwards. Median length of stay was 11 hours and 26 hours for admitted patients, 48% were due to infused edibles. Annual RPC cases increased more than 5-fold from 2009 to 2015. Colorado had an average increase of 34% in the RPC per year compared with the rest of the USA which had an increase of only 19%. Edible products were responsible for 52%, 9% were not in a child-proof container, poor supervision or product storage amounted to 34%. Almost half of the patients seen in the Hospital in the two years after legalisation were due to recreational cannabis, so legalisation, it is suggested, did affect the incidence of exposures.

2016 Itami et al gained scientific proof of the adverse effects of cannabis. ‘Important mechanisms involved in the formation of neural circuits in the brain have now been revealed by a research team. This group also discovered that delta-9-tetrahydrocannabinol (THC), a psychoactive substance also found in cannabis, causes disruption of neural circuits within the cortex. These results explain why cannabis may be harmful and have potential to find application in the functional recovery of brain injury and in cases of dementia’.

2016 Sophocleous et al investigated cannabis use and bone density. Cross-sectional study of individuals recruited from primary care in the UK between 2011 and 2013. Cases were regular smokers of cannabis divided into moderate (n = 56) and heavy user (n = 144) subgroups depending on whether they reported fewer or more than 5000 cannabis smoking episodes during their lifetime. Controls comprised 114 cigarette smokers. They concluded that, ‘Heavy cannabis use is associated with low bone mineral density, low BMI, high bone turnover, and an increased risk of fracture. Heavy cannabis use negatively impacts on bone health both directly and indirectly through an effect on BMI’.

2016 Conroy et al looked at sleep patterns and marijuana use. 98 subjects were split into 3 groups – daily users (49), once/month, up to 5 days/week (29) and a control group (20), of non-users. Most were in their early twenties, 45 were male and 53 female. While 20% of the non-smokers met the criteria for clinical insomnia, for daily users it was 39%, which was worse than occasional users. The
researchers also cited a previous study showing that found an association between higher rates of use and anxiety that may be a factor in disrupted sleep. Women were worse affected than men.

2016 Wilson et al looked at the results of exposure to marijuana smoke in children. They tested for metabolites of marijuana in their urine. Forty-three healthy babies aged 1 month to two years, hospitalise for bronchiolitis in a Colorado hospital between 2013 and 2105. 16% were found to have COOH-THC in their urine. Of those parents who reported marijuana use or exposure in the home, 75% had detectable levels of COOH-THC in their urine. Higher concentrations were found in non-white as compared to white children.

Schwitzer et al investigated the association between regular cannabis use and ganglion cell dysfunction. Their objective was to demonstrate whether the regular use of cannabis could alter the function of retinal ganglion cells in humans. 28 subjects were regular cannabis smokers and 24 non-users were controls. All were in their twenties. A small but significant delay was found in the time taken for the signals to be processed by the retina of the marijuana users by comparison with the control group.

2016 Henry et al looked at the intergenerational continuity in cannabis use. Fathers who began using cannabis by age 15 were more likely to meet the criteria for a lifetime cannabis disorder. The offspring of fathers who met the criteria for a disorder had higher odds of early initiation of cannabis use. Early-onset cannabis use by father was indirectly associated with their child's onset of cannabis use via father's lifetime cannabis disorder. No significant effects for mothers were observed, although analyses were limited due to the low rate of mothers who met the criteria for a lifetime cannabis disorder.

2016 Plunk et al looked at the impact of adolescent exposure to medical marijuana laws (MML) on high school completion, college enrolment and college degree completion. MMLs were associated with a 0.40 percentage point increase in the probability of not earning a high school diploma or GED after completing the 12th grade. High school MML exposure was also associated with a 1.84 and 0.85 percentage point increase in the probability of college non-enrollment and degree non-completion, respectively. Years of MML exposure exhibited a consistent dose response relationship for all outcomes. MMLs were also associated with 0.85 percentage point increase in daily marijuana use among 12th graders (up from 1.26%). Medical marijuana law exposure between 14 to 18 likely has a delayed effect on use and education that persists over time.

2016 Mason et al studied parent and peer pathways linking childhood experiences of abuse with marijuana use in adolescence and adulthood. ‘Confirming elevated risk due to child maltreatment, path analysis showed that sexual abuse was positively related to adolescent marijuana use, whereas preschool abuse was positively related to adult marijuana use. In support of mediation, it was found that both forms of maltreatment were negatively related to parental attachment, which was negatively related, in turn, to having peers who use and approve of marijuana use. Peer marijuana approval/use was a strong positive predictor of adolescent marijuana use, which was a strong positive predictor, in turn, of adult marijuana use’.

2016 Medical letter on Drugs and Therapeutics. An account is given of the efficacy of marijuana extracts Nabilone (THC), Dronabinol (THC), Epidiolex (CBD) and Sativex (THC and CBD).

2016 Amen et al looked at low hippocampal blood flow and higher alzheimer’s vulnerability in marijuana users. Persons with a diagnosis of cannabis use disorder by criteria (n=982) were compared to controls (n=92) with perfusion neuroimaging with SPECT at rest and at a concentration task. Marijuana users showed lower cerebral perfusion on average. Discriminant analysis distinguished marijuana users from controls with correct classification of 96%. With concentration SPECT regions, there was correct classification of 95%. The mRMR analysis showed right hippocampal hyperperfusion on concentration SPECT imaging was the most predictive in separating marijuana subjects from controls. They concluded that multiple brain regions show low perfusion on SPECT in marijuana users. The most predictive region distinguishing marijuana users from healthy controls, the hippocampus, is a key target of Alzheimer’s disease pathology. This study raises the possibility of deleterious brain effects of marijuana use.

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